**REQUEST FOR PROPOSAL  
SPECIFICATION OF SPECIFIED GOODS**

**Procurement No:** **27-g006-22**

## Specification

### Background

The Kiribati-Italy Renewable Energy Programme #8 (KIIREP #8) is part of a series funded projects from the Italian Government focusing on Renewable Energy (RE) projects. KIIREP#8 will be more centered on the PV off-grid system and Electrical Distribution Network rehabilitation on four boarding schools in three different islands.

Four (4) boarding schools were targeted, in this project component, namely Immaculate Heart College (IHC), St. Joseph College (SJC), Stephen Whitmee High School (SWHS) and Kauma Adventist High School (KAHS).

On the 30th of September 2020, the Italian government through its Italian Ministry of Ecological Transition (IMET) had transferred the 1st Tranche of funding amounting 250,000USD to be utilized in this request for proposal (RFP) procedure.

### Project Objectives

* Provide reliable and affordable 24/7 electricity access in four rural boarding school communities with total 1,844 beneficiaries of which 249 where staff and families and 1,595 students.
* Introduce a standard and robust PV Solar mini grid/hybrid technology and efficient and safe distribution network for the School which will be operated and maintained by a Renewable Energy (RE) Government entity for long term sustainability.
* Improve schools ability to deliver quality education programs through continuous access to resources such as internet, photocopy machines, computers and other electronic asset that will improved the standard of teaching and student learning.
* Support social and economic development of the school and village communities.

### 

### Requirements

All supporting documentation must be in English.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TECHNICAL REQUIREMENT and SPECIFICATIONS FOR TENDER – PVSBS/1 and PVSBS/2 (*PV SOLAR FOR BOARDING SCHOOLS*) PROJECT** | | | | | |
| **Item** | **Specifications Required** | **Specifications Offered** | | **Notes, Remarks, References** | **Evaluation Committee Notes** |
| **1** | **General Requirements**  The Solar PV off-grid project under this Terms of Reference (TOR) must include but not necessarily be limited to the following job activities; |  | |  |  |
| **1.1** | Design a PV Solar off-grid Systems with Generator Backup to be installed by Kiribati  Ministry of Infrastructure and Sustainable Energy to supply power to the identified site. The Solar PV unit must continuously supply a 3 phase 415V AC (240V AC single phase), 50Hz balanced sine wave electricity to the mini-grid systems. The Solar PV unit shall be of the modular type to allow for further expansion of the installed capacity. There are 4 project sites to be covered under this project with various capacity listed below.  25kW Immaculate Heart College (IHC) – North Tarawa  25kW Saint Joseph College (SJC) – Abaiang Island  25kW Stephen Whitmee High School (SWHS) – Abaiang Island  30kW Kauma Adventist High School (KAHS) – Abemama Island  From the above-mentioned information, all sites would be utilizing a **carport mounting** structure with at least 2.5 meters high above the ground. |  | |  |  |
| 1.2 | Supply of Major System Components for the system in clause (I) above. | |  |  |  |
| 1.3 | Provide technical support if required to Kiribati Ministry of Infrastructure and Sustainable Energy technical staff during installation of the Solar System | |  |  |  |
| 1.4 | Design should incorporate 3 phase diesel generators for use as back up. Design should aim to reduce the run time of the generator to a minimum to reduce fuel costs and CO2 emissions. | |  |  |  |
| 1.5 | All wiring and system designs must Conform to Australia & New Zealand standards. | |  |  |  |
| 1.6 | System Performance Figures as per item 3.0 | |  |  |  |
| 2 | **Photovoltaic System**  General terms and conditions where the PV Arrays will be installed include; | |  |  |  |
| 2.1 | A Minimum Array Size of **27.5kWp** for 25kW systems;   1. Immaculate Heart College (IHC); 2. Saint Joseph College (SJC); and 3. Stephen Whitmee High School (SWHS)   And a Minimum Array Size of **33kWp** for a 30kW system.   1. Kauma Adventist High School (KAHS) | |  |  |  |
| 2.2 | Photovoltaic cells shall be of a mono-crystalline or poly-crystalline silicon type. Amorphous and thin film type cells are not acceptable under this tender. Cells shall be fitted on overhead mounting structure. | |  |  |  |
| 2.3 | Suitable for an environment of high ambient temperature, high humidity and high level of atmospheric salt. | |  |  |  |
| 2.4 | Solar modules shall have minimum capacity of 375W Polycrystalline OR Monocrystalline Solar Panel | |  |  |  |
| 2.5 | The system must be designed to suit tropical costal conditions. All system components are to be fully integrated and compatible | |  |  |  |
| 2.6 | Area occupied by PV Array installation must be minimized as much as possible. Refer to item 3.1 | |  |  |  |
| 2.7 | **Lifetime**  The equipment shall be designed to last at least 20 years of outdoor exposure under the local conditions. | |  |  |  |
| 2.8 | **Information required from the Tenderer**  Performance of equipment  Tenders must include details of prior qualifying service, a statement attesting that the materials offered are identical to those used in prior service and the names and addresses of at least two users not affiliated with the manufacturer or Tenderer who are willing to corroborate the stated field experience.  Detailed drawings of the array structures and the module arrangement shall be provided. This shall include the angle of tilt of 10° as well as the foundation details for the structure proposed. The drawings shall state the thickness of the material and clearly indicate the structural soundness of the structure.  Structures with panels installed shall be rated for winds up to 150 km/h. | |  |  |  |
| 2.9 | Warranty  The required module shall have a manufacturing warranty of 10 years and a performance warranty of 25 years | |  |  |  |
| 3 | **Photovoltaic Support Structure (Rack)** | |  |  |  |
| 3.1 | PV modules need to be supported on a suitable Carport Mounted Support Structure that could fit in the Area dimension shown below and to withstand corrosive, heavy load and strong wind. Details are as follows;   |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***Project Site*** | ***System Size*** | ***Minimum Array size*** | ***Area dimension L x W*** | ***Mounting Structure*** | | 1. Immaculate Heart College (IHC) | 25kW | 27.5kWp | 27m x 10m | Carport mount | | 1. St. Joseph College (SJC) | 25kW | 27.5kWp | 27m x 7.5m | Carport mount | | 1. Stephen Whitmee High School (SWHS) | 25kW | 27.5kWp | 20m x 15m | Carport mount | | 1. Kauma Adventist High School (KAHS) | 30kW | 33kWp | 27m x 12m | Carport mount | | |  |  |  |
| 3.2 | Tenders must include details of prior qualifying service, a statement attesting that the materials offered are identical to those used in prior service and the names and addresses of at least two users not affiliated with the manufacturer or Tenderer who are willing to corroborate the stated field experience.  Detailed drawings of the array structures and the module arrangement shall be provided. This shall include the angle of tilt as well as the foundation details for the structure proposed. The drawings shall state the thickness of the material and clearly indicate the structural soundness of the structure.  The array mounting structure, when built and with the modules installed, must withstand winds up to 150 km/h | |  |  |  |
| 3.3 | All carport structure and post shall build to withstand heavy load, strong wind (150  km/h) and suitable for an environment of high ambient temperature, high humidity and high level of atmospheric salt. | |  |  |  |
| 3.4 | Tilt angle shall be adjustable between 10-20 degrees and suitable to the design of system as outlined in item 3.1 | |  |  |  |
| 3.5 | The material of rack and mounting brackets of the solar arrays must be designed to withstand corrosive maritime climate and strong winds as stated in 3.3. All support structure components including brackets and fasteners must be able to resist outdoor exposure without any appreciable corrosion | |  |  |  |
| 3.6 | A manual containing construction and assembly of the mounting structures and mounting of modules must be provided with tender | |  |  |  |
| 3.7 | Engineering Diagrams for foundations and Framing should be supplied with tender | |  |  |  |
| 4 | **Battery Energy Storage System (BESS)** | |  |  |  |
| 4.1 | BESS should cater for a daily energy required for each project sites as listed below;   |  |  | | --- | --- | | **Project Site** | **Daily Energy consumption** | | 1. Immaculate Heart College (IHC) | 145kWh | | 1. St. Joseph College (SJC) | 130kWh | | 1. Stephen Whitmee High School (SWHS) | 125kWh | | 1. Kauma Adventist High School (KAHS) | 200kWh |   Tenderers should take into account safe conditions to maximize the BESS life cycle and the life span of the Solar System  The battery technology preferred in this project should scalable up to at least 500kWh for future expansion of the system. | |  |  |  |
| 4.2 | **BESS technical requirements**  Option 1  The battery should be of lithium batteries that will meet the energy requirements per respective sites as identified in item 4.1. Lithium Phosphate batteries are only acceptable under this tender.  Option 2  The tenderer has the option of supplying the valve-regulated lead acid (VRLA) variety, with a gelled electrolyte. Absorbed glass mat (AGM) and flooded lead acid (FLA) batteries are not acceptable under this tender.  The tender technical evaluation will be based on lifespan, maintenance, and technological advancement of the battery. | |  |  |  |
| 4.3 | **BESS Performance**  The BESS performance shall meet the following requirements;   1. **Lithium Batteries** 2. The manufacture of the batteries is to be optimized for tropical environments, where operating temperatures vary between 30 °C and 35 °C; 3. The batteries self-discharge shall not exceed 3% per month at 20°C, and 6.5% per month at 30°C; 4. The batteries to be supplied for cluster 1 and 2 must achieve at least 6,000 cycles at an average Depth of Discharge (DoD) of 100%; 5. While in service, Lithium batteries are not to be discharged more than 80%. This is to be set at the main master inverter; 6. not less than 3,000 Cycle @ 80 % DOD 7. Battery cases are to be made of impact-resistant material;   Modules should be scalable up to a maximum of 500 kWh.   1. **For VRLA Batteries** 2. The manufacture of the batteries is to be optimized for tropical environments, where operating temperatures vary between 30 °C and 35 °C; 3. The batteries to be supplied for cluster 1 and 2 are to have positive tubular plates. Self-discharge shall not exceed 3% per month at 20°C, and 6.5% per month at 30°C; 4. The batteries to be supplied for cluster 1 and 2 must achieve at least 4,500 cycles at an average Depth of Discharge (DoD) of 33%. | |  |  |  |
| 4.4 | Batteries should have a life expectancy of 8 years or more | |  |  |  |
| 4.5 | The batteries shall be designed to operate in a tropical, marine environment subject to intermittent salt spray, continuous exposure to high ambient temperature (25-35 °C) and humidity approaching 100%. | |  |  |  |
| 4.6 | Battery bank voltage shall be 48V nominal voltage | |  |  |  |
| 4.7 | **Battery accessories**  The following accessories shall be delivered as part of the battery set:   1. **Lithium Battery**  * Cable lugs for battery cable * Battery fuse holder with fuses (Sized from inverter/charger requirements) * Battery racks (if necessary) * Cable conduits (flexi conduit) * BMS with communication accessories * Torque wrench  1. **VRLA Battery**  * Insulated series connectors (bridge links), * Battery lugs and fuses if necessary, * DC busbars for the positive and negative terminals, with PVC cover to avoid accidental short circuits, * Battery racks per battery set per system, * Torque wrench with correct socket for torquing the connector bolts at the battery terminals, * Conduit for cables | |  |  |  |
| 4.8 | **Lifetime and warranties**  A warranty of a minimum of 10 years and 5 years is required for Lithium Batteries and for VRLA batteries, respectively.  This warranty is to be with the manufacturer, not the supplier. If an extended warranty is to be purchased, this is to be done by the tenderer. Warranty conditions are to be included in the tender.  Tenderers must include a statement of warranties in effect, including what specifically is covered under warranty and requirements for obtaining compensation for batteries which have failed under warranty | |  |  |  |
| 5 | **Solar Inverters** | |  |  |  |
| 5.1 | The Solar Inverters or PV Inverters required for the project should meet the following requirements. | |  |  |  |
| 5.2 | Minimum Capacity of 25 kW for Lot 1 (IHC, SJC and SWHS sites) and Minimum Capacity of 30kW for Lot 2 (KAHS site) | |  |  |  |
| 5.3 | Be able to supply 3 phase 415V Power to the micro grid | |  |  |  |
| 5.4 | Shall have at least 2 independent MPPT inputs | |  |  |  |
| 5.5 | At least 2 strings per MPP input | |  |  |  |
| 5.6 | Minimum efficiency of 95 % | |  |  |  |
| 5.7 | Integrated monitoring and management features | |  |  |  |
| 5.8 | IP 65 Rating | |  |  |  |
| 5.9 | The inverter shall be labelled with the following information  Manufacturer;  Serial number;  Nominal output power at 25°C; Manufacturing date;  Country of origin;  Clear indication of the positive and negative connection on the battery cable; Safety warnings as needed. | |  |  |  |
| 5.10 | **Warranties**  Tenderers must include a statement of warranties in effect, including what specifically is covered under warranty and requirements for obtaining compensation for inverters which have failed under warranty. If as a result of the failure of one inverter (or any related equipment) the inverter is not available for a period of longer than three (3) consecutive days the warranty period shall be extended for that period of non-availability. | |  |  |  |
| 6 | **Battery Inverter/Chargers** | |  |  |  |
| 6.1 | **Inverter-Charger Performance**  The performance shall meet the following requirements:   1. The inverter shall have a sinewave output with total harmonic distortion must be less than 3% at unity power factor. 2. Inverters are to be rated for single-phase power output at 240 V, 50 Hz. 3. Three single phase inverters shall be configured into a three phase 415V network. 4. Inverters shall be supplied for operation from 48VDC battery set. The input voltage range shall be up to 64VDC without damage to the device. 5. The overload capability of the inverter shall allow generation of at least 150% of the nominal power for more than 3 minutes; 6. The inverters’ peak efficiency must be greater than 95%, and greater than 92% at maximum output.   The no-load power consumption shall be less than 1.5% of the rated output power | |  |  |  |
| 6.2 | Pure sine wave output | |  |  |  |
| 6.3 | The inverter shall have the following protective features:   1. Each inverter shall be equipped with an appropriately rated DC fuse/circuit breaker connected between the inverter and the battery. If a DC fuse is supplied then this shall be supplied as a levered fuse holder within a separate housing with a transparent cover to be able to view the fuse status. 2. Output protection: Electronic overload and short-circuit protection. An AC output wire fuse is not acceptable; 3. Over-temperature protection; 4. Battery low voltage and over voltage protection. 5. Inverters are to be rated to IP54, and be suitable for passively-cooled, indoor locations. 6. Inverter electronic components must be sealed from contact with salt air and include external heat sinks for cooling. If fans are used for cooling, they are not to blow air directly over electronic components, but rather over a heat sink. | |  |  |  |
| 6.4 | **Inverter Charger Full Technical Specification**  Tenderers are to provide manufacturers’ data sheets for the inverters, in English. Information that must be provided include;   1. Nominal AC power output under continuous operation; 2. Maximum AC power output (including length of operation at maximum power output); 3. Rated DC input voltage range & maximum DC charging/discharging current; 4. Rated AC output voltage range; 5. Rated AC output frequency range; 6. Efficiency curve as a function of load; 7. Harmonic distortion rate; 8. Power factor; 9. Connector type for DC inputs; 10. IP rating; 11. Operating temperature range; 12. Compliance to standards; 13. Physical Size and Weight; | |  |  |  |
| 6.5 | Minimum IP 54 Enclosure | |  |  |  |
| 6.6 | Integrated 2 wire Generator Control  Load Shedding Control Capability | |  |  |  |
| 6.7 | **Lifetime and warranties**  Tenderers must include a statement of warranties in effect, including what specifically is covered under warranty and requirements for obtaining compensation for inverters which have failed under warranty. If as a result of the failure of one inverter (or any related equipment) the inverter is not available for a period of longer than three (3) consecutive days the warranty period shall be extended for that period of non-availability | |  |  |  |
| 7 | **Other Components** | |  |  |  |
| 7.1 | **Technical specifications**  Full technical specifications shall be provided by the Tenderer;   * Major components datasheets (Solar Module, PV Inverter, BESS, and Battery Inverter/charger) | |  |  |  |
| 7.2 | **Additional documentation**  The Tenderers shall provide the following additional documentation:   * System Operation & Maintenance Manual; * Commissioning Sheet; | |  |  |  |
| 7.3 | Other components include but not limited to;  Salt Resistant DC Junction Box containing DC circuit breaker, Isolating fuses/circuit breakers for DC inputs from all strings of the solar array, Isolating circuit breakers from inverters/charge controllers, positive and negative buses for the termination of all dc sources | |  |  |  |
| 7.4 | Salt Resistant AC Junction Box with all integrated Circuitry and fusing for connection of solar inverters, Battery Inverters Generator and Load | |  |  |  |
| 7.5 | AC Load Shedding Contactors | |  |  |  |
| 7.6 | Cables for DC and AC circuit from;  a. PV array to DC Junction Box  b. DC Junction Box to solar inverters c. Solar inverters to AC Junction Box  d. AC Junction Box to Battery Inverters  e. Battery inverters to battery bank and cell interconnects (If necessary) | |  |  |  |
| 7.7 | Web based Data Logger/ Metering | |  |  |  |
| 7.8 | Suppliers shall commit to provide back-up online technical support during installation when required. | |  |  |  |
| 7.9 | Design and electrical diagram shall be provided by suppliers | |  |  |  |
| 7.10 | Installation Tools and components to be funded from purchaser  1. 6mm Allen (Hex) key – 4 sets  2. Power Electric Drill with bits, screw driver bits and socket bits – 2 units  3. 20m Tape – 4 units  4. Marker Pen and string – 4 sets  5. Spanner adjustable – 4sets  6. Socket wrench – 4 sets  7. Torque wrench – 4 units  8. Clamp meter – 4 units  9. Multi Crimping tool -4 units  10. Cable cutter 3 units | |  |  |  |
| 7.11 | **Services**  As part of the tender the Kiribati Ministry of Infrastructure and Sustainable Energy requires a daily schedule of rates from the contractor for the following Services. | |  |  |  |

### 

### Installation services

<insert related services>

### Delivery Time

The timeframe required to complete all activities is approximately 11 months, of which 3 months is for international order delivery time (as depicted in orange in the table below)



## Description of the Goods

*Here, list all items to be Tendered*

*(This part may be replaced by a proprietary Supplier description)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pos. | Description | Number | Delivery Time (to be verified or Tendered) | Price (to be Tendered) |
| 1 | 25kW PV Solar System with required accessories | 3 |  |  |
| 2 | 30kW PV Solar System with required accessories | 1 |  |  |

**Quotation**

The quotation should specifically indicate costs involved such as FOB, freight, insurance, Taxes (VAT) Custom duties (excise tax) and levies, KPA charges, and local freight and handling.

## Tenderer’s References

### Relevant similar deliveries carried out in the last five years

Please, provide information on each delivery for which your firm/entity, either individually as a corporate entity or as one of the major companies within an association, was legally contracted.

|  |  |  |  |
| --- | --- | --- | --- |
| Goods delivered | Buyer | Contact details | Value |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |