

**REQUEST FOR QUOTES (RFQ) #2014-13 THREE-PHASE 18kW  
 PROGRAMMABLE ELECTRIC AC LOAD CABINET**

Issue Date: April 25, 2014

Project Name:	Electrical Engineering and Renewable Energy Three-Phase 18kW Programmable Electric AC Load Cabinet		
BID Due Date/Time:	May 6, 2014, 1:00 PM		
Project Coordinator:	Frank Rytkonen	Phone:	503-821-1261
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Contract Coordinator:	George Marlton	Phone:	503-821-1277
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**SUBMIT QUOTES VIA EMAIL TO [PURCHASING@OIT.EDU](mailto:PURCHASING@OIT.EDU) OR MAIL/HAND DELIVERY TO THE ABOVE WILSONVILLE ADDRESS TO GEORGE MARLTON**

**PLEASE NOTE: EMAIL SUBMISSIONS SHOULD HAVE “RFQ #2014-13 THREE-PHASE 18kW PROGRAMMABLE ELECTRIC AC LOAD CABINET” IN THE SUBJECT LINE**

**1. ANNOUNCEMENT AND SPECIAL INFORMATION**

Quoters are required to read and understand and comply with all information contained within this RFQ. All quotes are binding upon Quoter for thirty (30) days from the RFQ Due Date/Time. All payments for services will be paid in accordance to OAR 580-061-0050. Quotes received after the RFQ Due Date/Time may not be considered. Travel and other expense reimbursement will only be reimbursed in accordance with the Oregon Tech Contractor’s Travel Reimbursement Policy at the time the expense is incurred.

It will be the responsibility of potential Quoters to refer daily to the OUS Procurement Gateway website (<https://secure.ous.edu/bid/>) to check for any available addenda, response to clarifying questions, cancellations or other information pertaining to this Request for Quotes.

**2. SCOPE**

The purpose of this RFQ is to purchase one new three-phase 18 kW programmable electronic AC load cabinet for the Oregon Institute of Technology Electrical Engineering and Renewable Energy Department in Wilsonville, Oregon. The 18 kW programmable electronic AC load cabinet must have the following:

- Wired for wye-connection with three separate power channels of 6000W each, 50-350Vrms line-to-line
- Castors on Cabinet
- Screw connection terminals for stranded wire sizes 14-4 AWG
- Constant Current, Voltage, Resistance, Power, and Short-Circuit modes with ability to continuously modulate parameters from no-load to full-load
- Windows Graphical User Interface application software or LabVIEW virtual instrument with drivers
- User manual on CD-ROM

- All shipping costs must be included in the quote and must be FOB destination Wilsonville, Oregon.

The scope further includes the following OIT Power Lab equipment specification document attached and hereby incorporated by reference as Exhibit A

**Delivery:**

Delivery time is of the essence and may be a factor in making an award

**3. Quote**

Quotes should be short and concise with the following information:

- A. Description of items to be provided, annotated with proposed deviations from scope or specification requirements;
- B. Price including shipping FOB Destination;
- C. Warranty information; and
- D. Estimated delivery time upon order submission.

**4. Evaluation**

The quote received by the lowest responsive responsible Quoter will be awarded a contract. The "lowest responsive responsible Quoter" is the lowest Quoter who has substantially complied with all requirements of the Request for Quote and who can be expected to deliver promptly and perform reliably.

**OREGON INSTITUTE OF TECHNOLOGY  
CERTIFICATIONS  
RFQ #2014-13**

Each Quoter must read, complete and submit a copy of this Oregon Institute of Technology Certification with their Quote. Failure to do so may result in rejection of Quote. By signature on this Certification the undersigned certifies that they are authorized to act on behalf of the Quoter and that under penalty of perjury the undersigned will comply with the following:

**SECTION I. OREGON TAX LAWS**

As required in ORS 305.385(6) the undersigned hereby certifies that to the best of the undersigned's knowledge, the Entity is not in violation of any Oregon Tax Laws. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 401.792 to 401.816 and ORS chapters 118, 314, 316, 317, 318, 320, 321 and 323; the elderly rental assistance program under ORS 310.630 to 310.706; and local taxes administered by the Department of Revenue under ORS 305.620. If a Contract is executed, this information will be reported to the Internal Revenue Service. Information not matching IRS records could subject Contractor to 31% backup withholding.

**SECTION II. AFFIRMATIVE ACTION**

The undersigned hereby certifies that they have not discriminated against Minority, Women or Emerging Small Business Enterprises in obtaining any required subcontracts, pursuant to OAR 580-061-0030(3).

**SECTION III. COMPLIANCE WITH SOLICITATION**

The undersigned further agrees and certifies that they:

1. Have read, understand and agree to be bound by and comply with all requirements, instructions, specifications, terms and conditions of the RFQ (including any attachments); and
2. Are an authorized representative of the Quoter, that the information provided is true and accurate, and that providing incorrect or incomplete information may be cause for rejection of the Quote or contract termination; and
3. Will furnish the designated item(s) and/or service(s) in accordance with the RFQ and Quote.

Firm Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_ Title: \_\_\_\_\_  
Name (Type or Print): \_\_\_\_\_ Telephone: \_\_\_\_\_  
Email: \_\_\_\_\_ OR CCB # (if applicable): \_\_\_\_\_

Business Designation (check one):

Corporation  Partnership  Sole Proprietorship  Non-Profit  Limited Liability Company

Oregon Certified Minority, Women, or Emerging Small Business: (Mark if applicable and certification #)

Minority: \_\_\_\_\_  Women: \_\_\_\_\_  ESB: \_\_\_\_\_

Self-Reported Minority, Women, or Emerging Small Business: (Mark if applicable)

Minority: \_\_\_\_\_  Women: \_\_\_\_\_  ESB: \_\_\_\_\_

## OREGON INSTITUTE OF TECHNOLOGY INSTRUCTIONS TO QUOTERS

Quotes are subject to the applicable provisions and requirements of the Oregon Administrative Rules and Oregon Revised Statutes.

### QUOTE PREPARATION

1. **QUOTE FORMAT:** Quotes must be submitted as indicated in the RFQ. Quotes may be submitted in writing to Oregon Tech office via e-mail, mail or in person.
2. **CONFORMANCE TO RFQ REQUIREMENTS:** Quotes must conform to the requirements of the RFQ. Unless otherwise specified, all items quoted are to be new, unused and not remanufactured in any way. Any requested attachments must be submitted with the quote and in the required format. Quote prices must be for the unit indicated on the quote. Failure to comply with all requirements may result in quote rejection.
3. **ADDENDA:** Only documents issued as addenda by Oregon Tech serve to change the RFQ in any way. No other directions received by the Quoter, written or verbal, serve to change the RFQ document. NOTE: IF YOU HAVE RECEIVED A COPY OF THE RFQ, YOU SHOULD CONSULT THE UNIVERSITY PROCUREMENT GATEWAY WEBSITE (<https://secure.ous.edu/bid/>) TO ENSURE THAT YOU HAVE NOT MISSED ANY ADDENDA OR ANNOUNCEMENTS. QUOTERS ARE NOT REQUIRED TO RETURN ADDENDUMS WITH THEIR QUOTE. HOWEVER, QUOTERS ARE RESPONSIBLE TO MAKE THEMSELVES AWARE OF, OBTAIN AND INCORPORATE ANY CHANGES MADE IN ANY ADDENDUMS ISSUED, AND TO INCORPORATE ANY CHANGES MADE BY ADDENDUM INTO THEIR FINAL QUOTE. FAILURE TO DO SO MAY, IN EFFECT, MAKE THE QUOTER'S QUOTE NON-RESPONSIVE, WHICH MAY CAUSE THE QUOTE TO BE REJECTED.
4. **USE of BRAND or TRADE NAMES:** Any brand or trade names used by Oregon Tech in RFQ specifications are for the purpose of describing and establishing the standard of quality, performance and characteristics desired and are not intended to limit or restrict competition. Quoters may submit quotes for substantially equivalent products to those designated unless the RFQ provides that a specific brand is necessary because of compatibility requirements, etc. All such brand substitutions shall be subject to approval by Oregon Tech.
5. **PRODUCT IDENTIFICATION:** Quoters must clearly identify all products quoted. Brand name and model or number must be shown. Oregon Tech reserves the right to reject any quote when the product information submitted with the quote is incomplete.
6. **FOB DESTINATION:** Unless specifically allowed in the RFQ, ***QUOTE PRICE MUST BE F.O.B. DESTINATION with all transportation and handling charges paid by the Quoter.***
7. **DELIVERY:** Delivery time must be shown in number of calendar days after receipt of purchase order.
8. **EXCEPTIONS:** Any deviation from quote specifications, or Oregon Institute of Technology Purchase Order Terms and Conditions may result in quote rejection.
9. **SIGNATURE ON QUOTE:** Quotes must be signed by an authorized representative of the Quoter. Signature on a quote certifies that the quote is made without connection with any person, firm or corporation making a quote for the same goods and/or services and is in all respects fair and without collusion or fraud. Signature on a quote also certifies that the Quoter has read and fully understands all quote specifications, and the Oregon Institute of Technology Purchase Order Terms and Conditions (including insurance requirements). No consideration will be given to any claim resulting from quoting without comprehending all requirements of the RFQ.
10. **QUOTE MODIFICATION:** Quotes, once submitted, may be modified in writing before the time and date set for quote closing. Any modifications should be signed by an authorized representative, and state that the new document supersedes or modifies the prior quote. Quoters may not modify quotes after quote closing time.
11. **QUOTE WITHDRAWALS:** Quotes may be withdrawn by request in writing signed by an authorized representative and received by Oregon Tech prior to quote closing time. Quotes may

also be withdrawn in person before quote closing time upon presentation of appropriate identification.

- 12. QUOTE SUBMISSION:** Quotes may be submitted by returning to Oregon Tech Purchasing and Contract Services Office in the location designated in the introduction of the RFQ via e-mail, mail or in person but no oral or telephone quotes will be accepted. Envelopes, or e-mails containing Quotes should contain the RFQ Number and RFQ Title.

#### **QUOTE EVALUATION AND AWARD**

- 1. PRIOR ACCEPTANCE OF DEFECTIVE PROPOSALS:** Due to limited resources, Oregon Tech generally will not completely review or analyze quotes which fail to comply with the requirements of the RFQ or which clearly are not the best quotes, nor will Oregon Tech generally investigate the references or qualifications of those who submit such quotes. Therefore, neither the return of a quote, nor acknowledgment that the selection is complete shall operate as a representation by Oregon Tech that an unsuccessful quote was complete, sufficient, or lawful in any respect.
- 2. DELIVERY:** Significant delays in delivery may be considered in determining award if early delivery is required.
- 3. CASH DISCOUNTS:** Cash discounts will not be considered for award purposes unless stated in the RFQ.
- 4. PAYMENT:** Quotes which require payment in less than 30 days after receipt of invoice or delivery of goods, whichever is later, may be rejected.
- 5. INVESTIGATION OF REFERENCES:** Oregon Tech reserves the right to investigate references and or the past performance of any Quoter with respect to its successful performance of similar services, compliance with specifications and contractual obligations, and its lawful payment of suppliers, sub-contractors, and workers. Oregon Tech may postpone the award or execution of the contract after the announcement of the apparent successful Quoter in order to complete its investigation. Oregon Tech reserves the right to reject any quote or to reject all quotes at any time prior to Oregon Tech's execution of a contract if it is determined to be in the best interest of Oregon Tech to do so.
- 6. METHOD OF AWARD:** Oregon Tech reserves the right to make the award by item, groups of items or entire quote, whichever is in the best interest of Oregon Tech.
- 7. QUOTE REJECTION:** Oregon Tech reserves the right to reject any and all quotes.
- 8. QUOTE RESULTS:** Quoters who submit a quote will be notified of the RFQ results. Awarded quote files are public records and available for review by appointment.

## SECTION 26 32 36

PROGRAMMABLE AC ELECTRONIC LOAD  
04/14

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE Std 802.3 (2012) Ethernet

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2014) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-232-F (1997; R 2002) Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange

UNIVERSAL SERIAL BUS IMPLEMENTERS FORUM (USB-IF)

USB 2.0 (2000) Universal Serial Bus Specification

## 1.2 SYSTEM DESCRIPTION

## 1.2.1 System Requirements

The programmable AC electronic load (AC load), consisting of commercial, off-the-shelf electronic devices, communication channels, and PC-based workstation software, will be used to provide a varying electronic load for testing single- or three-phase AC electrical generation sources. Provide a single system utilizing a communication link for remote programming and programming software.

The AC load must consist of three independent single phase AC loads to be used in a three phase application. Each phase shall operate from 50 VAC - 350 VAC range and discharge with maximum power of 6 kW for a three-phase total power of 18 kW. AC load configuration shall be made-up of a modular design to eliminate single point failure. AC load modules shall be mounted in a single bay, 72" height cabinet.

The overall system shall be a three phase, wye-connected, 18 kW total power, programmable AC electronic load. Each phase of the AC load shall be capable of discharging up to 60 A simultaneously. Each phase shall be able to meet the requirements of Sections 1.2.2 and 1.2.3.

### 1.2.2 Programmable Mode Ranges and Accuracy

The system shall maintain the specified end-to-end accuracy. The system operating modes and accuracy requirements are as follows:

- a. Constant Current: Range (RMS) 0 - 60 A, Accuracy 0.2%, Resolution 0.05%
- b. Constant Voltage: Range 50 - 350 V, Accuracy 0.2%, Resolution 0.05%
- c. Constant Power: Range 600 W - 6 kW, Accuracy 0.5%, Resolution 0.05%
- d. Constant Resistance: Ranges 100-1000  $\Omega$ , Accuracy 1, 5%, Resolution 0.05%
- e. Short Circuit: Max Surge Current 600 A, up to 50 msec, Max. Continuous current: 60 A rms.
- f. Power Factor: Range 0 -1, lead/lag 0 -1, Accuracy 1%, Resolution 0.05%
- g. Crest Factor: Range 1.414 - 3.5, 180 A limit, Accuracy 1%, Resolution 0.05%

### 1.2.3 Measurement Readback and Accuracy

The system shall maintain the specified end-to-end accuracy. The system operating modes and accuracy requirements are as follows:

- a. Current: Ranges (RMS) 0 - 60 A, Accuracy 0.2%, Resolution 0.01%
- b. Peak Current: Ranges 0 - 180 A, Accuracy 0.5%, Resolution 0.01%
- c. Voltage: Ranges 50 - 350 V, Accuracy 0.1%, Resolution 0.01%
- d. Peak Voltage: Ranges 50 - 500 V, Accuracy 0.5%, Resolution 0.01%
- e. Frequency: Range 45 - 440 Hz, Accuracy 0.1%, Resolution 0.01%
- f. True Power: Ranges 0 - 21 kVA, Accuracy 0.5%, Resolution 0.01%
- g. Apparent Power: Range 0 - 21 kVA, Accuracy 0.3%, Resolution 0.01%
- c. Reactive Power: Range 0 - 10.5 kVA, Accuracy 0.3%, Resolution 0.01%
- d. Peak Power: Range 0- 90 kW, Accuracy 1.0%, Resolution 0.1%
- e. Resistance: Range 1.25-50, 50-500  $\Omega$ , Accuracy 1%, 5%, Resolution 0.01%
- f. Crest Factor: Range 1.414 - 3.5, Accuracy 0.5%, Resolution 0.01%
- g. Power Factor: Range 0 -1, lead/lag 0 -1, Accuracy 0.5%, Resolution 0.01%

#### 1.2.4 Physical Description

##### 1.2.4.1 Modules

6 kW modules shall consist of two (2) chassis. Each chassis (HxWxD) is 17½ x 19 x 25 in and rack mountable. Weight of each module shall not exceed 180 lbs.

##### 1.2.4.2 Cabinet

Three (3) 6 kW per phase modules shall be mounted and provided in a cabinet. Cabinet shall be no larger than 72" x 23" x 30" in dimension and house all three independent 6 kW AC loads. Cabinet shall be mounted on casters and weigh no more than 700 lbs. Cabinet shall have common input power and communication interface point.

##### 1.2.4.3 Electrical

Each module shall have a selectable switch to allow 120 V, 220 V, and 240 V input. Module shall have accessible input fuse without removing panels. Module shall be wired with proper fuse rated at 120 VAC input.

##### 1.2.5 Power Source

Power shall be provided to the fans and control circuits of each load module.

Maximum continuous current: 5 A.

##### 1.2.6 Communications

Communication between the programmable AC load and a computer workstation shall be over IEEE 802.3 Ethernet, TIA-232-F serial, or USB 2.0 communications channels (in order of preference).

##### 1.2.7 Expansion Requirements

The system shall be easily upgradeable, in a minimum of 3 kW building blocks, and can be field upgraded to a configuration over 100 kW.

#### 1.3 DELIVERY OF TECHNICAL DATA AND COMPUTER SOFTWARE

##### 1.3.1 Data, Drawings, and Manuals

Deliver all items of software and technical data (including technical data which relates to computer software).

##### 1.3.3 Technical Data Package

###### 1.3.3.1 System and Installation Drawings

Deliver a complete data package for all materials and equipment as specified.



#### 1.3.3.2 Equipment Data

Deliver a complete data package for all materials and equipment as specified.

#### 1.3.3.3 Installation, Setup and Operation Guides

Include the manufacturer's standard installation, setup, and operation guides for software, communications, and hardware.

#### 1.3.3.4 User's Guides

Include the manufacturer's standard user's guides for all hardware and software provided with the system.

#### 1.3.3.5 Certifications

Provide written certifications that system components meet the requirements specified.

Submit the performance verification test data to the customer.

#### 1.3.7 Operation and Maintenance Manuals

Include operation and maintenance manuals of all software and hardware.

### 1.4 ENVIRONMENTAL REQUIREMENTS

All associated equipment shall operate without damage or degradation under the following ambient conditions, unless otherwise noted.

- a. Operating Temperature: 60 to 85 degrees F.
- b. Operating Humidity: 20 to 80 percent, non-condensing.

## PART 2 PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT

#### 2.1.1 General

Units of the same type of equipment shall be products of a single manufacturer. Each major component of equipment shall have the manufacturer's name and address, with model and serial number in a conspicuous place. All materials and equipment shall be currently in production at time of delivery to the customer.

#### 2.1.2 Field Wiring, Cabling, and Terminals

- a. The AC load shall be able to accommodate termination of single- or three-phase field power wiring per **NFPA 70** capable of handling the full load of the system. Wiring shall terminate via clearly marked and labeled terminals or provided connectors.
- b. Communication cables shall terminate at standard jacks per the channel specifications.

## 2.4 SYSTEM SOFTWARE

Macros queues of up to 100 commands must be able to be run manually or from a triggered event such as phase angle, input voltage level, or system trigger.

User-defined custom waveforms must be able to be created through a full-screen graphical editor that provides control of current, voltage, resistance, power, crest factor and power factor.

Loads shall be able to be controlled completely by either:

a. National Instruments LabVIEW software (supplied by the customer). Virtual instrument AC load GUI interface for LabVIEW and IVI-C /COM drivers shall be provided by the manufacturer.

b. A manufacturer-supplied stand-alone executable software program that is compatible with Windows 8.

## PART 3 EXECUTION

### 3.1 CALIBRATION

AC load shall include detailed calibration procedures. Calibration shall be able to be performed by the user.

The system shall be delivered calibrated or calibrated on site to NIST traceable standards with a calibration that is valid for a full year.

### 3.2 SHIPPING AND RECEIVING

The manufacturer shall use commercial best practices.

The customer shall complete a receipt inspection and verification testing within 30 days of receiving the AC load.

### 3.3 WARRANTY

The manufacturer shall guarantee the AC load to be free from manufacturing defects for a minimum warranty period of one year.

-- End of Section --