**Scope of Works –**

**General Requirements**

**I.** The project covers the supply, delivery, and installation of Solar PV Power Systems on the Roof Decks of the following SSS Property Buildings, with the required capacity utilizing Micro inverters:

a) Lot 1: Bacolod Building, 29kWp (min.)
b) Lot 2: Cagayan De Oro Building, 75kWp (min.)
c) Lot 3: General Santos Building, 60kWp (min.)

with rapid shutdown device, remote monitoring system, grid-tied configuration, net metering, and with provisions for future battery installation. This includes the complete installation of corresponding wiring infrastructures including the roughing-ins from the roof deck's PV Arrays, down to the tapping points.

The Solar PV systems materials must be of the approved type, application and comply with the minimum technical specifications required for the project. Inspection of all supplied materials/equipment will be made by EFMD, SSS representative/s in validating compliance and conformity with the technical specifications, applicable standards and must be free from any faults/damages.

Compliance with the minimum requirements specified in the Statement of Compliance, with international standard codes, regulations imposed by the local government and distribution utility

**II. General scope of works instructions and complementary services**

**Phase A scope of works:**

The scope of works also requires structural analysis to determine the loading capacity of the existing structure and to issue a Certificate of Structural Adequacy/Stability if the roof decks and their supporting structures are found to be structurally sound.

In case there is a need to retrofit the building structure, the scope of necessary complete retrofitting designs and recommendations, term of preferences, and budget estimate for the separate SSS outsourced retrofitting procurement, must be submitted together with the conditional Certification of Structural Adequacy/Stability to safely accommodate the proposed Solar PV System loads to the building as applicable. These serve as the proof of completed structural services under Phase "A" of the project.

**Phase B scope of works:**

1. Conduct pre-coordination meetings with concerned units to assess the local conditions and establish work methodology for the installation of solar PV system, framing, mounting and waterproofing requirements. The supplier should submit a Gantt chart and prepare necessary shop drawings and proposed plans.

2. The PV system shall be sized to fit within the available roof-deck areas, with allowance for maintenance access, ventilation, the solar irradiation analysis, and performance evaluation measurements must be conducted and presented with geotechnical capacities determination, including the assessment of the roof deck structural integrity, proposed building load, and electrical service requirements.
3. Preparation of administrative documentation for importation, ordering, shipment, port releasing, and delivery to site. All vital and fragile components of the equipment shall be properly sealed and secured against any forms of risk and damage.
4. All working personnel shall strictly observe safety protocols to avoid personal injury and damages of property during the project implementation, and as may be necessary, after the installation and shall likewise protect the SSS properties from any damages resulting from the installation of the system.
5. The supplier must observe standard manufacturer's installation guidelines to optimize harnessing solar irradiation and energy production, The Solar PV system. modules, arrays, wiring installations, alignment, must be regularly maintained and implement repair and corrections semi-annually as required while under warranty period.
6. Supply and installation of any other miscellaneous, incidental materials, and render services including items that may be realized needed during the contract implementation to complete and make the Solar PV system efficiently functional and safe to operate
7. Supply, Delivery, and Installation of PV module.
8. Supply, Delivery, and Installation of micro inverter
    a. Provide DC disconnect/Isolation switch to enable safe isolation from the PV micro inverter system.
    b. The supplier must provide documentation for inverter system components:
        - Name of the Manufacturer
        - Data sheet
        - User Manual
        - Trouble shooting guidelines.
    c. The supplier is responsible in designing the appropriate set-up of the inverter system configurations with other complementary components and in coordination with the SSS Engineering Team.
9. PV Mounting rails and brackets
    a. Supply, Delivery and Installation of appropriate mounting rails, brackets that can withstand the maximum wind loads at 250km/hr, complete bolts and nuts, railing materials and other essential components, parts and accessories including consumable items.
    b. The supplier shall provide wind load calculations.
    c. The PV array must be designed and positioned in such a way that the PV Panels are not shaded during daytime to optimize harnessing of Solar energy.
    d. The materials to be used shall be stainless steel or other corrosion resistant material.
    e. All areas affected during the implementation of the project by chipping/boring, dismantling works and other related activities shall be restored to original condition at the owner's satisfaction at no additional cost to the SSS.

f. The waterproofing works to the affected areas shall be applied observing the industry standards and best practices suitable with the existing local conditions and warranted for at least 5 years. No leak test is available to be provided to the winning bidder. The existing waterproofing is functioning efficiently and there are no leaks therein.
g. The affected portions of the mounting pedestal or frames of the Solar PV system will have to be applied with the same type of existing waterproofing materials, selected waterproof testing of the affected portions is mandatory.

10. Solar PV Monitoring System
    a. The PV system shall include a monitoring system to display system performance to SSS.
    b. The minimum required data for monitoring will be the Solar Irradiance, Solar Energy Generation, Load Consumption from PV, total load consumption, all operation data and fault information of the connected equipment.
    c. The Monitoring system shall be connected to SSS LAN using CAT6 and Wi-Fi ready.
    d. In case of no connectivity, the system must have data storage capacity for a minimum of fifteen (15) days.
11. Wiring and Circuit Protection
    a. All system wiring shall comply in accordance with the provisions of the Philippine Electrical Code (PEC).
    b. Areas where wiring and conduits pass through ceilings, walls, or other areas of the building, shall be professionally restored, booted, sealed, and returned to their original condition. use RSC for outdoor and IMC for indoor.
    c. All required overcurrent protection in the system and must be easily accessible for maintenance.
    d. All connections must use approved type of connectors.
    e. The supplier must provide DC disconnect for the PV arrays.
    f. The supplier must provide the required/necessary Panel boards/breakers to complete the functionality of the system.
    g. All AC & DC circuits must be with suitable/appropriate circuit protection.
    h. The supplier must submit a single line diagram that shows all system parts and components.
12. Delivery and Storage
    a. Protect materials during transport with suitable packaging and handling.
    b. Materials shall be stored out of contact with the ground in weather-tight coverings with a slight slope so that water does not pool on the cover.
    c. Do not stack other materials on top of the PV modules.
13. As built plans
    a. A final set of as-built drawings shall also be provided detailing the system as installed, including any deviations from the plan design. Submit four (4) hard copies signed and sealed by PEE and soft copy stored in a new & free of virus USB card storage containing the “as-built” drawings and specifications as CAD and PDF files.

b. Each drawing, specifications and calculations shall be signed by the practitioner and show the PRC number of the engineer who prepared the document or is responsible for its preparation and sealed by the PEE.

14. Operation and Maintenance Training
    a. The Developer shall prepare four (4) hardcopies in hard book bind and a soft copy of the detailed Operation and Maintenance Manual, identifying all procedures, tools, and equipment necessary to provide maintenance per the manufacturer's recommendations.
    b. The operational manual shall include a detailed wiring diagram, procedures for system start-up and shutdown, a description of normal operational indicators, error indicators, and a troubleshooting guide.
    c. Provide training for designated personnel in the operation of the entire photovoltaic energy system, including operation and maintenance of inverter(s), a PV module, transfer switches, disconnects, and other features as requested by the Owner.
15. The supplier/contractor shall prepare a construction plan producing a minimum disruption of day-to-day activities, utilities, services, etc. Specifically, address the means to keep the existing building accessible and operational through location and/or phasing of the work.
16. Testing and commissioning of all input and output wiring system including other necessary test to be perform, properly documented and check compliance to the standards and applicable safety requirements of the completely functional PV Power System. To validate compliance with the provisions of the PEC, an inspection by a licensed electrical inspector is mandatory after the complete installation.
17. Upon completion of all work under this specification, the contractor shall furnish labor, materials, and incidentals to clean areas affected and leave all areas in such a condition that no cleaning is no longer necessary.
18. Structural Analysis
    a. Perform the necessary field investigations to determine the actual condition of the roof decks and obtain the necessary design data.
    b. Develop standards and procedures for structural investigation and evaluation.
    c. Perform structural evaluation and determine the most suitable and economical treatment appropriate to the roof decks by means of the preparation of Technical Study in accordance with the standards developed and set above.
    d. To issue a Certificate of Structural Adequacy/Stability if the roof decks are found to be structurally sound or after the retrofitting works if the there is a need to retrofit the structure and to safely accommodate the proposed Solar PV System loads to the building as applicable.

**Phase C scope of works:**

The Contractor shall perform all necessary activities to ensure the successful application, approval, and implementation of Net Metering with the Distribution Utility (DU) in accordance with ERC guidelines and DU-specific procedures. This includes:

1. Documentation and Submission:

a) Prepare and compile all necessary documents required by the DU for Net Metering application, including application forms, system diagrams, technical specifications, test reports, and certifications.
b) Ensure compliance with all interconnection and metering standards as prescribed by the DU.

2. Coordination and Processing:
   a) Liaise with the DU for inspection scheduling, compliance checks, and verification of installed systems.
   b) Address and rectify any deficiencies or findings raised by the DU during the inspection or evaluation process.
3. Interconnection and Energization:
   Assist the DU during site testing, system commissioning, and final energization procedures.
4. Turnover and Reporting:
   a) Submit proof of successful energization and signed Net Metering Agreement.
   b) Provide documentation of DU approval, including Certificate of Compliance (if issued), interconnection approval, and energization report.