

भारतीय प्रौद्योगिकी संस्थान  
(भारतीय खनि विद्यापीठ), धनबाद  
**INDIAN INSTITUTE OF TECHNOLOGY**  
**(INDIAN SCHOOL OF MINES), DHANBAD**



Notice Inviting Tender (NIT) in Two-Bid System  
for  
**Supply and Installation of Grid Tied Wind Energy Emulator  
System**

Tender No.: IIT(ISM)/CERE-500475-2017-18

दिनांक/ Date: 16 March 2018

**Bid Submission deadline: 10.04.2018 at 1:00 P.M.**

**Tender Fee: Rs. 5000/- (Rs. Five Thousand only)**

**[To be submitted with Part-1 (Techno-commercial bid) in the form of Demand Draft issued by any Nationalized / Scheduled commercial bank in favour of "Registrar, IIT (ISM), Dhanbad" payable at Dhanbad (India)]**

**REGISTRAR**

**Indian Institute of Technology (Indian School of Mines), Dhanbad**

**P.O. – Indian School of Mines (I.S.M.)**

**DHANBAD –826004 (INDIA)**

**[www.iitism.ac.in](http://www.iitism.ac.in)**

**GSTIN : 20AAAAI0686D1ZA**

*Signature*  
16/03/18

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## **CHAPTER 1**

### **Instructions to Bidders**

IIT (ISM), Dhanbad was formerly known as Indian School of Mines (ISM) and was a Deemed University before it got converted into an Institute of National Importance under the Institutes of Technology (Amendment) Act, 2016 passed by the Parliament of India and got the assent of President of India. The Indian School of Mines, now IIT (ISM), Dhanbad, was formally opened on 9th December 1926, by Lord Irwin, the then Viceroy of India to address the need for trained manpower related to mining activities in the country with disciplines of Mining and Applied Geology. In 1967, it was granted the status of a deemed to be university under Section 3 of UGC Act, 1956 and it was renamed as Indian Institute of Technology (Indian School of Mines) in 2016. It started as an institution to impart mining education, and today, has grown into a technical institution with various academic departments. IIT(ISM) is located in the mineral-rich region of India, in the city of Dhanbad in the state of Jharkhand. It is the third oldest institute [after IIT Roorkee and IIT (BHU) Varanasi] which got converted into an IIT.

IIT (ISM), Dhanbad intends to procure the equipment "Grid Tied Wind Energy Emulator System" to enrich its teaching and research facility at Dhanbad.

Reputed manufactures or authorized distributors are invited to submit their bid for "Grid Tied Wind Energy Emulator System" for IIT (ISM), Dhanbad as per this tender document in a Two-Bid System: - (a) Techno-Commercial (also termed as technical bid) bid (Part-1) consisting of all technical details of the item along with commercial terms and conditions, Tender Fee and EMD and (b) Price bid (Part-2) indicating price for their items mentioned in the technical bid. All instructions and terms and conditions must be followed, failing which bid(s) will liable to be rejected.

### **INSTRUCTIONS**

1. Offer should be submitted under TWO-BID system in two separate sealed covers i.e. "Techno-commercial bid" and "Price bid".
2. Tender Number and tender submission deadline must be clearly mentioned on the top of the envelope.
3. a) In a tender, either the Indian agent on behalf of the principle/ OEM and the Principle/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.  
b) If an agent submit bid on behalf of the principle/ OEM, the same agent shall not submit a bid on behalf of another principle/ OEM in the same tender for the same item/product.
4. Bidder(s) must submit PAN given by Income Tax authorities, TIN and copy of PAN / TIN with the bid.
5. The offer must be submitted in **Two-Bid**. Tender should be dropped in the tender box kept in the office of **Deputy Registrar (Purchase & Stores), IIT (ISM), Dhanbad- 826004 (Jharkhand, India)** only. Bids may be submitted by Speed Post / Courier in sealed cover only, but IIT(ISM), Dhanbad will

not accept such bid if delivered/submitted to the office of the Deputy Registrar (Purchase & Stores section), IIT (ISM), Dhanbad after the submission deadline and such bids will be treated as Late bids / non-responsive bids. It will be the sole responsibility of the bidders that their bid should be submitted/delivered as per bid submission deadline. IIT (ISM), Dhanbad will not be responsible for any delay or transit loss or late delivery of bids to the office of the Deputy Registrar. No Tender is to be handed over to any staff of IIT (ISM), Dhanbad personally. All bids / correspondences should be sent to the following address only: "Dy. Registrar (P&S), IIT (ISM), Dhanbad, P.O. – Indian School of Mines (ISM), DHANBAD – 826004 (Jharkhand, India)". Bids sent through Email/Fax or submitted in unsealed cover(s) will not be accepted and such bids will be treated as non-responsive bids.

6. Bid(s) must be sent sufficiently in advance so that it reaches the institute on or before the submission deadline. Bid(s) received after the submission deadline will not be considered.
7. Bid document(s) and all enclosures must contain the signature and seal of the authorised representative of the bidder.
8. The bidder quoting for item(s) as per this tender should be the registered to provide the item/services with the appropriate government authority. Copy of registration certificate should be enclosed with the tenders (part-1). Offers submitted without proper registration certificate shall be rejected summarily.
9. The bidder quoting for item(s) as per this tender should be the registered to provide the item/services with the appropriate government authority. Copy of registration certificate should be enclosed with the tenders (part-1). Offers submitted without proper registration certificate shall be rejected summarily.
10. The Bank/RTGS detail on the letter-head of the bidder(s) must be submitted along with the tenders (part-1). A copy of the cancelled cheque should also be attached.
11. Name and PAN/Voter Card No. /Aadhar No. of the authorized signatory of the bidder(s) must be mentioned in the Form 7.2.
12. A copy of PAN/Voter Card/Aadhar Card of the authorized signatory of the bidder(s) must be attached with the Form 7.2

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## **CHAPTER 2**

### **Terms and Conditions**

**The offer must comprise of the following, failing which it will be treated as non-responsive bid hence will be rejected:**

1. The bids under Two-Bid System will consist of two parts as per following details:- **a) Techno-Commercial bid (Part 1)** consisting of all technical details along with Commercial terms and conditions and EMD (Earnest Money Deposit) and Tender Cost, in the form of two separate Demand Drafts issued from any Nationalized / Scheduled commercial bank in favour of "Registrar, IIT (ISM), Dhanbad" and payable at "Dhanbad (Jharkhand, India)", and **b) Price bid (Part 2)** indicating price for the items / services mentioned in technical bid (part-1). In stage-one, only the Techno-Commercial (Part 1) shall be opened and evaluated. In stage-two, the Price bids (Part 2) of only the technically qualified and acceptable offers will be opened, for further evaluation.
2. Sealing and Marking of Bids:
  - a) The Techno-Commercial bid (Part 1) must be sealed in a separate envelope (ENVELOPE-ONE) with Tender Cost and EMD in the form of two separate Demand Drafts, duly super-scribed as "Techno-Commercial Bid (Part 1), Tender No.: IIT(ISM)/CERE-500475-2017-18, Submission Deadline: 10.04.2018" as per following details: -  
**Tender Cost: Rs. 5000/- (Rs. Five Thousand only),**  
**EMD: Rs. 40000/- (Rs. Forty Thousand only).**
  - b) The Price bid (Part 2) should be sealed in separate envelopes (ENVELOPE-TWO), duly super-scribed as "Price Bid (Part 2), Tender No.: IIT(ISM)/CERE-500475-2017-18, Submission Deadline: 10.04.2018".
  - c) The above TWO separate sealed envelopes are to be put in a bigger envelope (ENVELOPE-THREE), which should also be sealed.
  - d) Each of the above THREE envelopes MUST be super-scribed with "Bid for Supply and Installation of Grid Tied Wind Energy Emualator System against Tender No.: IIT(ISM)/CERE-500475-2017-18, Dated: 16 March 2018, Submission Deadline: 10.04.2018".
3. The bids must be neatly typed/computer printed. Hand written offer will be rejected. Bids must carry the numbers of sales tax / VAT / TIN / PAN / Service Tax Registration No. Bids must be in sealed envelope.
4. All relevant technical specifications/details of offered items, drawings, printed technical leaflets, and commercial details which are necessary to ensure that offer is complete in all respects should be attached with the technical bid documents.
5. A 'Compliance Statement' along with a certificate and duly signed that the tenderer satisfies the technical requirements given as per Form 7.5. The said statement should be in a tabular form with the columns: sl. no., (2) technical requirement as per NIT; (3) what is offered by the tenderer; and (4) status of compliance: Complied/Not complied).
6. IIT(ISM) does not bind itself to offer any explanation to those bidders whose Technical Bids have not been found acceptable by the Evaluation Committee of the Institute.
7. Following documents have to be furnished by the bidders with the technical bids (part-1):
  - (a) Self attested copies of credentials in support of capability to undertake the supply/work.
  - (b) Technical literature/catalogue with the detail specification of the material



- (c) Satisfactory performance certificate from their customers for same/similar supply/service must be enclosed along with the technical bid.
- (d) A copy of this tender document must be signed and sealed on all pages by the bidder(s) accepting the instructions and terms & conditions of the NIT and must be attached with the bid.
8. Price should be quoted on FOR, IIT(ISM) Dhanbad basis (in case of indigenous supply). In case of foreign supply, the price basis should be preferably FOR, IIT(ISM) Dhanbad or the price basis may be CIF, Kolkata only in exceptional cases. The packing, forwarding, freight and transit insurance charges, if any, must be included in the price and should not be claimed separately. Duties & taxes, if applicable, are to be shown separately clarifying whether those are extra or included in the price. Educational discounts, if any, should be mentioned clearly. Justification of the price quoted must be provided with the Price Bid. For this, Price List of the OEM and purchase order of govt. organizations / IITs/ NITs/ CSIR Labs / ISRO labs etc. should be attached. Price bids of only technically qualified tenderers shall be opened in on a pre-notified date and time. Decision of IIT (ISM), Dhanbad in this regard will final and binding by all the bidders.
9. IIT(ISM), Dhanbad is entitled for Excise Duty Exemption under Govt. of India notifications and is registered with DSIR, Govt. of India for this purpose. This may be taken into consideration while quoting minimum possible rate. Exemption Certificates can be issued in favour of manufacturers only, if it is mentioned in the bid. It will not be issued any Indian Agent/dealer or distributor at any circumstances. IIT(ISM) will provide only custom duty exemption certificate for availing concessional custom duty. IIT(ISM) will not pay any extra custom duty other than duty exemption certificate.
10. IIT (ISM), Dhanbad does not issue form 'C' or 'D' for concessional Sales tax/VAT. Hence, full rate of sales tax as applicable to educational institutions against the form of certificate should be indicated.
11. **Tender Fee:-** All bidder(s) must have to submit a Demand Draft of required amount in the form of Demand Draft issued from any Nationalized/ Scheduled commercial Bank in favour of "Registrar, IIT (ISM), Dhanbad" payable at Dhanbad with the bid (part-1). Bid received without Tender Fee in part-1 (techno-commercial bid) will be rejected. Tender Fee is non-refundable. It must not be clubbed with Bid Security or EMD.
12. **Bid Security or Earnest Money Deposit (EMD):-** Required Amount for EMD must be submitted in the form of Demand Draft issued from any Nationalized/Scheduled commercial Bank in favour of Registrar, IIT (ISM), Dhanbad payable at Dhanbad with the bid (part-1). Bid received without EMD in part-1 (techno-commercial bid) will be rejected. It must not be clubbed with Tender Fee. No interest will be payable by IIT (ISM), Dhanbad on the Earnest Money Deposit. The earnest money of all the unsuccessful bidder(s) will be returned to the respective bidder(s) through bank / RTGS transfer without any interest within 60 (sixty) days only after placing the order / awarding the contract. The Earnest Money of successful bidder(s) shall be returned on receipt of Performance Security (Performance Bank Guarantee / PBG) as mentioned in this tender document. If the successful bidder(s) fails to furnish the performance security or fails to deliver/provide the item/installation/service as per the order's terms and conditions within stipulated period, the earnest money shall be liable to be forfeited by IIT (ISM), Dhanbad. An undertaking to this is to be submitted.
13. Tender Fee and EMD must be in the two separate Demand Drafts.
14. **Performance Security or Performance Bank Guarantee (PBG):-** The successful bidder(s), on whom order will be placed, has to submit a performance security of 10% of the total order value at

the earliest as per PO terms before release of any payment. Performance security has to be submitted in the form of Bank Guarantee/Demand Draft/FDR from any Nationalized/Scheduled commercial Bank in favour of the Registrar, IIT (ISM), Dhanbad. Performance security should remain valid for a period of two months beyond the date of completion of all contractual obligations of the successful bidder(s). No interest will be payable by IIT (ISM) Dhanbad on the Performance Security deposited. In case the contractor fails to provide satisfactory service, the Performance Security submitted by the bidder(s) is liable to be forfeited. An undertaking to this is to be submitted.

15. **Validity Period:** - The validity period of the tender should be clearly specified. It must be at least for **240(Two Hundred Forty) days** from opening of bids.
16. **Warranty/Guarantee:** Total cost of supply should include 01(One) year onsite warranty including technical support (service, support and maintenance) for all equipment and accessories (within 5 business day support). The cost of repair/replacement/shipping, if any, should be borne by the supplier during the warranty period. A one year warranty certificate including technical support is required from the original equipment manufacturer (OEM).  
In case the local representative of the OEM/Principal Company is replaced, a letter of commitment by the OEM/Principal Company is required stating that they or their new representative will directly cover the warranty and service the equipment as and when required as per the terms and conditions mentioned in this document.
17. **Comprehensive Annual maintenance contract (AMC):** The cost of 'annual maintenance contract (AMC)' and "comprehensive maintenance contract (CMC)" should be maximum of 10% of purchase cost for each year after warranty and should be provided separately for extension of warranty for additional years (which is beyond the normal warranty period mentioned earlier) on yearly basis as an option with the price bid. Offer including terms & conditions should be quoted on per year basis to enable purchaser make AMC for any period from 01 to 03 years, if required.
18. **Delivery Period and Liquidated Damage:** As time of the essence for this procurement, hence the ordered materials/work complete in all respects are required to be delivered and installed within the period stipulated in the purchase order failing which liquidated damages of 1% per week for the delayed period subject to maximum of 5% of the total basic value of the order shall be deducted from the invoice of the supplier. Earliest/ expected delivery period should be clearly indicated. Packing should be suitable for 'Air freight'.
19. **Inspection:** Inspection shall be carried out at IIT (ISM), Dhanbad after arrival of the materials and decision of the Institute in this regard shall be final.
20. **Rejection and Replacement:** Rejection, if any, shall be notified to the supplier within 30 days of receipt and inspection of the material/workmanship. Rejected materials/work is to be removed by the supplier at his own risk and cost from IIT (ISM). Campus within 14 days of intimation of rejection. Defective Supplies are required to be replaced within 15 days of the removal of the rejected materials/work.
21. **Risk Purchase:** IIT (ISM) shall be at liberty to realize from the supplier the differential amount, if any, which it shall have to incur on purchase of the material/work at higher price(s) from elsewhere in the market, if the supplier, due to their fault, fails to supply the ordered quality and quantity of the material/work within the stipulated time.

22. Conditional offer will not be accepted.

23. Payment: In case of indigenous item i.e. inside India, payment may be released through RTGS / online payment mode against complete execution of the purchase order (PO) and submission of all the required documents as per the order within 30 days after satisfactory supply, inspection, installation/commissioning & acceptance and on submission of pre-receipted tax invoice, delivery challan, warranty certificate and installation report in triplicate and Performance Bank Guarantee. In case of foreign supply, i.e. outside India i.e., payment may be released through Letter of Credit as per policy of IIT (ISM), Dhanbad. The invoice should be duly certified by the Head of Deptt. of IIT (ISM), Dhanbad to which supply is made or any other IIT (ISM) official authorized for this purpose. IIT (ISM), Dhanbad does not make any advance payment. However, as a special case in foreign supply only, 90% Letter of Credit (LC) Payment term may be accepted against dispatch of required documents as per PO terms and PBG and balance 10% payment via wire transfer/RTGS will be released only after satisfactory installation report and other documents as per PO terms received from the user department from the firm.

24. Advance payment will not be released. Any bid having condition of advance payment will be treated as non-responsive bid.

25. Country of origin and port of shipment must be stated in the technical bid itself in case of foreign supply. Any change at later stage will not be accepted.

26. Name and address of Indian Agent, percentage of agency commission, if any and role of the Agent with respect to the subject supplies and a statement thereon that "Agency Commission is included in the bid.

27. Payment will be released through bank/ RTGS/Wire transfer. The payment will be released after statutory deductions and compensation of delay / liquidated damage (LD) / late delivery etc., if any.

28. Any payment will be released only after satisfactory completion of the work/installation and after submission the certified bill(s) / invoice(s).

29. All communications are to be addressed to the Registrar, IIT (ISM), Dhanbad quoting the Tender No. and Date.

30. IIT (ISM), Dhanbad reserves the right to accept or reject or cancel any or all tender notice or bid(s) or order(s) at any stage without assigning any reason thereof.

31. For any dispute, the place of jurisdiction shall be Dhanbad (Jharkhand, India) only.

32. It will be the sole responsibility of the bidder(s) that its bid should reach on or before the submission deadline to Registrar, IIT (ISM), Dhanbad.

33. **Governing Law:** The order, placed, will be the contract between the successful bidder(s) and IIT (ISM), Dhanbad and shall be governed by the LAWS of India and under the contract shall be taken by the parties only in Dhanbad (Jharkhand, India) to competent jurisdiction.

34. Bid(s) shall be submitted in official tender form / format only. If submitted in any other form / format, the same shall be rejected. No paper shall be detached from the tender. All pages must be numbered properly and there must be seal and sign of the bidder(s) on all the pages of its bid.



35. The name and address of the bidder(s) shall be clearly written in the space provided and no overwriting, correction, insertion shall be permitted in any part of the tender. The tender should be filled-in and submitted in strict accordance with the instructions laid down herein; otherwise the bid is liable to be rejected.
36. The bid is liable to be rejected if complete information is not given therein, or if the particulars and data (if any) asked for in the Schedule to the tender are not filled-in properly.
37. The successful bidder(s) will indemnify IIT (ISM), Dhanbad, in case of any damage or liability, which may arise on account of any act or omission directly/indirectly attributable to the bidder(s).
38. Dispute, if any arising out of providing the said service(s) shall be settled mutually or arbitration by sole Arbitrator to be appointed by the Registrar, IIT (ISM), Dhanbad at Dhanbad as per the provisions of the Indian arbitration and Conciliation Act, 1996 and the Rules framed there under. The award passed by the said sole Arbitrator, will be binding upon the parties. The arbitration proceedings shall be held at Dhanbad only.
39. The successful bidder(s) shall ensure that its authorized representative should be present at the time of any discussion at IIT (ISM), Dhanbad regarding the bid, for which no any kind of TA/DA/boarding/lodging will be facilitated by IIT (ISM) Dhanbad.
40. The schedules of items/services are required as per Chapter-4 of this tender. Bidder(s) must clearly indicate in its tenders, the different taxes and duties which they propose to charge mentioning clearly the present rate(s) thereof with appropriate reference. Vague offer like "duties as applicable" shall not be considered.
41. Price should be quoted at Price Bid (Part-2) (Chapter – 5 of this tender) only for the item(s)/services as mentioned at Chapter – 4 of this tender. The required item(s)/services to be delivered / provided on or before the dead line as per purchase order.
42. The bidder(s) should be registered with VAT, CST, SST, Income Tax, service tax authorities, GST etc. and to enclose the copies of the relevant certificate along with the technical bids. The agency must be authorized by appropriate government authority to deliver the items/services at the IIT (ISM) Dhanbad.
43. The successful bidder(s) will ensure that its employees/staff/personnel would strictly follow all the security instructions and rules and regulations of IIT (ISM), Dhanbad during their visit in the campus.
44. If the successful bidder(s) commits breach of any of the above or Order's terms and conditions or is not able to deliver the item / provide the services / complete the work on time, the contract will be cancelled and security deposit shall be forfeited and a damage liability at the discretion of IIT (ISM), Dhanbad will be imposed on the bidder(s).
45. Bills / Invoices raised by the bidder(s) will be subject to applicable statutory deductions including T.D.S.
46. Necessary corrigendum(s), if required, will be issued at any stage, which must be acceptable to the bidder(s). Any corrigendum will be published on our website [www.iitism.ac.in](http://www.iitism.ac.in) only. Bidder(s) must be

in touch with our website [www.iitism.ac.in](http://www.iitism.ac.in) for corrigendum(s). It will be sole responsibility of the bidder(s) that they will go through the corrigendum(s) published, if any, on our website [www.iitism.ac.in](http://www.iitism.ac.in) and submit its tender accordingly.

47. Shortlisted bidder(s) may be called for presentation / demonstration / meeting at IIT (ISM), Dhanbad office with a short notice. Request from the bidder(s) to change the date and time of presentation / demonstration / meeting will not be accepted. If the bidder(s) will not attend for the same, then their bid(s) will be treated as non-responsive and hence the bid(s) will not be considered for further process.
48. Price bids will be opened for those bidder(s) who are shortlisted and declared as technically qualified bidder(s) by the Committee of the IIT (ISM), Dhanbad. In this regard, decision of IIT (ISM), Dhanbad will be final and binding to all the bidder(s).
49. Please note that no part shipment/transshipment/third party shipment is acceptable to us.
50. Submission deadline / last date & time for submission of the bids and date & time for opening of the same are given in this bid. The bids will be opened as per IIT(ISM) rules. Authorized representative of bidders having authorization letter, a govt. issued ID card and an employment ID card issued by the bidder may present during bid opening at their own discretion. In case of submission deadline / last date or bid opening date is a holiday/declared as a holiday, then next working date will be the submission deadline / last date for submission/ opening of tender. Submission deadline or bid opening date & time will not be changed upon any request from the bidder side. However, it may be changed as per IIT(ISM) rules. In this regard, decision of the IIT (ISM), Dhanbad will be final and binding to all the bidders.
51. For the items / services, the bidders must ensure the required quality, quantity, materials, dimensions & other parameters and quote accordingly. In case items / services provided are not same as quoted/ordered, the claim for payment shall not be accepted. No payment, claims for such items / services shall be released. In this regard, decision of IIT (ISM), Dhanbad will be final and binding to the bidders.
52. IIT (ISM), Dhanbad at its discretion may change the quantity/quality/parameters/upgrade the criteria/drop any item(s) or part thereof at any stage. In case of any dispute, the decision of IIT(ISM) shall be final and binding on the bidders/tenderers.
53. IIT (ISM), Dhanbad reserves the right to accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The decision of the competent authority of IIT (ISM), Dhanbad will be final and binding to the bidder(s).
54. All the bidders, those are interested to participate in this bid, must have to submit the technical specification of their bid in MS-Word Format in a CD with the technical bid. The CD must be marked with the NIT No. and submission deadline.
55. Professional(s) to be deployed by the successful bidder(s) for the supply of the item / installation / execution of the work in order to provide the item(s) /service(s) as per order must be well qualified.

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### **CHAPTER 3**

#### **Schedule of Requirements**

| <b><u>Description</u></b>                                                                                                                                                                                                         | <b><u>Details</u></b>                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| NIT No.                                                                                                                                                                                                                           | IIT(ISM)/CERE-500475-2017-18                                                           |
| Date of Tender                                                                                                                                                                                                                    | 16 March 2018                                                                          |
| Bid submission deadline                                                                                                                                                                                                           | 10.04.2018, 1:00 P.M.                                                                  |
| Date of opening of the bids<br>(technical part-1)                                                                                                                                                                                 | 10.04. 2018, 4:00P.M.                                                                  |
| Earnest Money Deposit (EMD) Amount ( <i>in the form of Demand Draft issued from any Nationalized / Scheduled commercial Bank in favour of "Registrar, IIT (ISM), Dhanbad" payable at Dhanbad</i> )                                | Rs. 40000.00 (Rupees Forty Thousand Only)                                              |
| Acknowledgment of the Order                                                                                                                                                                                                       | The order acknowledgment must be submitted within 2 (Two) days from the date of order. |
| Performance Security/ Performance Bank Guarantee (PBG) <i>in the form of Demand Draft / Bank Guarantee issued from any Nationalized / Scheduled commercial Bank in favour of Registrar, IIT (ISM), Dhanbad payable at Dhanbad</i> | Should be submitted within 15 (fifteen) days from the date of issue of order.          |

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## CHAPTER 4

### Specifications and allied technical details

#### **Wind Emulator Module – 1 set**

- DC shunt motor 220V DC, 2.5 K W, 1500rpm
- Three phase Slip Ring Induction motor 2.2 KW, 415 V AC, 1000rpm, base plate for mounting machines with speed encoder 1024 ppr
- 220V, 2.5KW, 1500 rpm DC shunt Motor Coupled to 415V, 2.2 KW 1000 rpm 6 pole Three phase slip ring induction motor, 1024 ppr encoder included.

Along with necessary power supplies for Sensors and shielded cables for motor terminals

#### **Three Phase Fully Controlled IGBT based Converter(Two for the purpose of Inverter and one for converter) – 3 sets**

- **General Specifications**

Input AC Voltage: - 415 Volt

DC bus Voltage: - 600 Volt

Output AC Voltage: - 415 Volt, output AC Current :- 30 Amp

Switching Frequency upto 20 kHz

Fundamental Frequency 50 Hz

Type of Cooling: - Forced Air

Ambient Temp: - 40 Deg maximum

Duty Class: - Class I

- **IGBT Details**

Number of IGBT=6, Generation Trench V-IGBT

CAL4= Soft switching 4 Generation CAL-diode.

Isolated copper baseplate using DCB (Direct Copper Bonding) technology.

Must have increased power cycling capability and Low switching losses at high di/dt.

- **Three phase bridge rectifier Module**

Blocking voltage 1600 V or more

High surge current carrying capability, Large isolated base plate & Easy mounting

- **Gate Driver**

It will interface and isolate the Control Unit/Primary Circuit from the secondary which is directly connected to the high power.

Gate Driver will controls the IGBT's dynamic behavior and its short circuit protection.

Input signal level is 0/15V.

Interlocking time between the input signals is 3μs.

It monitors the errors: power supply under-voltage (below 13.3 V), short-circuit between Collector and Emitter. The error reset time is typically 9μs.

On detection of error/fault, the Gate Driver switches off the IGBT.

The IGBT switching speed to be adjustable by two separate resistors.

- **Kit Details**

3-phase teaching kit consists of 3-phase uncontrolled rectifier and 3-phase IGBT based controlled

Inverter. It will also have a brake chopper.

3-phase 415 V input is to be applied to the uncontrolled rectifier using an autotransformer.

The dc output of the Rectifier is to be given to the input of the IGBT based inverter.

DC capacitor bank is connected in between the rectifier and inverter as source to the inverter.

3 phase 415 V ac Output is achieved from the inverter and is provided for the Motor Interface.

Driver is the interface unit between the power module and controller. Each Driver drives 2 switches in a Module.

+15V/0V supply is given to Vs and GND. Alternate ON/OFF pulses of +15V are given to Vin1 and Vin2.

Vin1 corresponds to Top IGBT and Vin2 corresponds to Bottom IGBT.

ERROR is triggered when Vs falls below 13.3 V and Short circuit of IGBT. ERROR output is taken to the controller for turning off the system during occurrence of the error.

- **Capacitor & Snubber**

Rectified DC input is given to electrolytic filtering capacitors. Each capacitor is 4700  $\mu$ F/450 V.

2 capacitors are connected in series to have equivalent capacitance of 2350  $\mu$ F / 900 V.

Resistors of value 27 k / 20 W are connected across each capacitor for voltage balancing.

Snubber Capacitors of 0.22  $\mu$ F / 1500 Vdc (4 nos) are connected across the dc link for voltage overshoot protection.

The snubbers limit the over-voltages during commutations and as a consequence reduce the losses.

They are kept very close to the device to reduce the inductance between the switches and the capacitors.

- **Cooling**

Teaching kit stack assembly is provided with forced air cooling. Forced air-cooling is provided by Hi Cool Fan. 230VAC 1ph. should be applied to the Fan input terminals provided on the unit.

IGBT modules are mounted on 250 mm heat sink (extruded type).

Flow of air is 3 m/s.

- **Thermal Protection**

Normally Closed Thermal contact switch is used for protection against thermal runaway.

The position of the thermal switch normally closed when its temperature is below the threshold temperature (80 °C) & it changes to normally open above 80 °C.

After cooling down, it again retains it normally closed position.

Thermal switch is placed at the warmest point on the heat sink.

#### **FPGA based controller – 1 set**

- It is having a Xilinx FPGA Zynq™-7000 SoC XC7Z020-CLG484-1 with Dual ARM® Cortex™-A9 MPCore™
- Capability upto 667 MHz operation along with NEON™ Processing / FPU Engines.
- Memory allocation in the board by 512 MB DDR3 and 256 Mb Quad-SPI Flash with Full size
- Isolated Voltage (8 NOS) and current (8 NOS) sensors for feedback
- Voltage +/- 0-1000V AC/DC measurement and output is instantaneous.
- Current Sensor 0-25 AC/DC measurement and output is instantaneous.
- Dual, 200KSPS-1MSPS 16 bit 4x2 channel Simultaneous sampling for ADC for sensors alone.
- PWM Card 3.3/5 to 15 V Level Shifting of 12x2 PWM Out with optical isolation.
- Dedicated I/O for encoder and Hall sensors with 5V supply and Differential noise reduction.
- 4 Digital Input which can take 3.3V/5V input to FPGA.
- 230V, 5A, 4 numbers of NO-NC Contactor Relay for HV Driving purpose.

#### **Control and Monitoring Software – 1 set**



- Real time capturing and plot up to 32 Channels in 200 kps rate with buffering option up to 60sec, that includes voltage (8nos) & current (8nos) analog signals and additional add-on card's data along with viewing probes for application algorithm using which logic can be probed.
- Up to 32 virtual input/output for control monitoring of digital controller signal.
- Real time storage/buffer storage of data for post analysis and data exporting provision to .png/CSV file format.
- Gigabit Ethernet communication with the board for programming, controlling, monitoring and capturing at high data R/W rate.
- Real time display of power vector diagram with detailed running statistics.
- FFT analysis of the voltage and current waveform in both Scope mode and programed mode. Scope mode with voltage and current measuring.
- Dashboard arrangement for experiment setups.
- Tcl command support for writing values to a file.
- Xilinx System generator, library modules in Matlab for control applications.
- MATLAB integration for captured data analysis. Direct link to MATLAB Simulink software. Capability to make the algorithm schematically in Simulink environment using the System generator tool box in Simulink and transfer the code to the controller for hardware implementation. Sensor outputs are available as schematic blocks making ADC and sensor interfacing simplified.
- Library Blocks  
Building blocks for the wind energy system like the GSC (grid side converter), RSC (Rotor side converter), PLL (Phased locked loop) is required to be provided with the module. These blocks are open and editable.

#### **Grid Side Reactor, Contactors, Capacitor, Relay – 1 set**

- L, C filter for designed rating. Switch and relay( 1 No) along with relay drives for the protection of the system
- Grid Side Reactor, Contactors, Capacitor:  
3Phase Line reactor: 440V, 25A, 10mH,50Hz – 1 No.  
Power Capacitor : 440V, 2kVAR,2.6A – 1 No  
3Phase Contactor:440V, 50A, 50/60Hz – 1 No

**Warranty/Guarantee:** One (01) Year from the date of successful installation.

**Training :** Training at the time of installation for three(03) days will be provided by the supplier at free of cost at the site.

## CHAPTER 5 PRICE SCHEDULE

### Price Bid (Part 2)

#### PRICE BID

(Note: This price bid must be in a sealed cover and should be sealed separately from the techno-commercial bid cover.)

The bidder(s) shall quote the amount tendered/financial bids in the following format:  
"Price Bid for **Supply and Installation, Grid Tied Wind Energy Emulator System**"

"I / We ( \_\_\_\_\_ ) on behalf of M/s \_\_\_\_\_

\_\_\_\_\_ hereby undertake to provide **Supply and Installation, Grid Tied Wind Energy Emulator System** as specified in this tender and our technical bid for an amount of Rs. \_\_\_\_\_ (in words Rupees \_\_\_\_\_) for the item as in **Chapter -4**. The above quoted amount is inclusive of and in accordance with all the statutory liability, Service Charges, Administrative Charges, etc." as applicable.

Details of the prices quoted for the various items as per technical bid are as follows: -

.....

\_\_\_\_\_  
Signature of the bidder(s)/authorized signatory with seal

#### UNDERTAKING BY THE BIDDER(S)

I have carefully gone through the various terms and conditions mentioned in the tender document of **Supply and Installation, Grid Tied Wind Energy Emulator System**. I agree to all the conditions and offer to supply the item at IIT (ISM), Dhanbad. I am making this offer after carefully reading the conditions and understanding the same. I have acquainted with all the tasks required to be carried out, before making this offer. I will abide by the corrigendum(s), if any, to be issued by IIT (ISM) Dhanbad on its website [www.iitism.ac.in](http://www.iitism.ac.in). I hereby sign this undertaking as token of our acceptance of various conditions mentioned in tender document. Justification of the price is also attached herewith.

Place: \_\_\_\_\_

Dated: \_\_\_\_\_

Name & Signature of the bidder(s): \_\_\_\_\_

Address: \_\_\_\_\_

\*\*\*\*\*

## **CHAPTER 6**

### **Contract Form**

With reference to the tender reference no. **IIT(ISM) /CERE-500475-2017-18**, Dated: **16 March 2018** of IIT(ISM), Dhanbad for Supply and Installation, **Grid Tied Wind Energy Emulator System**, we (bidder(s)'s name) \_\_\_\_\_ accept all the instructions and terms and conditions of the tender and accordingly hereby submit our quotation no. \_\_\_\_\_ dated \_\_\_\_\_.

#### **ALL TERMS AND CONDITIONS OF THE N.I.T. ARE ACCEPTED**

|    |                                                                                                   |  |
|----|---------------------------------------------------------------------------------------------------|--|
| 1  | Name and address of the bidder                                                                    |  |
| 2  | Telecom nos. of the bidder i.e. phone fax, & email id.                                            |  |
| 3  | Signature, name & designation of the person signing on behalf of the bidder & his/her office seal |  |
| 4. | Name & designation of the contact person & his phone/mobile no./e-mail ID                         |  |

We hereby declare that all statements/details made in this tender are true, complete and correct to the best of my knowledge and belief. I understand that in the event of any information being found false or incorrect at any stage or we do not satisfy any of the stated criteria, our offer is liable to be cancelled automatically and IIT (ISM), Dhanbad may take an action against this firm for such false information including legal action.

**Signature:**

**Name:**

**Designation:**

**Bidder(s)'s Name:**

**Seal:**

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**CHAPTER 7****Form 7.1- Checklist**  
**(to be submitted with technical bid part-1)**

|     |                                                                                                                                                                                                                                                                         |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 1.  | Duly sealed and signed (on all pages) of the tender document.                                                                                                                                                                                                           |  |
| 2.  | Demand draft is attached as Tender Fee                                                                                                                                                                                                                                  |  |
| 3.  | Demand draft is attached as EMD.                                                                                                                                                                                                                                        |  |
| 4.  | Form No. 7.4 (Techno-Commercial bid, Part-1) is attached                                                                                                                                                                                                                |  |
| 5.  | Form No. 7.2 and 7.3 are attached with Techno-commercial bid (part-1)                                                                                                                                                                                                   |  |
| 6.  | Details of PAN, TIN, Service Tax Registration No., GST No. etc. is attached                                                                                                                                                                                             |  |
| 7.  | Bank account details is attached                                                                                                                                                                                                                                        |  |
| 8.  | Complete contact details (Name, Postal address, E-mail address, phone no. mobile no.) is provided                                                                                                                                                                       |  |
| 9.  | Complete technical details attached                                                                                                                                                                                                                                     |  |
| 10. | The Techno-Commercial bid (Part 1) is sealed in a separate envelope (ENVELOPE-ONE) with EMD and Tender Fee in the form Demand Draft and duly super-scribed as "Techno-Commercial bid (Part 1) - Bid for Supply and Installation, Grid Tied Wind Energy Emualator System |  |
| 11. | The Price bid (Part 2) is sealed in separate envelopes (ENVELOPE-TWO) and duly super-scribed as "Price Bid (Part 2) – Bid for Supply and Installation, Grid Tied Wind Energy Emualator System                                                                           |  |
| 12. | A copy of PAN/Voter Card/Aadhar Card including ID card of the bidder (firm) of the authorized signatory of the bidder(s) is attached with the Form 7.1                                                                                                                  |  |

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**Form No.: 7.2**

To,  
The Registrar,  
Indian Institute of Technology (Indian School of Mines), Dhanbad,  
P.O. – I.S.M.  
DHANBAD– 826004.

**Ref.:** Your Notice Inviting Tender No. IIT-ISM / CERE-500475-2017-18, Dated: 16 March 2018.

**Sub:** Technical bid relating to **Supply and Installation, Grid Tied Wind Energy Emulator System**

Sir/ Madam,

1. I/We have gone through all Chapters of the tender document such as Instructions and Terms and conditions, minimum eligibility criteria, schedule of requirements, Specifications and allied technical details etc. as enlisted by you in your Notice Inviting Tender for the subject under reference.
2. I/We, hereby confirm that we have understood all the above and confirm my/our commitment to abide by them.
3. I/We also confirm my/our commitment to provide the services as enlisted in your Notice Inviting Tender under reference.

**Seal and Signature of authorized signatory of the bidder(s) with date→**

| Documents                       | Yes/No | Document No. (If submitted a copy of the same) |
|---------------------------------|--------|------------------------------------------------|
| PAN Card/Voter ID/Aadhaar Card  |        |                                                |
| Official ID Card                |        |                                                |
| Other Documents (specify below) |        |                                                |

(A copy of PAN/Voter Card/Aadhar Card and official ID card of the authorized signatory of the bidder(s) must be attached with this letter.).

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**Form No.: 7.3**  
**(to be submitted with technical bid part-1)**

1. Tender Fee (Non-refundable): DD NO. \_\_\_\_\_ Date: \_\_\_\_\_ Amount: Rs. Five Thousand only, Issued by bank and branch \_\_\_\_\_
2. Earnest Money Deposit: DD NO. \_\_\_\_\_ Date: \_\_\_\_\_ Amount: Rs. Seventy Six Thousand only, Issued by bank and branch \_\_\_\_\_
3. Validity of Quotation: days from the date submission deadline (minimum 240 days from the submission deadline).....
4. Performance Security or PBG: Will Be Submitted with the proforma invoice or invoice, if Purchase Order placed by I.I.T. (I.S.M.), Dhanbad
5. Payment Terms: Payment after supply, satisfactory installation and submission of all required documents as per Purchase Order after statutory deductions and penalty (liquidity damage), if any as decided by I.I.T. (I.S.M.), Dhanbad.

**ALL THE ABOVE MENTIONED TERMS & CONDITIONS ARE ACCEPTED BY US AND PROFORMA IS SUBMITTED FOR CONSIDERATION.**

**Signature & Seal of the Bidder(s)**

\*\*\*\*\*

**Form No.: 7.4****TECHNO-COMMERCIAL BID (Part-1)****TECHNICAL BID**

1. Name of the Bidder(s).....
2. Name of the authorized person (who signs on the tender document on behalf of bidder(s)) with PAN/Voter Card No./Aadhar No. ....
3. Address of the Bidder(s)....., Website .....
4. Phone No. .... (Mobile).....Fax..... E-mail .....

**Details of the item and its specification:**

| Sl. No | Particulars | Description |
|--------|-------------|-------------|
|        |             |             |

**Name of the authorized signatory:****Name of the Bidder(s):****Contact No.:****Signature & Seal of the Bidder(s)**

\*\*\*\*\*

**Form No.: 7.5****To be attached with TECHNO-COMMERCIAL BID (Part-1)****Compliance Statement**

| Sl. No | Technical requirement as per NIT | What is offered by the bidder | Status of Compliance<br>Complied/Not Complied |
|--------|----------------------------------|-------------------------------|-----------------------------------------------|
|--------|----------------------------------|-------------------------------|-----------------------------------------------|

**Signature & Seal of the Bidder(s)**

\*\*\*\*\*

**Form No.: 7.6****FORMAT OF BANK GUARANTEE**

Whereas \_\_\_\_\_ (hereinafter called "the Bidder") has submitted its bid dated \_\_\_\_\_ (date of submission of bid) for the supply of \_\_\_\_\_ (name and/or description of the goods) (herein after called "the Bid") against Tender Document No. \_\_\_\_\_ of the Indian School of Mines, Dhanbad.

KNOW ALL PEOPLE by these presents that WE \_\_\_\_\_ (name of bank) of \_\_\_\_\_ (name of country), having our registered office at \_\_\_\_\_ (address of bank) (hereinafter called "the Bank"), are bound unto \_\_\_\_\_ (name of Purchaser) (hereinafter called "the Purchaser") in the sum of \_\_\_\_\_ for which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this \_\_\_\_\_ day of \_\_\_\_\_ 2009.

THE CONDITIONS of this obligation are:

- 1) If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or
- 2) If the Bidder, having been notified of the acceptance of its bid by the Purchaser during the period of bid validity:
  - (a) Fails or refuses to execute the Contract Form if required; or
  - (b) Fails or refuses to furnish the performance security, in accordance with the Instruction to Bidders;

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to six months from the date of opening of tender or the period of the bid validity whichever is later and any demand in respect thereof should reach the Bank not later than the above date.

Authorized Signatory with Stamp

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