TENDER

FOR

SUPPLY & INSTALLATION OF WIND TURBINE WITH HARDWARE IN LOOP SIMULATOR IN SCHOOL OF COMPUTING & ELECTRICAL ENGINEERING, IIT MANDI

Tender No.: IITMANDI/Admin/PUR-141/2014-15/7348-49

Tender date: 04th February, 2015

Last Date of submission: 25th February, 2015

Indian Institute of Technology, Mandi

Transit Campus: Mandav Hotel, 2nd Floor (Near Bus Stand), Mandi – 175001 (H.P)

Tel.: 01905-267061 **email**: sceeoffice@iitmandi.ac.in

Indian Institute of Technology Mandi, Mandi invites tender for supply, erection, installation, commissioning, testing, demonstration and training of an Instrument, as per specifications given in the Annexure attached to the Tender form. All offers should be made in English and should be written in both figures and words. Tender forms can be downloaded from the website (http://iitmandi.ac.in/administration/tenderseoi.html) of the Institute.

The bidders are requested to read the tender document carefully and ensure compliance with all specifications/instructions herein. Non-compliance with specifications/instructions in this document may disqualify the bidders from the tender exercise. The Director, IIT Mandi, reserves the right to select the item (in single or multiple units) or to reject any quotation wholly or partly without assigning any reason. Incomplete tenders, amendments and additions to tender after opening or late tenders are liable to be ignored and rejected.

Terms and Conditions:

1. The technical and financial bids should be quoted separately and put in different sealed envelopes marked "**Technical bid**" or "**Financial bid**" as applicable. These separate bids envelopes are to be put in an outer envelope which should also be sealed.

2. The Vendors who have earlier supplied the equipment to any of the IITs, IISc, IISERs and other Scientific Institute of National Repute may only tender. The details of such institutions and the cost with name of equipment may also be supplied with the bids.

3. The technical and financial bids should be submitted in original. The financial bid should include the cost of main equipment/item and its accessories. If there is any separate cost for installation etc. that should be quoted separately.

4. Each individual sealed envelope as well as the outer envelope should be marked with the following reference on the top left hand corner: "**IITMANDI/Admin/PUR-141/2014-15/7348-49/Item Name.__ ____dated 04th February, 2015"**

5. The printed literature and catalogue/brochure giving full technical details should be included with the technical bid to verify the specifications quoted in the tender. The bidders should submit copies of suitable documents in support of their reputation, credentials and past performance.

6. The rates should be quoted in figures (typed or printed) and cutting should be avoided. The final amount should be in figures as well as in words. If there are cuttings, they should be duly initialed, failing which the bids are liable to be rejected.

7. Any bids received after **1:00 P.M. on 25th February, 2015** shall not be considered

8. The Technical Bids will be opened on **25th February, 2015 at 04:00 P.M.** The date & time for opening of Financial Bids will be informed later on to the technically qualified bidders.

9. While sending rates, the firm shall give an undertaking to the effect that "*the terms/conditions mentioned in the enquiry letter/Tender Notice against which the rates are being given are acceptable to the firm.*" In case the firms do not give this undertaking, their rates will not be considered.

10. If the supplier/firm is original equipment manufacturer (OEM)/authorized dealer/sole distributor of any item, the certificate to this effect should be attached.

11. The quantity shown against the item is approximate and may vary as per demand of the Institute at the time of placing order.

12. All tender documents should have to be sent through courier, speed post or registered post only. All tender documents received after the specified date and time shall not be considered.

    The postal address for submitting the tenders is:

    "**Assistant Registrar, Stores and Purchase"**
    Indian Institute of Technology Mandi (IIT Mandi),
    Administrative Block (Mandav Hotel,
    Near Bus Stand), Mandi – 175001 (H.P), India"

13. In the event of any dispute or difference(s) between the vendee Institute (IIT Mandi) and the vendor(s) arising out of non-supply of material or supplies not found according to specifications or any other cause whatsoever relating to the supply or purchase order before or after the supply has been executed, shall be referred to "The Director, IIT Mandi", Mandi who may decide the matter himself or may appoint arbitrator(s) under the arbitration and conciliation Act,1996. The decision of the arbitrator shall be final and binding on both the parties.

14. The place of arbitration and the language to be used in arbitral proceedings shall be decided by the arbitrator.

15. All disputes shall be subject to Mandi Jurisdiction only.

16. All tenders in which any of the prescribed conditions is not fulfilled or any condition is putforth by the tenderer shall be summarily rejected.

17. The bidders or their authorized representatives may also be present during the opening of the Technical Bid, if they desire so, at their own expenses.

    Note: Price bids of only those bidders will be opened whose technical bids are found suitable by the committee appointed for the purpose. Date and time of opening of price bids will be decided after technical bids have been evaluated by the committee. Information in this regard will be posted on Institute's web site / Notice board. In exceptional situation, an authorized committee may negotiate price with the qualified bidder quoting the lowest price before awarding the contract.

18. **Clarifications**:

    In case the bidders requires any clarification regarding the tender documents, they are requested to contact our office (e-mail: sceeoffice@iitmandi.ac.in & arsp@iitmandi.ac.in on or **before 21/02/2015**.

19. **Tender Cost**:

A Demand draft of **Rs. 1,000/-(Rupees One Thousand only)** towards non-refundable **tender fee, drawn in favour of "The Registrar, IIT Mandi"** payable at Mandi should accompany the Technical bid documents. In the absence of tender cost, the tender will not be accepted.

20. **Earnest Money Deposit (EMD)**:

A refundable amount of Rs. **1,00,000/-** as earnest money deposit (EMD) in the shape of DD from a scheduled bank in India **(valid for a minimum period of 3 months from the date of submission of tender)** should accompany the bid documents. The DD drawn in favour of "The Registrar, IIT Mandi" payable at Mandi should accompany the bid documents. The EMD should be kept in a separate sealed envelope, should be marked clearly and put in the outer envelope that contains the technical and financial bid envelopes. The bidders should enclose a pre-receipted bill for the EMD to enable us to return the EMD of unsuccessful bidders. Failure to deposit **Earnest Money** will lead to rejection of tender. The bidders should submit separate EMD.

21. **Pre – Qualification Criteria**:

a. Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed.

b. The Vendors who have earlier supplied the equipment to any of the IITs, IISc, IISERs and other Scientific Institute of National Repute may only tender. The details of such institutions and the cost with name of equipment may also be supplied with the bids.

c. An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well.

d. OEM should be internationally reputed Branded Company.

e. Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid.

f. **Furnishing of wrong/ambiguous information in the compliance statement may lead to rejection of bid and further black listing of the bidder, if prima-facie it appears that the information in the compliance statement was given with a malafide/fraudulent intent.**

22. **Prices**:

a. The Prices quoted should be inclusive of all taxes or duties, packing, forwarding, freight, insurance, delivery and commissioning etc. at destination site (IIT Mandi, Mandi). IIT Mandi is registered with DSIR, Govt. of India and is exempted from Custom / Excise Duty. Exemption Certificate to this effect will be issued by IIT Mandi. **Hence, Customs/Excise Duty exempted price should be quoted**. The rates shall be firm and final. Nothing extra shall be paid on any account. **In the price bid/financial bid, the**

vendor should clearly mention the final price breakup i.e. ex-work price/FCA price, FOB price, CIP/CIF price & FOR IIT Mandi, Kamand Campus price, as applicable in their bid.

b. In case of imported equipment(s)/item(s), the agency commission, if any, payable in Indian rupees should be mentioned separately. For imported equipment, the Letter of Credit will be opened for the amount excluding agency commission in Indian Rupees. The firm should clearly mention the address of foreign bank in the financial bid.

23. **Validity**:

The bid should be valid for acceptance up to a period of 180 Days. The Bidders should be ready to extend the validity, if required without any additional financial implications.

24. **Delivery**:

The Equipment should be delivered and installed within the period as specified in the purchase order and be ready for use within 24 weeks of the issue of purchase order unless otherwise prescribed. If the bidder fails to deliver and place any or all the Equipments or perform the service by the specified date, penalty at the rate of 1% per week of the total order value subject to the maximum of 10% of total order value will be deducted.

25. **Training**:

Bidders need to provide adequate training to the nominated persons of IIT Mandi at their cost. IIT Mandi will not bear any training expenditure.

26. **Warranty Declaration**:

Bidders must give the comprehensive on-site warranty as required from the date of successful installation of Equipment against any manufacturing defects and also give the warranty declaration that "*everything to be supplied by us hereunder shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document.*

Any deviation in the material, and the specifications from the accepted terms may liable to be rejected and the bidders need to supply all the goods in the specified form to the satisfaction / specifications specified in the order / contract and demonstrate at their own cost.

27. **Performance Bank Guarantee:** A performance bank guarantee from a scheduled bank in India for an amount equal to 10% of the price for duration of two months beyond the expiry of warranty period will be taken from the supplier or Indian agent.

28. **Terms of Payment**: Payment will generally be made only after delivery and satisfactory installation, testing, commissioning etc. **This must be specified in the tender/quotation.**

- In case of imported supplies, payment (excluding Indian agency commission, if any) will be made through irrecoverable Letter of Credit in two installments. 80 % of the money will be released on submission of shipping of documents. Remaining 20 % will be released after successful installation of the instrument and submission of a performance bank guarantee

for 10% of the order value from a nationalized bank, valid for 2 months beyond the expiry of the warranty.

29. **Tender expenses and documents**: All costs incurred by the bidder in the preparation of the tender shall be at the entire expense of the bidder.

30. **Tender Evaluation Criteria**: The technical bids will be opened and evaluated by a duly constituted committee. After evaluation of the technical bid, the financial bid for only those offers which have qualified in the evaluation of technical bid will be opened.

31. **Return of EMD**:

- The earnest money of unsuccessful bidders will be returned to them without any interest within 30 working days after awarding the contract.
- The earnest money of the successful bidder will be returned to them without any interest within 30 Days after supply of material.

32. **Manual and documentation**: All the manuals necessary for operating and servicing the equipment (including details of electronic circuits) will have to be provided along with the instrument.

33. Bidders should go through the tender terms, conditions and specifications carefully and fill in the attached compliance statement accurately and unambiguously. They should ensure that all the required documents are furnished along with the bid.

Sd/-
Assistant Registrar
Stores & Purchase

BID PARTICULARS

1. Name of the Supplier :

2. Address of the Supplier :

3. Availability of demonstration of equipment : Yes / No

4. Tender cost enclosed: : Yes/No if yes

D.D. No._____ Bank_____ Amount_____

5. EMD enclosed : Yes / No if Yes

D.D. No._____ Bank_____

6. Name and address of the Officer/contact person to whom all references shall be made regarding this tender enquiry.

Name :

Address :

Telephone No. :

Fax No. :

Mobile No :

e-Mail :

Web

Annexure 1

Ref:-ENQUIRYNO:- **IITMANDI/Admin/PUR- 141/2014-15/Wind Turbine with Hardware in Loop Simulator**

Specification for Wind Turbine with Hardware in Loop Simulator:

S. No.	Name of Equipment
01	**Wind Turbine with Hardware in Loop Simulator** **Software:** ➢ Modeling environment should be based on Matlab/Simulink/SimPowerSystems. ➢ FPGA programming environment interface optionally must be available. ➢ Models for easy learning of students in field of Drives, Power Electronics, Power System and Renewable Energy must be provided. ➢ Software should be capable of generating PWM pulses independent of simulation clock ➢ Should be capable to simulate the effect of IGBT dead time using a unique solver approach with Time stamping & interpolation ➢ Should be optimized for parallel and real□time simulation of interconnected multi□drive ➢ Should have an option to support API Languages: C/C++, Java, etc ➢ Software based on the Eclipse integrated development environment (IDE). **Hardware** Processing Unit: ➢ One Chassis with Intel quad□Core processor or more. ➢ Should have Real□time Operating System ➢ Should have INTEL processor On□Chip and On□board Fast shared memory, used for inter processor communication, or better. ➢ Should have an option to allow users to implement their own models, solvers & signal processing on FPGA chips to achieve sub microsec time step ➢ Should have 1 Gbps standard Ethernet connection to transfer the models from Host computer to the simulator. **I/O unit:** ➢ Should have 1 FPGA Driver board□ Capable of driving at least 64 I/O lines ➢ FPGA based I/O cards.. ➢ Should Include the customizable signal generation & signal processing functions such as PWM, quadrature decoders & encoders, time stamped DIO, frequency /duty measurement etc ➢ Minimum count of I/O must be 16 Analog Channels & 48 Digital Channels. ➢ Can be optionally compatible with FPGA modeling environment ➢ Can be optionally connected to I/O interface accessories such as mapping boxes, breakout boxes (BOB), screw terminals DB□37 ➢ Can be optionally capable to support IEC 61850 Compliant protection Equipment ➢ Should have minimum 8 channels of high currents min 15 A, and 8 channels for high voltage sensors up to 500V **2kW Machine unit** ➢ **Module Workstation** The Workstation shall be constructed of heavy gauge steel finished with baked, scuff-resistant enamel paint. The workstation and cabinet shall provide sufficient space for performing the exercises and for storing the modules in-between exercises. Physical Characteristics Dimensions (H x W x D) : 375 x 930 x 530 mm (14.8 x 36.6 x20.9 in) ➢ **Resistive Load** The Resistive Load shall have adjustable impedance levels for numerical load equality, thus allowing observation of the effects of identical resistive on the voltages and currents in a circuit. The module shall have 9 load components arranged in three identical groups to implement balanced and unbalanced 3-phase delta or star (WYE) loads. The three groups shall be capable of being adjusted in seven equal load steps. When connected in parallel,

the loads shall create a single-phase load that can be varied in 21 load steps.

1. Resistance (group): 1200/2400/4800 Ω
2. Current : 0.05-0.35 A
3. Current Increment: 0.05 A

- **Line Inductor**

The Line Inductors shall consist of three separate inductors to be connected in series in a three-phase circuit. 3x Inductors of 60 mH – 3.5 A – 50/60 Hz

- **Wound Rotor Motor**

The winding dimensions shall permit the study of operation as a wound-rotor induction motor, a frequency converter, a phase-shifter, a position controller, a variable-coupling single-phase transformer, a three-phase transformer, an asynchronous induction generator and can be used to
implement a Doubly-Fed Induction Generator.

I. Full Load Speed = 1435 rpm
II. Full Load Current = 4,4 A
III. Full Load Torque = 13,3 N•m
IV. Starting Current = 17,5 A
V. Starting Torque = 16,0 N•m
VI. Stator Resistance (Per Phase) = 2,3 Ohm
VII. Rotor Resistance (Per Phase) = 19 Ohm

- **DFIG Wiring Module For Wound-Rotor Motor**

It shall provide connection access to the Three-Phase Wound-Rotor Induction Motor from the workstation through a flexible connecting cable. The module shall have ten 4-mm color-coded safety jacks for the power windings and six 2-mm jacks for the search coils. Jacks of different sizes shall prevent accidental connections between power windings and search coils.

- **Power Supply**

I. Fixed AC, 3 Phases : 240/415 V – 10 A
II. Fixed AC, 1 Phase : 240 V – 10 A
III. Variable AC, 3 Phases: 0 to 240/415 V – 7 A
IV. Fixed DC : 240 V – 3 A
V. Variable DC : 0 to 240 V – 12 A
VI. Input : 240/415 V – 50 Hz – 10 A

- **Four Quadrant Dynamometer**

Speed Range = 0 to 3000 rpm
Nominal Torque Range = 0 to 12,18 N•m
Peak Torque = 48,72 N•m
Direction of Rotation : CW & CCW
Built-in HMI
Communication Port : RS-485

- **2x IGBT Modules**

Shall consist of 7 insulated-gate bipolar transistors (IGBT) mounted in a half-size EMS module. Six IGBTs are used to
Implement choppers and inverters. These IGBTs shall be protected against a variety of severe operating conditions, such as short-circuits, overvoltage, overcurrent, and overheat. The IGBT module shall also includes a synchronization output to trigger an oscilloscope when observing the switching controlsignals as well as a switching control disable input that shall allow all six IGBTs in the chopper/inverter section to be switched off.

I. DC Bus = 840 V 6 A DC
II. DC link capacitor =1360 µF
III. IGBT Peak Current = 50 A
IV. Maximum switching frequency = 20 kHz
V. Switching Control Signals: 0/5 V - 0-20 kHz

- **Three-Phase Splitter**

The Three-Phase Splitter shall be used to connect equipment in addition to the Four Quadrant Dynamometer, at a workstation equipped with only one three phase wall outlet.

- **Coupler**

The Coupler shall consist of a rubber ring for in-line coupling of two machines without slip. It shall also minimize the vibrations created by the machines when they are not perfectly aligned.

- **Connection Leads**

The Connection Lead Set shall consist of PVC-covered, extra flexible leads terminated with stacking 4 mm safety sockets.

- **Instructor Material**

  Appropriate instructor manual All of the equipment is supplied complete with courseware on CDROM, and includes theoretical information, practical assemblies, typical results and questions with typical answers. It is profusely illustrated and gives circuits, step-by-step assembly instructions and procedures

Technical Support

The equipment should include unlimited technical support on hardware and software for at least 5 years. The technical support should cover all the software and hardware supplied as part of the simulator irrespective of whether the software or hardware was manufactured by the equipment vendor or purchased from third parties. If this cost is not included with the supply, please itemize the additional cost or clearly state non-availability of the service and the reason for the same. The simulator vendor shall demonstrate their expertise for supporting third party software and hardware, now and in the future.

Software Maintenance and Upgrade

The simulator should include unrestricted upgrade (all releases including major and minor releases) and maintenance (patches and fixes) for at least 5 years. The upgrade and maintenance should cover all the software modules supplied as part of the simulator whether the software module was manufactured by the simulator vendor or purchased from third parties. Please identify third party software/modules and provide details (such as transferable contracts from original manufacturer) to support vendor's ability to offer maintenance, upgrade coverage and guarantee compatibility for the requested period. The Institute shall request contact information of existing client sites to verify the history of satisfactory execution of such extended maintenance on vendor developed and third party products. If this cost is not included with the supply, please state non-availability of the service and the reason for the same.

Hardware Warranty

The proposal should include a "repair or replace hardware warranty" that covers parts and labor for at least 5 years with zero deductible. The warranty should cover all the hardware supplied as part of the simulator whether the hardware was manufactured by the simulator vendor or purchased from third parties including off-the-shelf processor boards, power supplies, I/O modules, etc. Please identify all third party hardware boards and provide details (such as transferable contracts from original manufacturer) to support simulator vendor's ability to offer the warranty coverage for the requested period. The Institute shall request contact information of existing client sites to verify the history of satisfactory execution of such extended maintenance on vendor developed and third party products. If this cost is not included with the supply, please state non-availability of the service and the reason for the same.

Hardware Upgrades and Compatibility

The vendor should provide a clear and demonstrated path for a cost effective hardware upgrade with full backward compatibility. From upgrade cost point, please describe any hardware exchange program offered by the vendor to offset the cost of hardware upgrade including percentage discount offered on exchange and any annual enrolment fee for the *exchange discount program*. In the case of third party components including off-the-shelf processor boards, I/O modules, etc. included with the simulator, please describe in sufficient detail, including any limitation, as to how upgrade with full backward compatibility is assured. Considering 5 year life of the simulator, this aspect is very important to assess the total cost of operation. The compatibility is also important for effective collaboration with other institutions and sponsors that may have a different version of hardware and/or software. If this cost is not included with the supply, please state non-availability of the service and the reason for the same.

Compliance statement for the tender specifications

INDIAN INSTITUTE OF TECHNOLOGY MANDI
HIMACHAL PRADESH-175001

Ref:-ENQUIRY NO:- **IITMANDI/Admin/PUR-141/2014-15/ Wind Turbine with Hardware in Loop Simulator**

Instructions

1. You have to fill in all columns and ensure that you furnish all the required information accurately and unambiguously.
2. If our specification contains any values, you have to provide your values against the column in the same unit as we have specified.
3. Deviation in values, materials etc. from our specification may be explained in the remarks column

S. NO	Check list of documents/ Undertakings ?	YES/NO	Remarks (Give explanation if answer is No)
1	Is Tender fees attached?		
2	Is EMD attached? (if applicable)		
3	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
4	If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
5	Undertaking from OEM regarding technical support & extended warranty period		
6	Validity of 180 days or not?		
7	Undertaking from bidder regarding acceptance of tender terms & conditions		
8	Whether list of reputed users (along with telephone numbers of contact persons) for the past three years specific to the instrument attached.		
9	Whether special educational discount for Indian Institute of Technology (IIT) Mandi (H.P) given.		
10	Whether two weeks training of operator and research students without any charges offered.		
11	**Does the instrument complies with all the specifications as per Annexure 1. Attach a separate sheet showing compliance with the specifications and explanations thereto if the equipments varies from the requested specifications.**		
12	Whether free Installation, Commissioning and Application Training offered.		
13	Whether Five years comprehensive onsite extended warranty offered.		
14	Whether Annual maintenance after expiry of comprehensive onsite warranty quoted separately as optional.		