



QUAID-E-AWAM UNIVERSITY OF ENGINEERING SCIENCE & TECHNOLOGY,  
NAWABSHAH.

No:QUEST/NH/DF/

Dated: 22-02-2017.

To,

The Deputy Director ( A& F ) ,  
Sindh Public Procurement Regularity Authority,  
Karachi.

SUBJECT: REQUEST TO UPLOAD THE NIT.

Dear Sir,

With due regards , it is stated that photocopies of NIT and Bidding Document are enclosed herewith as hard copy for further necessary action and with a request to upload the NIT and related documents timely on SPPRA website.

Thanks in anticipation.

  
DEPUTY DIRECTOR (Proc)

CC to:

01. PS to vice chancellor, Quaid-e-Awam University of Engineering Science & Tech: Nawabshah.
02. PA to Registrar , Quaid-e-Awam University of Engineering Science & Tech: Nawabshah.
03. Resident Auditor , Quaid-e-Awam University of Engineering Science & Tech: Nawabshah.

1525  
23-02-17

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY,  
NAWABSHAH  
( Say No to Corruption )



TENDER NOTICE

01. Sealed bids are invited from Importers of Scientific Equipment / Suppliers having at least 5 years of Experience in related field on Cost Paid up to (CPT) Nawabshah with 05% **bid security** in the shape of pay order / bank Draft in the name of Director Finance, QUEST, Nawabshah for the supply of Computer Controlled WIND ENERGY UNIT or equivalent laboratory Equipment with installation , commissioning , Training , parts service warranty for Energy Environment Engineering Deptt: of Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah.

2. **Eligibility: Registered with Tax Authorities** ( Income Tax , GST , Custom).

3. **Method of Procurement.** The University would adopt **Single Stage – Two Envelop Procedure** for selection of firm. The bidder should submit Two separate sealed envelopes. One envelope should contain the Technical Proposal and the other envelope should contain the Financial Proposal. Both envelopes should be clearly marked "Technical Proposal" and "Financial Proposal".

4. **Bidding/Tender Documents:**

Tender Documents with detailed specifications can be obtained from the office of the undersigned against the paid challan of Rs.1000/- in University Account 44-8 NBP , Engineering University branch , Nawabshah ( Non-Refundable). The bid along with required

**Date of Issuance:** Documents will be issued from the first day of publication in Newspapers of this advertisement up to **14-03-2017**

**Date of Submission:** . **15-03-2017** (12:00 Noon)

**Date of Opening:** On same day i.e **15-03-2017** (01:00 PM).

5. **Place of issuance, submission, inquiries and opening will be** FINANCE WING, ADMINISTRATION BLOCK, SAKRAND ROAD, NAWABSHAH (67480). SINDH.

6. **Terms & Conditions.**

Under following conditions bid will be rejected:-

- (i) Conditional and telegraphic bids/tenders;
- (ii) Bids not accompanied by bid security of required amount and form;
- (iii) Bids received after specified date and time.
- (iv) Black listed firms or permanently bared by the PPRA or SPPRA Authorities.
- (V) Firms in litigation.

7.. Procuring Agency reserves the right to reject all or any bids subject to the relevant provisions of Sindh Public Procurement Rules 2010.

08. The Tender Document can be downloaded from University website ([www.quest.edu.pk](http://www.quest.edu.pk)), as well as SPPRA ,Karachi website ( [www.sppra.gov.pk](http://www.sppra.gov.pk))..

FAZAL ALI SHAIKH  
DIRECTOR FINANCE

ISSUED ON: \_\_\_\_\_

ISSUED TO: \_\_\_\_\_

QUAID-E-AWAM UNIVERSITY OF  
ENGINEERING, SCIENCE & TECHNOLOGY  
NAWABSHAH



TENDER DOCUMENTS

For Supply of

COMPUTER CONTROLLED

**WIND ENERGY UNIT**

FOR ENERGY ENVIORMENT ENGG: Deptt: under HEC & QUEST Sponsored Funding

INSTRUCTIONS TO TENDERS  
&  
TERMS AND CONDITIONS

## INSTRUCTIONS TO TENDERS AND TERMS & CONDITIONS.

### 1. BIDS:

Rates shall be for the supply of material described in the Bill of Quantities at QUEST Nawabshah, meeting the following conditions;

- 1.1 Quotation must be in DUPLICATE and should remain valid for 90 days from the date of the submission of tenders.
- 1.2 Telephone/telex/fax/telegraphic tenders shall not be entertained.
- 1.3 Bidders must have an office and workshop / service center facilities preferably in Karachi failing which their offer will not be considered.
- 1.4 Bidders must have factory-trained engineers to provide after sales services.
- 1.5 After opening of tenders no change is allowed to be made in the tender documents.
- 1.6 All taxes (if any) including GST should be included in the quoted price of items.
- 1.7 No advance payment shall be made against the purchase order.
- 1.8 All the information provided in the bid should also be adequately supported by relevant documents and technical brochures. Bidders may attach documents highlighting the competitive edge and unique features of their proposals.
- 1.9 Incomplete tenders will not be acceptable.
- 1.10 The Procuring Agency reserves the right to accept or reject any or all the bids or increase or decrease the quantity of items..
- 1.11 In case of agents bidding for the tender, they must enclose original Proforma Invoice/Fax copy/Quotation from their Principals failing which their offers may be ignored.
- 1.12 The agent must **submit following documents along** with their offer failing which their offer will be rejected.
  - 1.12.1.1 List of clients in Pakistan for a similar work / supply.
  - 1.12.1.2 *The bidder has to provide certificate that all items are new and up to the required standard.*

- 1.12.1.3 Non-Black List Affidavit / Certificate (confirming that bidder has never been black listed from any Government/Semi Government organization).
- 1.12.1.4 Bidder will provide Bank Statement of last two years which shows its Financial Position in the market.
- 1.12.1.5 Each page of Bidding Document shall be signed by the C.E.O or authorized officer of the Firm with Seal ( attach CNIC & Service or visiting Card ) of concerned ) in case of noncompliance Bidding Document will be assumed as incomplete and may lead to disqualification of Bid.
- 1.12.1.6 Bid will be assumed to cover Freight charges , local Transport, Marine & other accidental Insurance of equipment /installation .
- 1.12.1.7 Bid Shall be expressed in Pak: Rupee or convert to one currency.
- 1.12.1.8 Bid shall cover Tariff, Custom Duty, other applicable taxes ,installation , Commissioning charges , local transport , marine / accidental insurance , operational software with rights ( if ) and training .
- 1.12.1.9 The Supplier shall provide original copy of Operating software of equipment.
- 1.12.1.10 Supplier will provide original Booklet printed by manufacturer for guidelines and other reasons.
- 1.12.1.11 Bid shall be expressed in Pak Rupees or shall be expressed in single international currency .US Dollar etc.
- 1.12.1.12 Other essential extra accessories (if) available in original packing or have been given by manufacturer then it will be responsibility of supplier to hand over in original packing to end user / purchaser without any excuse or charging any amount.
- 1.12.1.13 Suppliers shall provide a list original from manufacturer of accessory , chemicals , test articles etc received with consignment .
- 1.12.1.14 At least Pakistan Engineering Council registered Engineer shall be hired by the suppliers and proof shall be given to :

- 1.12.1.15 Case of payment will be processed after availing no objects Certificate from End User Department.

**2. EARNEST MONEY**

The tenderers should submit their bid along with a Bank Guarantee / Call Deposit of 5% of the Tender Cost as Earnest Money in the name of Director Finance, Quaid-e-Awam University of Engineering, Science and Technology Nawabshah as per ANNEXURE-D.

**3. VALIDITY OF PRICES**

The prices quoted should be valid for a period of at least 90 days from the date fixed for opening of tenders.

**4 SIGNING OF THE AGREEMENT**

Within 14 days of the issuance of the letter of intent / Purchase Order the successful bidder will be required to sign a Contract Agreement with the purchaser (i.e., The QUEST Nawabshah) for the supply of such quantity in whole or in part of the tendered stores as clarified in the letter of intent / Purchase Order.

**5 ON-ARRIVAL INSPECTION & TAKING OVER**

**9.1 ON-ARRIVAL INSPECTION (Where applicable)**

There shall be inspection by the representative of the Purchaser on arrival of stores at consignees end in presence of representative(s) of the Contractor / Agent if any . The report of inspection which inter-alia should indicate the conditions in which each unit of package has been received will be signed by the above-mentioned representatives.

**9.2 TAKING OVER (Where applicable)**

Upon receipt of the items in the Warehouse of Purchaser and after final inspection by inspection agency (or agencies) nominated by the Purchaser, the Purchaser will issue a taking over certificate in which he shall certify the date on which the items have been so accepted. The taking over of damaged items during the transportation shall be withheld until it has been completely repaired / replaced and checked.

10. **WARRANTY**

- 10.1 The contractor shall issue warranty to the effect that the stores shall be fit for the particular purposes and operations.
- 10.2 The contractor shall guarantee supply of good quality stores in accordance with the specifications and that stores shall be brand new and absolutely free from all defects in materials quality and workmanship. In case of defect the stores or the necessary components shall be replaced by the contractor free of cost up to the Purchaser's premises within a reasonable time.
- 10.3 Warranty period shall be minimum ONE Year or as per Manufacturer, whichever is higher.

12. **BREACH OF CONTRACT**

In case of breach of contract, the damages suffered by the Purchaser shall be recovered to the full extent from the Contractor's Performance Bond and .

13. **DEFAULT-LIABILITY OF CONTRACTOR**

- 13.1 The purchaser may upon written notice of default to the Contractor terminate the contract in circumstances detailed hereunder.
- 13.1.1 If in the judgment of the purchaser the contractor fails to make delivery of items within the time specified in the Contract Agreement or within the period for which the purchaser has granted extension to the contract.
- 13.1.2 If in judgment of the Purchaser, the Contractor fails to comply with any of the other provisions of this contract.
- 13.2 In the event the Purchaser terminates the contract in whole or in part, the Purchaser reserves the right to purchase upon such items and in such a manner, as he may deem appropriate. items similar to the one terminated and the Contractor will be liable to the Purchaser for liquidated damages for delay until such reasonable time as may be required for the final supply of items.



14. **REJECTION**

In the event any portion of the stores supplied by the contractor is found to be defective in material or otherwise not in conformity with the requirements of the contract, the Purchaser shall have the right to either to reject or to request in writing rectification of the stores, then the Contractor shall with utmost diligence and at his own expense correct the same or replace the defective stores. If the Contractor fails to do so, the Purchaser either:

- (i) Opt to replace or rectify such defective stores and charge to the Contractor the excess cost occasioned to the Purchaser plus (15%) fifteen percent.
- (ii) Terminate the Contract for default.
- (iii) In the event the Contractor is not able to rectify or replace the rejected stores within reasonable time, the Purchaser reserves the right to acquire the said stores at a reduced price considered equitable under the circumstances. Nothing in the clause shall affect any claim by the Purchaser under any clause of the Terms & Conditions.

15. **DELAY IN DELIVERY- LIQUIDATED DAMAGES**

- 15.1 If the Contractor fails to deliver the items with the time laid down in the Contract Agreement or any extension thereof, there shall be a deduction from the Contract Price, as liquidated damages, a sum of 2% of total value per month or a part of the month contract price of each unit of the undelivered stores for each calendar month of delay. Total liquidated damages payable to the Purchaser shall not in any case exceed by five percent (5%) of the Contract Price of the unit or units so delayed and such deduction shall be in full satisfaction of the Contractor's liability for the said failure. The amount will be recovered from the Local Agent's Commission/Performance Bond.
- 15.2 Should the progress of the contract at any time be lagging behind the programme agreed between the Purchaser and the Contractor, the Purchaser shall notify the Contractor in writing and the Contractor shall thereupon take such steps as he deem fit to expedite the progress of the Contract.

16. **PERIOD OF GUARANTEE**

- 16.1 The term period of Guarantee shall mean the period of twelve (12) months or as per clause 11.3, from the date on which the items have been put into operation. In any case this period shall not exceed eighteen (18) months from the date of the taking over certificate.
- 16.2 During the period of guarantee the Contractor shall remedy all defects in design materials and workmanship that may develop under normal use of the said stores upon written notice from the Purchaser who shall indicate in what respect the items is faulty.

- 16.3 The provisions of this clause included all the expenses that the Contractor may have to incur for delivery of such replacement parts, material of items up to Purchaser's premises.

17. **ACCEPTANCE TERMS**

The submission of the tender against the tender inquiry by the tenderer means that the tenderer has read and accepted the terms and conditions relating to all the tender document and annexure(s) and has thoroughly examined the specifications and particulars in the tender inquiry.

18. **DISQUALIFICATIONS**

Offers are liable to be rejected if, there is any deviation from instructions as laid down in the bid document i.e.

- 18.1 Technical details/brochures and literature pertaining to the offered items are not attached.  
18.2 Tenders are submitted without the required earnest money.  
18.3 Offers are received after specified date and time.  
18.4 Specification and other requirements are not properly adhered to or manufacturer's brochures show specifications different from those given in the proposal.  
18.5 Authorized dealership certificate from the principal is not attached.  
18.6 **GST/NTN** certificate is not attached.  
18.7 Any other major discrepancy found in the proposal.

19. **PAYMENT**

- 19.1 70% payment shall be released at the time of delivery of items, 30% will be released after installation and getting satisfactory certificate from the purchaser / head of the department, no part payment will be allowed.

## **Contract Agreement**

**THIS CONTRACT** is made at \_\_\_\_\_ on \_\_\_\_\_ day of 2017. Between the QUEST Nawabshah (hereinafter called the "Purchaser") of the First Part and M/s ..... a firm registered under the laws of Pakistan and having its registered office at ..... (Hereinafter called the "Supplier") of the Second Part.

**WHEREAS** the Purchaser invited bids for procurement of items, in pursuance whereof M/s..... being the supplier/ manufacturer/ authorized Agent of ..... (Item name) in Pakistan and ancillary services offered to supply the required item (s); and

Whereas the Purchaser has accepted the bid by the Supplier for the supply of .....(item name) and services in the sum of Rs.....(amount)- (Rupees.....) cost per unit, the total amount of .....(quantity of item).....(item name) shall be Rs.....(amount)- (Rupees.....)

### **NOW THIS CONTRACT WITNESS AS FOLLOWS:**

1. In this Contract words and expressions shall have the same meanings as are respectively assigned to them in the Terms and Conditions of Tender Form and this Agreement.
2. The following documents form and be read and construed as integral part of this Contract, viz:
  - a) the Tender Form and the Price Schedule submitted by the Bidder,
  - b) the Schedule of Requirements;
  - c) the Technical Specifications;
  - d) the Terms and Conditions of Contract;
  - e) the Purchaser's Notification of Award (Supply order).
3. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide items and Services and to remedy defects therein in conformity in all respects with the provisions of this Contract.

4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the items and Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of this Contract at the time and in the manner prescribed by this Contract.

5. This Contract shall be governed by the laws of Pakistan and the courts of Pakistan shall have exclusive jurisdiction.

**IN WITNESS** Whereof the Parties hereto have caused this Contract to be executed at the place and shall enter into force on the day and year first above mentioned.

**Signed/ Sealed by the  
Supplier/ authorized Agent**

**Signed/ Sealed by Purchaser**

1. \_\_\_\_\_

1. \_\_\_\_\_

2. \_\_\_\_\_

2. \_\_\_\_\_

## WARRANTY / GUARANTEE CERTIFICATE

Firm's Name \_\_\_\_\_

Contract No. \_\_\_\_\_

1. I/We hereby guarantee that the items supplied against the above contract are in accordance with the relevant specifications and terms of the contract and that material used. Whether or not of our manufacture are in accordance with the latest approved standard specifications are of good workmanship/quality throughout, and that we shall replace free of cost, every article or part thereof which before use or in use, shall be defective or not within the limits and tolerance of specifications requirements, or in any way not in accordance within the terms of the contract.
2. In case of our failure to replace the defective stores free of cost within the period specified by the purchaser, we will refund the cost involved.
3. The Warranty/Guarantee will remain valid for 12 months after receipt of stores by the consignee/installation of items.

Signature : \_\_\_\_\_

Name : \_\_\_\_\_

Status in the firm : \_\_\_\_\_

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

# FORM OF TENDER

***Contractor/Manufacturer/Supplier***

Telegraphic Address : \_\_\_\_\_  
Telephone Number : \_\_\_\_\_  
Fax Number : \_\_\_\_\_

To,

**The Director Finance**

QUEST, Nawabshah.

Dear Sir,

In response to your invitation to Tender No. \_\_\_\_\_ dated \_\_\_\_\_ I/We hereby submit my/our tender in duplicate for the supply of items as per details given in the schedule hereto duly signed by us or such portion thereof as you may specify in acceptance of tender at the prices given in the said schedule and agree to hold this offer open till \_\_\_\_\_.

I/We shall be bound by a communication of acceptance dispatch within the prescribed time.

I/We have understood the Terms and conditions of Invitation to Tender and have thoroughly examined the specifications quoted in the schedule hereto and am/are fully aware of nature of items required and my/our tender is to supply items strictly in accordance with the requirements.

The Tender particulars have been furnished and signed.

Yours Faithfully

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

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

## TENDER PARTICULARS

### TENDER MUST GIVE SPECIFIC ANSWER FOR EACH ITEM AGAINST EACH OF THE FOLLOWING QUESTIONS

1. Whether Item offered conforms to particulars specified in the schedules, if not, details of deviation must be stated.
  
2.
  - 2.1 Brand of items.
  
  - 2.2 Name & Address of Manufacturer
  - 2.3 Country of Origin of items
  
3. Earliest date by which delivery can be affected and complete schedule of delivery. If delivery period is different for different items, it is to be indicated item-wise. The delivery schedules offered must be guaranteed.
  
4. Whether specification of packing as prescribed in Tender inquiry will be adhered to.

**CONTRACT PERFORMANCE BOND**

(This Bond must be from Scheduled Bank executed on a Stamp Paper)

Known all men by these present, we, \_\_\_\_\_ AND  
 \_\_\_\_\_ address or legal title of Contractor (here insert the legal title  
 of \_\_\_\_\_ are jointly and severally bound to the surety).

Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah including its  
 successor in office and Assignees acting through the Vice Chancellor, (herein after called the  
 "Purchaser") in the sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_  
 \_\_\_\_\_) to be paid to the Purchaser for which payment we  
 jointly and severally bind ourselves and our successors, assignees and legal representatives.

**Signature** \_\_\_\_\_

Signature \_\_\_\_\_

**Dated** \_\_\_\_\_

***The above \_\_\_\_\_ have tendered  
 to the Purchaser for the supply of items for the Quaid-e-Awam University of  
 Engineering Science & Technology Nawabshah and this tender in part has been  
 accepted.***

**NOW THE CONDITION OF THIS BOND IS**

1. That the said \_\_\_\_\_ shall supply the items on C&F Karachi basis to  
 the Purchaser strictly in accordance with the terms and conditions on which the Contract has been  
 awarded to them and shall complete the supply in terms of the contract.
2. AND, if the said \_\_\_\_\_ do not comply  
 with the supply of items within the stipulated period, or such extended period as may be allowed  
 to them by the purchaser, or only partly supply, or do not commence the supply, or commit a  
 breach or failure in the performance or any part of the Contract, the said Bond shall come into  
 force.

AND, if the said \_\_\_\_\_ should execute the contract in terms of the conditions of  
 the Contract and hand-over the work to the Purchaser, his obligation shall be void.

Signature \_\_\_\_\_

Signature \_\_\_\_\_

Dated \_\_\_\_\_



**ANNEXURE "D"**

**Guarantee No.** \_\_\_\_\_

**Issued date** \_\_\_\_\_

*Expiry date* \_\_\_\_\_

**Amount** \_\_\_\_\_

**Guarantee No.** \_\_\_\_\_

**Issued date** \_\_\_\_\_

*Expiry date* \_\_\_\_\_

**Amount** \_\_\_\_\_

**The Director Finance**  
QUEST, Nawabshah.

Where as \_\_\_\_\_ (Herein after called "The Bidder") has submitted its bid dated \_\_\_\_\_ for Quaid-e-Awam University of Engineering, Science & Technology Nawabshah herein after called " The Bid".

And whereas the bidder has requested the bank to issue the Bid Bond/Earnest Money in favour of Quaid-e-Awam University of Engineering Science & Technology Nawabshah for the Sum of Rs. \_\_\_\_\_ (5% of the total estimated price) required to be furnished by the Bidder for consideration of its Bid. Now, thereof we (BANK) \_\_\_\_\_ having our registered office at \_\_\_\_\_ (herein after called "The Bank" hereby Guarantees irrevocably and unconditionally to pay forthwith to the sum of Rs. \_\_\_\_\_ (5% of the total estimated price) without any reference to the Bidder on Quaid-e-Awam University of Engineering Science & Technology Nawabshah first demand in writing stating that the Bidder has withdrawn or unilaterally modified its offer or has after having acceptance of its Bid by Quaid-e-Awam University of Engineering Science & Technology Nawabshah failed to execute the CONTRACT or has failed after executing the CONTRACT to submit to Quaid-e-Awam University of Engineering Science & Technology Nawabshah the performance guarantee/bond required under the CONTRACT.

This guarantee shall remain valid and in force for 120 days from the last date fixed for submission of the Bids that is and any demand for payment by Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah within the said validity period of this guarantee shall be paid forthwith by the bank to Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah.

This guarantee is valid upto \_\_\_\_\_ and any claim arising out of this guarantee must be lodged on or before the \_\_\_\_\_.

WITNESS

BANK

\_\_\_\_\_

\_\_\_\_\_

6 2 6

## Bill of Quantities

<i>S #</i>	<i>Name of the Equipment</i>	<i>Qty</i>	<i>Rate in Pak Rs.</i>
01.	<i>Computer Controlled Wind Energy Unit with SCADA or equivalent With Installation, Commissioning, Training to staff and at least three years of parts warranty. Equivalent</i>		

#	<i>Features / Equivalency</i>
01.	<p><b>EEEC. Unit:</b></p> <p>Unit mounted on an anodized aluminum structure and panels of painted steel.  Main metallic elements of stainless steel.  Diagram in the front panel with similar distribution to the elements in the real unit.  The unit includes:  Stainless steel tunnel of 2000 x 550 x 550 mm. approx., which includes two transparent windows of 1000 x 130 mm. approx.  Aerogenerator:  Diameter: 510 mm. Starting air speed: 2.0 m/s.  Max. power output: 60W. Voltage: 12 V.  Max. charging current: 5A.  It includes a set of six blades.  The aerogenerator incidence angle can be modified to simulate different weather conditions and it's possible to set different blade configurations (aerogenerator with 6, 3 or 2 blades).  This unit allows to change the angle of every blade, as each one embeds its own calibrated protractor. The blades can be adjusted in a 360° range.  Low friction alternator, which provides a smooth and silent output.  Friction less alternator and fixed shaft.  Axial fan with variable speed (computer controlled) for wind simulation:  Max. flow rate: 5750 m<sup>3</sup>/h. Max. power: 0.37 kW. It includes a finger guard.  DC load and battery charger regulator:  It regulates how power generated in the aerogenerator is distributed to and from the auxiliary battery and to the load. A display informs about the state of the charge, operating parameters and fault messages. The functions of the electronic protection are:  Overvoltage disconnection, short circuit protection of load and module, overvoltage protection at module input, over-temperature and overload protection, and battery overvoltage shutdown.  Auxiliary battery charger:  It carefully assesses the battery and then delivers the optimum charge required.  Battery: Nominal voltage: 12 V. Rated capacity (20 hours rate): 24 A/H.</p> <p><b>DC Loads Module:</b></p> <p>Metallic box with diagram in the front panel.  2 Lamps of 12 V.  One DC motor: voltage: 24 V, power: 5W  Rheostat of 500W.  2 Manual switches.  Independent connection for every load with the help of the 4 position load selector:  Position 1: The aerogenerator or regulator operates at open circuit voltage.  Position 2: The DC lamps and the rheostat are directly connected to the aerogenerator or regulator, depending on the selection made in the computer. These loads can be connected independently or in parallel with the help of manual switches.  Position 3: The DC motor is directly connected to the aerogenerator or regulator.  Position 4: Bypass mode, there are no DC loads.</p> <p><b>Sensors:</b></p> <p>"J" type temperature sensor to measure the air temperature inside of the tunnel.  The air speed is measured with a sensor placed in the tunnel; sensor range: 0.20-10 m/s.  An optical sensor measures the rotational speed of the aerogenerator (r.p.m.).  DC voltage and current sensor. It is possible to know, in real time, the value of the DC voltage and the current given by aerogenerator, measured before and after the regulator.</p> <p>The complete unit includes as well:  Advanced Real-Time SCADA.  Open Control + Multicontrol + Real-Time Control.  Specialized Control Software based on Labview.  National Instruments Data Acquisition board (250 KS/s , kilo samples per second).</p>

Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.

Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.

Capable of doing applied research, real industrial simulation, training courses, etc.

Remote operation and control by the user and remote control for technical support, are always included.

Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).

Designed and manufactured under several quality standards.

Optional CAL software helps the user perform calculations and comprehend the results.

This unit has been designed for future expansion and integration. A common expansion is the Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.

Optional (NOT included in the minimum supply):

- EE-KIT. Kit of Conversion and Consumption Simulation (AC).

- EE-KIT2. Grid Connection Inverter Kit.

**EEEC/CIB. Control Interface Box:**

The Control Interface Box is part of the SCADA system.

Control interface box with process diagram in the front panel.

The unit control elements are permanently computer controlled.

Simultaneous visualization in the computer of all parameters involved in the process.

Calibration of all sensors involved in the process.

Real time curves representation about system responses.

All the actuators' values can be changed at any time from the keyboard allowing the analysis about curves and responses of the whole process.

Shield and filtered signals to avoid external interferences.

Real time computer control with flexibility of modifications from the computer keyboard of the parameters, at any moment during the process.

Real time computer control for parameters involved in the process simultaneously.

Open control allowing modifications, at any moment and in real time, of parameters involved in the process simultaneously.

Three safety levels, one mechanical in the unit, another electronic in the control interface and the third one in the control software.

**DAB. Data Acquisition Board:**

The Data Acquisition board is part of the SCADA system.

PCI Express Data acquisition board (National Instruments) to be placed in a computer slot.

Analog input: Channels=16 single-ended or 8 differential. Resolution=16 bits, 1 in 65536. Sampling rate up to: 250 KS/s (Kilo samples per second).

Analog output: Channels=2. Resolution=16 bits, 1 in 65536.

Digital Input/Output: Channels=24 inputs/outputs.

#### EEEC/CSOF. Computer Control +Data Acquisition+Data Management Software:

The three softwares are part of the SCADA system.

Compatible with the industry standards.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data. Sampling velocity up to 250 KS/s (Kilo samples per second).

Calibration system for the sensors involved in the process.

It allows the registration of the alarms state and the graphic representation in real time.

Open software, allowing the teacher to modify texts, instructions.

Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

5 **Cables and Accessories**, for normal operation.

6 **Manuals**: This unit is supplied with 8 manuals: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.

\* References 1 to 6 are the main items: EEEEC + EEEEC/CIB + DAB + EEEEC/CSOF + Cables and Accessories + Manuals are included in the minimum supply for enabling normal and full operation.

#### EE-KIT. Kit of Conversion and Consumption Simulation (AC):

- Single-phase inverter:

Single-phase.

25 kHz switch mode technology.

Start-up power of 200%.

Short-circuit protection.

High temperature protection.

Overcharge protection.

Operation state indicating LED.

Rear connection/disconnection switch.

- AC Loads Module:

Metallic box.

Diagram in the front panel.

Axial compact fan of 230V with plastic guards.

3 Lamps of 220V - 240V., power: 11W.

Independent connection for every load with the help of the 4 positions selector:

- Inverter operation with no load.
- Fan motor connected.
- One AC lamp connected.
- Two AC lamps connected in parallel.

- AC voltage and current sensor. The value of AC power can be visualized with the software.

#### EE-KIT2. Grid Connection Inverter Kit:

Inverter used for the conversion and injection to the grid of the power generated by a simulated source of renewable energy. The simulated source is a simulator used to obtain a variable power to be injected to the grid.

The operation mode is displayed by means of an indicating LED at the front side of the housing.

It is equipped with extensive safety measures to ensure that it is immediately switched off as soon as the AC plug is removed from the wall socket or the operation of the public grid fails.

The inverter can be connected to a computer (PC) through a RS232 communication to display some parameters, such as voltage and current inputs, mains voltage and frequency, maximum AC power, kWh, etc.

- Grid Connection Inverter:

Input (DC):

Nominal power @ 25°C: 150 W.

Maximum power @ 25°C: 220 W.

MPP voltage: 45-125V DC.

Maximum voltage: 155V DC.

Nominal current: 3A.

Output (AC):

Voltage: 230V (207 - 253 V).

Maximum power, fuse: 2.25 A.

Frequency: 50 Hz (49.8 ~ 50.2 Hz).

This unit is supplied with the Grid Simulator (ESR), which simulates a low power grid to inject the power generated by the inverter.

- Grid Simulator (ESR):

ESR is designed to create an isolated low power grid. The unit uses a battery as voltage source and generates a sine signal of 220V/50Hz. The main features of the ESR are:

Inlet voltage source: battery of 12Vdc.

Output: 220V/50Hz.

Isolation transformer.

Battery charger included.

Protection fuses.

The user can work with this module safely. The devices included in the EE-KIT2 can be used worldwide.



**TECHNICAL EVALUTION CRITERIA**  
**Allocated Marks 100**

Passing Marks : 70

S #	DESCRIPTION	MARKS
1	Features as per specifications required / decided by the evaluation committee. (a) A category 20 Marks, (b) B category 15 Marks (c) C category 10 marks	20
2	Importers status / venture (a) 20 Consignments 10 Marks (b) 10 or not less than 05 05 Marks	10
3	Completed work with import / supply, Training, installations, Commission with certificate :- (a) 50 work 10 marks (b) 40 work 05 ©	10
4	Brand Manufacturers approved authorized Distributor (a) Int'l Distributor 10 Marks, (b) Local Distributor 05 Marks (c) Local vender 02marks	10
5	Local Office of Distributor / Vendor (a) Karachi 5 Marks, (b) Lahore 3 Marks (c) others 02marks	05
6	Sharp Delivery Time / accomplishment of Task (overall *) (a) Timely Accomplishment 60 days from Supply order 5 Marks (b) delivery within 90 days 3 Marks	05
7	Client List of related Job (a) More than 100 clients with list 5 Marks, (b) Less than 100 but above 75 clients 3 Marks (c) <75 02marks	05
8	PEC Registered Engineers working in the organization (a) above 05 0 5 Marks, (b) < 5 but more than 2 . 0 3 Marks (c) Only 01 0 2marks	05
9	Current bank Balance of Company / Distributor / Vendor a) > 100M 10marks b) < 50 M & >2.0M 05marks	10
10	Last paid 3 month tax Return GST / Income Tax a) 100% paid return 10 marks b) 80% paid return 5 marks	10
11	Total turnover of company / Distributor / vender per anum a) 200 M 10 Marks b) 100M 05 marks	10
<b>TOTAL</b>		<b>100</b>