TERMS OF REFERENCE FOR THE SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF AUTOMATIC CALIBRATION FACILITY FOR RADIOMETERS (ACFR)

A. BACKGROUND

Measurement of solar radiation is important for a wide range of applications such as agriculture, electricity generation, engineering, architecture and health among others. Further, it is also essential in monitoring the effects on plant growth, analysis of evaporation and irrigation, design of solar heating systems, predictive models of weather and climate and many other applications.

Solar radiation is measured using a sensor. This sensor is not complete until it is calibrated. Solar radiation requires traceability to WMO standard and it is necessary to calibrate instruments prior to their deployment in order to ensure high-quality observational data. Comparison and calibration must also be performed periodically to track instrument performance and enable appropriate correction.

The Calibration Facility for Radiometers to be acquired is designed for the calibration of field pyranometers by comparison to a reference pyranometer. Currently, PAGASA has around 150 pyranometers deployed in the field and calibration is required for data homogeneity. In addition, private entities are also maintaining their own pyranometers for their own purposes. These pyranometers are calibrated every two years in other countries due to lack of calibration facility in the Philippines in order to maintain their traceability to reference standards.

With the acquisition of this Calibration Facility, PAGASA can encourage these private entities to have their sensors calibrated to save money on handling and expensive calibration fees overseas. PAGASA may only charge these companies at acceptable rates. Hence, cost of investment will eventually be recovered and at the same time, all pyranometers within the PAGASA network are all regularly standardized.

B. APPROVED BUDGET FOR THE CONTRACT (ABC)

The Approved Budget for the Contract (ABC) is **SIXTEEN MILLION NINE HUNDRED NINETY-NINE THOUSAND & ONE HUNDRED PESOS ONLY (16,999,100.00)** inclusive of VAT and other applicable taxes prescribed by law.

C. PERIOD AND PLACE OF DELIVERY

The winning bidder shall Supply, Deliver, Install, Test and Commission the Automatic Calibration Facility for Radiometers (ACFR) within a period of **One Hundred Fifty (150) calendar days** commencing upon receipt of the Purchase Order (PO). The location of delivery at National Solar Radiation Center (NSRC), PAGASA Science Garden Compound, Agham Road, Diliman, Quezon City.

D. TECHNICAL SPECIFICATIONS

1. **Automatic Calibration Facility (1 unit)**
   Includes:
   - Calibration workstation
   - Computer system (PC, Label Printer and Certificate Printer
   - Calibration Software including Instructional Guide

2. **CMP3 Reference Instrument (2 units)**

   Reference instrument for calibrating: CM3, CMP3, SMP3

3. **CMP6 Reference Instrument (2 units)**

   Reference instrument for calibrating: CMP6, CM6B and SMP6

4. **CMP21 Reference Instrument (2 units)**

   Reference instrument for calibrating: CMP10, CMP11, CMP21, CM11/11B, SMP10, SMP11, SMP21 and CMA11, CM14/14B

5. **CMP22 Reference Instrument (2 units)**

   Reference instrument for calibrating: CMP22, SMP22

6. On-site installation of the ACFR by the Factory Service Engineer that includes travel and accommodation expenses

7. **Instrument Labels for Approximately 300 Calibrations (2 units)**
   - Part Number: 2075070

8. **Label Printer Ribbon (2 units)**
   - Part Number: 4410636

E. Training

- On-site training of ten (10) PAGASA personnel for four (4) days that includes training kits and meals (AM/PM snacks and lunch) during the training.

F. WARRANTY

i. Five (5) years support service that includes:

a.) Audit on the 2nd year and 4th year after installation for two (2) days per visit by factory engineer / auditor;

b.) Yearly re-calibration of one (1) set of reference pyranometers at the World Radiation Center, Davos, Switzerland for five consecutive years that includes return shipment.

The sets of reference instruments are interchanged each year, each set is used for one year and the next year this set is sent to factory, recalibrated and administrated in the reference ACFR;

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Website: http://bagong.pagasa.dost.gov.ph

c.) One-time participation of one (1) PAGASA employee on Training on Radiometry and Calibration of Reference Radiometers in the IPC XIII, Davos, Switzerland

d.) Annual calibration of Digital Multimeter, five (5) years

ii. Products are warranted to be free from defects in materials and workmanship for a period of one (1) year from date of delivery.

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