

**Supply, Delivery, Installation, Testing, and Commissioning  
of Nine Thousand Eight Hundred Twenty-Two (9,822)  
Units of Solar Home System for Siargao Electric  
Cooperative, Inc. (SIARELCO), Dinagat Island Electric  
Cooperative, Inc. (DIELCO), Siasi Electric Cooperative,  
Inc. (SIASELCO), Busuanga Island Electric Cooperative,  
Inc. (BISELCO), Eastern Samar Electric Cooperative,  
Inc. (ESAMELCO), Cotabato Electric Cooperative, Inc. –  
PPALMA (COTELCO-PPALMA), Basilan Electric  
Cooperative, Inc. (BASELCO), Maguindanao Electric  
Cooperative, Inc. (MAGELCO) Franchise Areas**

## **TERMS OF REFERENCE**

Photovoltaic Mainstreaming/Solar Home System Project for SIARELCO, DIELCO, SIASELCO, BISELCO, ESAMELCO, COTELCO-PPALMA, BASELCO, MAGELCO Franchise Areas

### **I. BACKGROUND/RATIONALE**

The National Electrification Administration (NEA) is committed of ensuring that no household is left without access to electricity in support of President Ferdinand “Bongbong” Marcos Jr.’s pledge to complete the household electrification by the conclusion of his term.

The NEA intends to boost the deployment of Solar Home Systems (SHS) in the most rural regions of the Philippines serviced by electric cooperatives (ECs) as part of this initiative. This will be accomplished through a consumer service-for-fee approach.

The Photovoltaic Mainstreaming/Solar Home System (PVM/SHS) aims to ensure long-term sustainability. Under this approach, the electric cooperatives will own the SHS and will receive a full cost recovery tariff to cover the expenses of operating, maintaining, and replacing capital parts of the systems based on their expected lifetimes. The goal is to make reliable electricity accessible to all, even in the farthest areas of the country.

### **II. PROJECT DURATION**

The project duration covering the installation of the Nine Thousand Eight Hundred and Twenty-Two (9,822) 50Wp-solar home system units shall be for a period of one hundred and eighty (180) days from the receipt of the Notice to Proceed to supply, deliver and install all SHS packages including the conduct of trainings.

Exact dates of delivery and/or completion should be reckoned from the receipt of the Notice to Proceed.

The liquidated damages shall be imposed for the inability of the SUPPLIER to comply with the Approved Delivery Schedule, unless a written request for time extension been approved in writing by the PURCHASER.

### **III. SCOPE OF WORK**

This tender is for supply, delivery, and installation of stand-alone prepaid modular **SHS** packages with batteries, associated Loading Systems, warranties of equipment, provision of spares, and training of member-consumers-owners (MCOs), Solar Business Unit (SBU) staff, and Community Based Technicians (CBTs), to electrify rural households using SHS with batteries, all to specifications herein and in verified proper working order.

Prior to installation, SBU teams from EC will precede the SUPPLIER team(s) to identify specific households within the target areas defined in the bid lot definitions who are able and willing to pay for the level of Solar as a Service (SaaS) being procured in this bid. These households will be signed up by EC as MCOs.

Once the pilot one hundred (100) installations are accepted then the SUPPLIER may proceed with the remaining installations.

NEA, in coordination with EC will conduct inspection and acceptance of Solar Home System (SHS) and its associated Loading Systems. After acceptance, proper ownership of the goods installed will be passed onto the EC Solar Business Unit (EC SBU). Subsequently, after final acceptance, a 24-month warranty period will be honored.

The Scope of Work by the SUPPLIER will include, but not necessarily limited to:

1. An Installation Plan will be a working document drawn up by the SUPPLIER together with the EC SBU, to ensure efficiency and minimize installation time. The Plan is to be shared with EC at all times.
2. Tool Kits are to be delivered to EC to ensure proper operations and management (O&M) by the EC in maintaining the performance of all installed SHS.
3. Provide Training Program organized in five (5) parts for the EC SBU technicians, CBTs and Selling Point Vendors.
4. Pilot installations. At the commencement of the installation period, a total of 100 SHS and their associated Loading Systems shall be installed. Installers should familiarize themselves with the inspection requirements and acceptable tolerances (section VIII.3), verification checklist (section VIII.4), technical specification (section XII) and Installation of SHS (section XIII).
5. Member-Consumer-Owner Instruction shall be provided in the use and care of the SHS package, provision of one user manual per household, and provision of one community poster per sitio or purok or household cluster.
6. Installation of Nine Thousand Eight Hundred Twenty-Two (9,822) 50Wp - solar home system units within the franchise area of the EC and must be in compliance with Philippine Electrical Code (PEC). The recipients must be included in the approved list of beneficiaries to be provided by EC.
7. Weekly Reporting of Installation activities requires providing an Installation Acceptance Sheets (IAS) and detailed per beneficiary installation pictures confirming the installed SHS by the MCO triggering the inspection/verification for each milestone.
8. Warranty Period. A twenty-four (24) month warranty period that starts on the day of Certificate of Inspection and Acceptance from the NEA received by the SUPPLIER for the last installation on the lot where the SUPPLIER will expeditiously resolve all warranty claims by the EC SBU, replacing all faulty parts as necessary, on top of the component warranty requirements.
9. Spares as specified are to be provided by the SUPPLIER but their management shall be undertaken by the EC SBU, ensuring that spares are complete and available.

#### **IV. PRE-AWARDING ACTIVITY**

Prior to awarding and after receiving a Notice of Post Qualification, the SUPPLIER shall assist the NEA, in undertaking the Factory Acceptance Test requirements within thirty (30) days after receipt of the said Notice. If the NEA representative(s) are satisfied, NEA will release a Factory Acceptance Certificate with “passed” remark and a Notice to Award and Notice to Proceed will be released soon after to the SUPPLIER. If the NEA representative(s) are not satisfied, NEA will issue a Factory Acceptance Certificate with “failed” remark to the SUPPLIER and release another Notice to the next Lowest Calculated Bid.

## V. PRE-INSTALLATION PREPARATION

### V.1 Installation Plan

The Installation Plan is a key document to optimize the installation schedule by careful planning of logistics and grouping and sequencing of clusters. For the initial draft of the Installation Plan, EC might not have signed-up all the households (HHs) to receive an SHS, thus it is imperative that the SUPPLIER work with the management of the EC to understand how they will be allocating resources to this task and structure their installation thereafter accordingly.

Given the Installation Plan is a live document informing NEA of the progress of the Project, it will also be used to record and inform NEA of any schedule impact the SUPPLIER is facing.

The SUPPLIER must take full responsibility in transporting the SHS units to the EC, to allow the EC to keep the Installation Plan up to date.

Detailed list of households (beneficiaries) per EC is provided below:

<b>Electric Cooperative</b>	<b>Number of Households</b>
SIARELCO	627
DIELCO	480
SIASELCO	1,615
BISELCO	1,000
ESAMELCO	1,000
COTELCO-PPALMA	1,000
BASELCO	2,100
MAGELCO	2,000
<b>TOTAL</b>	<b>9,822</b>

### V.2 Loading Machine Systems

The Loading Machines and their operation are critical to ensuring a sustained revenue for the SBU and thus ensure the main objective of the program and PVM – for the SBU to become a new business line of the EC providing electrification to the off-grid households.

Immediately prior to the commencement of the installations of SHS into a new cluster area, the SUPPLIER must activate the Loading System as requested by the SBU having trained the operator and undertaking testing ensuring proper operation.

### V.3 MCO Instruction and Support Material

The SUPPLIER shall be responsible to provide adequate instructions to MCOs, which may be coursed through the EC and its personnel, on the proper use of their solar package.

The SUPPLIER shall be responsible to deliver the following support materials:

1. Visual aids for each training team (large poster A4, comic strip, movie, etc.) using English with local dialect translation;

2. A User Manual / Poster, laminated with plastic (weatherproof plasticized folder or A4 poster) for each MCO; and
3. A verbal-walk through of the User Manual/Poster with the MCO immediately after installation – ideally with two adult members of the MCO household.

The SUPPLIER shall prepare these instructions to individual MCOs based on the following:

1. The instructions are dedicated to rural MCOs most of whom have little or no electricity/technical background;
2. The instructions will be very simple and straightforward presenting key information in an easy-to-understand manner;
3. Language of the User Manual / Poster shall be Tagalog or *Bisaya or local language*, as agreed upon by the EC SBU;
4. The instructions shall be conducted in Tagalog /or *Bisaya or local language*, with the occasional assistance of the EC technician able to translate when needed;
5. The instructions shall be provided to each MCO just after the installation (and before signing of the IAS);
6. A maximum of two pages (back-to-back A4 paper) should be enough for the MCO to understand the basics of the system (how it works, how to use it properly, how to identify failed components or system faults, and how to ask for help).

The SUPPLIER shall include in its bid the detailed content of the support materials, for approval of EC, which should cover at least the following topics:

1. What is a PVM Solar Kit?
  - a) Solar kit operating principles: “Catch-Store-Use”, the relationship between energy available daily and sunlight conditions, shading, battery charge and discharge, status indicators and protections.
  - b) System components, type of appliances.
  - c) Typical day load schedule illustrating the number of hours of use of appliances vis-à-vis daily available energy.
2. What does the MCO need to know about SHS operation and maintenance?
  - a) How to know the number of days left in the credit and battery charge level.
  - b) Load management - how to optimize appliance use when solar conditions are suboptimal.
  - c) Do’s and Don’ts of proper operation and use.
  - d) Maintenance activities including panel cleaning and trimming trees to prevent shading.
  - e) Recommendations in case of extended periods of system non-use.
  - f) Safety procedures and precautions (if any).
  - g) Warranties and limits of the system.
  - h) How to pay for the service?
  - i) Prepayment and credit management (How to purchase credit and reload the system?).
3. How to troubleshoot?
  - a) Basic fault diagnosis and key indicators of system or component failure.
  - b) Contact information for Service Support and break-down maintenance service.

As mentioned above, the SUPPLIER shall be responsible to deliver a User's Manual to every MCO receiving a SHS package, the distribution and explanation of which can be done through the EC and its personnel. The Manual shall be prepared before installation starts, based on the above requirements, and approved by EC before replication.

#### **V.4 Technician Training and Support Material**

The SUPPLIER shall provide comprehensive and properly documented training to both the Community Based Technicians (CBT) and the EC SBU Technicians as specified below. CBTs act as the first line of O&M, addressing more complex troubleshooting issues than MCOs have been instructed in recognizing and fixing themselves, but referring upward to an EC SBU Technician should the issue be out of the CBTs scope or parts need to be replaced. The EC SBU Technician is responsible for the post-installation services on full O&M of the SHS and Loading Machines and all warranty claims.

It is mandatory that the SUPPLIER has available SHS package identical to that being installed to assist with the training, where it can be assembled and disassembled to show the various parts, function, simulate troubleshooting and repair.

The SUPPLIER shall be responsible to provide training prior to the delivery of SHS. The Bidder shall propose in its bid a detailed Training Program organized in 5 parts, as follows:

1. BASIC SOLAR KITS TRAINING WORKSHOP FOR CBTs at EC's headquarter (or venue selected by the EC near the off-grid sites), 1 day
  - a) Basics on solar energy, solar systems, etc. (theory)
  - b) Prepayment and loading system
  - c) Installation and operation basics
  - d) Maintenance and troubleshooting basics
  - e) Loading machine troubleshooting
  
2. ADVANCED SOLAR KITS TRAINING WORKSHOP FOR EC-SBU TECHNICIANS (in EC headquarter, minimum of 2 days)
  - a) Basics on solar energy, solar systems, sizing, etc. (theory)
  - b) Loading System
    - i. Installation and operation
    - ii. Prepayment and credit
    - iii. Management software system (The software used to configure, manage, and report on operational procedures.)
    - iv. Training and management of loading agents at selling points.
  - c) Installation of SHS
    - i. Operation and maintenance
    - ii. Inspection and maintenance report (log sheet)
    - iii. Troubleshooting and replacement
    - iv. Data collection and reporting and database management
    - v. Warranty service claims training

- d) Component testing, repair, or replacement
  - e) Claims process (provide claim's forms)
  - f) Warranty hotline
    - i. Stock and inventory management
    - ii. Basic training and management of CBTs
3. **LOADING SYSTEM TRAINING** for the various SBU technicians, CBTs and selling point vendor, where and when required for proper operation and maintenance.
    - a) Operation and management of loading machines including trouble shooting for vendors and CBTs, and diagnosis for SBU technicians.
    - b) Operation and management of management software. (The software used to configure, manage, and report on operational procedures.)
    - c) Basic accounting requirements for vendors
  4. **ON-THE-JOB TRAINING** (during installation): for both EC SBU technicians and local CBTs in the field, over installation period.
    - a) Best locations (including orientation & tilt) for PV module, box, lamps, etc.
    - b) Installation (including securing and fastening) techniques
    - c) Testing and commissioning
    - d) Credit loading process
    - e) MCO instruction (see MCO Instruction & Support Material)
  5. **FINAL WORKSHOP** for EC SBU technicians at EC headquarters, 1 day
    - a) Review of learning
    - b) Open forum
    - c) Evaluation
    - d) Presentation of Certificates to passing technicians

The SUPPLIER shall be responsible to deliver the following support materials:

1. Training materials, posters, tools, etc.
2. Demo kits of the SHS packages installed
3. Guidelines for EC technicians (see below section)
4. Training Certificates for passing technicians

#### ***TECHNICAL GUIDELINES FOR EC SBU TECHNICIANS & CBTs***

The SUPPLIER shall provide Technical Guidelines on SHS installation, O&M, training, and troubleshooting to both the EC SBU and CBTs as described above for those attending the training. The Guidelines shall be prepared before Advanced EC SBU training and Basic CBT training, and approved in writing by EC before replication. The EC SBU Technical Guidelines are based on the requirements below.

A simplified version of the Technical Guidelines shall also be prepared for the CBT as reference material when practicing in the field. Please note that the level of previous

training for the CBT could be close to none and thus the instructions need to present the information in a clear and simple manner.

The Guideline for EC Technicians is dedicated to EC technicians who have a basic electrical background, can understand what a solar system is, how it works, how to diagnose breakdowns or faults, and to some extent, how to repair or replace parts.

1. The Guideline shall help the EC technicians to conduct maintenance, repairs, moving, and new installations of solar packages and loading units, beyond the training provided by the SUPPLIER.
2. The Guideline shall also help EC trainees to train the loading agents in the field with the credit selling terminals/tools provided by the SUPPLIER.
3. The Guideline should be simple and well-illustrated (pictures and drawings preferable than explanation texts).
4. The Guideline shall be prepared in English but the support materials shall allow easy translation of the content by the EC.

The Guideline shall cover at least the following topics:

1. A complete list of components (all system sub-items), with associated specifications, manufacturer's literature warranties and ordering references.
2. Complete Installation instructions:
  - a) Detailed instructions to choose the best locations/places for components and to install the solar module, the wiring, the lamps. Include clear "do's/don'ts" pictures/drawings.
  - b) A recommended post-installation acceptance test procedure, including all appropriate test procedures.
3. Complete MCO Instructions:
  - a) Explain to the user the system operating principles, load management requirements, warranties and limits of the system, impact of shading/dirt of the array and how to check and avoid it, user maintenance checks and how to conduct them, how to load and manage their credits, and how to get service support.
  - b) Explain to the loading agent (EC staff) how to operate and manage the loading unit, the credit sales to customers, and the reporting to EC (transaction data transfer).
4. Complete O&M instructions:
  - a) A recommended routine maintenance schedule, with inspection/maintenance instructions.
  - b) Specific care and maintenance guide for the system and components (controller, battery, PV module, lamps, Loading Machine, etc.).
  - c) A detailed troubleshooting guide referencing all the system sub-items. This shall include repairs and diagnostic procedures that can be done by the EC or a qualified third party. Repairs and procedures not to be attempted by non-electricians and/or electricians unfamiliar with photovoltaic systems shall also be identified.
  - d) Recycling procedure for main components.



- e) A complete list of all system components, with associated manufacturers literature, specifications and warranties.
  - f) A functional block diagram showing the placement of all hardware and ratings of all component and a physical layout diagram.
  - g) Instructions on handling and management of used or damaged SHS packages, spare parts, and wastages from the packing/staging materials.
  - h) Detailed instructions on the use of the Loading Machines and their software to manage SHS and their associated MCOs, including:
    - i. Registration of an MCO;
    - ii. Registration of SHS;
    - iii. Linking and unlinking of an MCO to a SHS;
    - iv. Loading of credit to an MCO;
    - v. Reports on registered MCOs, registered SHS, total loading activity (for vendor cash reconciliation), loading activity by MC, non-loading exception reports;
    - vi. Issuance of maintenance tokens to SBU technicians and CBTs;
    - vii. Upload and backup of all data on a weekly basis to the EC SBU; and
    - viii. Black log sheet template
5. Procedures on how to undertake a Warranty Claim.

The Guidelines shall comply with RA 6969 or the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, and related national regulations for recycling and/or special disposal of batteries including battery collection, storage and recycling schemes. Disposal through a DENR registered Transport Storage and Disposal (TSD) facility will need to be clearly stated.

The SUPPLIER shall also be responsible to provide any technical support/assistance on the operation and maintenance of its SHS to the EC SBU staff throughout the Contract term. The EC will provide a training room at its headquarters or in an appropriate venue.

From five (5) to a maximum of fifteen (15) EC SBU technician/staff will require training, while no more than 30 CBTs will be trained by the SUPPLIER.

## **VI. SUPPLY AND INSTALLATION OF SHS**

### **VI.1 System Description Summary**

The SHS service levels offered are designed to meet the basic power demands of most rural customers. Only the second, higher Service Level 2 is to be supplied and installed in this bidding.

The Bidder cannot contest the minimum sizing of Service Level 2, defined in Table below. The bidder may, however, propose larger battery capacity.

<b>Package</b>	<b>Est. Ave. Daily Consumption (Wh/d)</b>	<b>Min PV Power (Wp)</b>	<b>Min Effective Battery Capacity (Ah)</b>
<b>Service Level 2</b>	95	50	24

**Table 3: System Minimum Sizing Requirements**

The technical details of the Service Level 2 SHS are described in XII.1. Although TVs are not required to be supplied under this tender, the Bidder is encouraged to offer specifications and pricing of DC TV for its SHS which the EC SBU (alone or in joint venture with the SUPPLIER or other companies) might consider selling, leasing, or renting to households in a separate unregulated business outside the scope of the current PVM project.

## **VI.2 Installation**

Once the applicable trainings have been undertaken, the Installation Plan has been accepted by NEA, and the initial Loading Machines have been installed and tested in the pilot clusters, the SUPPLIER will proceed to the Pilot Installations.

The Pilot Installations will be the benchmark for the installation practice to be used and will serve as the approved "blueprint" for the standard of installations. This will provide the an opportunity to iron out any installation issues prior to proceeding with the remaining units-installations. Any additional installation requirement(s) identified through the parallel verification during the Pilot Installation shall become requirements for acceptance of the remaining SHS packages.

The SUPPLIER shall meet the installation requirements as specified in this Terms of Reference.

Prior to verification, the SUPPLIER, is to complete the installation process and are required to:

1. Request the SBU's technician/representative to seal with box with the EC's electrical seal;
2. Provide the MCO household head and interested members with Member Consumer Instruction; and
3. Request the MCO household head to sign the Installation Acceptance Sheet (IAS), further described below in *Reporting*.

At the completion of the 100 SHS Pilot Installations, along with any non-conforming aspects / defects being corrected at the SUPPLIER's expense identified from verification, the SUPPLIER shall proceed with the remaining installations.

## **VI.3 Reporting**

The Reporting process is streamlined, incorporating existing EC MCO registration practices with some added requirements ensuring transparency and accountability.

The Installation Acceptance Sheet (IAS) is a document approving the completion of the installation by requiring signatures from the MCO household head and the accompanying the EC technician or staff member.

The IAS will contain basic information of the MCO's name and address, MCO's geographical coordinates, the MCO identification number assigned by EC, and the list of equipment installed with their serial numbers. The IAS will also provide a series of tick box questions confirming installation and instruction. The format of the IAS is to be made available by the SUPPLIER for approval by EC prior to installation.

In support of the IAS, the SUPPLIER will provide clear and high-resolution digital copy and hard copy per beneficiary installation pictures of:

1. Member-Consumer-Owner (MCO) with complete name, address and identification number;
2. MCO residential house;
3. Installed SHS major components (panel, battery and charge controller) including its serial number;
4. Torch lamp;
5. DC Radio;
6. Phone Charger; and
7. Lamps and lamp switches.

The images including IAS are to be filed in a folder with the MCO identification number.

To summarize, an Installation Report will be submitted by the SUPPLIER weekly together with the IAS and support pictures starting five (5) days after the first week of installation. Installation Report (IR) will contain the total number of installed SHS per barangay and a corresponding excel file (updated excel file for the succeeding reports) having the list of beneficiaries with MCO identification number, barangay municipality address and date of installation for each. Template of the IR is to be submitted to EC for approval.

#### **VI.4 Verification**

Verification will be undertaken by NEA Inspection Team in coordination with EC. The first one hundred (100) pilot installations will be inspected to fine tune the verification checklist in coordination with the SUPPLIER, and the EC SBU. The SUPPLIER and EC must provide an Installation schedule to coordinate the pilot installation and provide the Installation Report (IR) to for the Verification.

Additional installations will commence only after the first 100 SHS installations were verified.

#### **VI.5 Hand-Over Process**

The SUPPLIER shall take full responsibility for the care of the SHS and related goods until Acceptance by NEA of both Completed Installation Report (CIR) and the Final Verification Report (FVR).

If any loss or damage to the SHS or related goods occurs during the period when the SUPPLIER is responsible for their care, the SUPPLIER shall rectify the loss or damage at the SUPPLIER's risk and cost so that the SHS and related goods and SUPPLIER's documents conform with the Contract. The SUPPLIER shall not be liable for any loss or damage caused by any actions performed by the household after FVR has been accepted by NEA, except defects covered by warranty.

## **VII. AFTER-SALES SERVICE (POST-INSTALLATION)**

Payment will be made to the SUPPLIER after final verification of the installation of the SHS and their associated Loading Machines and no other on-site obligations will be demanded of the SUPPLIER except for the standard warranties under the Warranty Period.

The warranties will cover both the entire SHS package as well as individual components and accessories to the package.

The individual component and accessories to the package shall be made available for purchase by the EC even after warranty period.

### **VII.1 Warranty Period**

Under the Warranty Period, the SUPPLIER shall provide a 2-year full system warranty and a separate 10-year warranty specifically for the battery. During these warranty periods, the SUPPLIER shall assist the EC through every means possible to ensure the replacement of defective parts (covered by the warranty) within a two-week period at no (zero) cost to NEA and EC. Failure to replace the defective parts within specified period shall result in imposition of a penalty, which shall be deducted from any amount due to Supplier. The Warranty Period is an additional requirement to the standard Component Warranties.

The Warranty Period will start on the day of Acceptance from NEA received by the SUPPLIER for the last installation on the lot.

The SUPPLIER will bear full transportation costs of faulty equipment and replacement parts being claimed under warranty for the entire duration covering the Warranty Period.

The SUPPLIER will be the focal point for the life of the Warranties and all claims will be undertaken through the SUPPLIER for replacement units, components, and accessories.

The EC SBU is responsible for undertaking of O&M, and to promote an efficient and sustainable O&M service, a smooth warranty claim process is required. The SUPPLIER will work with the EC SBU staff to establish such a process, training EC SBU technicians to test and undertake the fixing of minor issues, and defining the terms and procedure for parts replacement under warranty, as required.

A Hotline directing all technical queries shall be set up for EC SBU technicians to have immediate and direct communication with the SUPPLIER technician when required, for the entire period of the Warranty Period

## VII.2 Component Warranties

In addition to the general Warranty Period, warranties on the components shall meet the following requirements:

Component	Warranty (Year)	Description
PV Module	10	80% of rated power after 10 years
Batteries	10	
Charge Controller	2	
Loading Machine	3	
LED Lights	2	LED to 70% of initial lumen output
Other Appliances	2	

**Table 4:** *Component Warranty Requirements*

Manufacturers' Warranties will start at the same time as the Warranty Period, detailed in Warranty Period.

## VII.3 Spares

As part of the Warranty Period undertaking, the SUPPLIER shall maintain the EC defined stock level ensuring responsibility for the claim and replacement of any spare part, as detailed in the Warranty Period.

Component/Accessories	Spare Requirement %/lot size
SHS kits	0.2%
PV modules	2%
Battery	2%
Charge Controller	2%
Loading Machine	15% of total vending machines calculated based on the ratio of 1 vending machine per 100 SHS units

PV module mounting hardware	1%
LED bulb	3%
Lamp socket	
Lamp wire	
Lamp switch	
Lamp plug	
Torch & charging cable	2%
Radio & charging cable, if any	1%
USB Port	2%
USB phone charging cable	1%
RFID Card / Dongle Key	3%
PV to controller cable	1%

**Table 5: Spare Parts Requirements**

The SUPPLIER shall maintain the EC stock at this level throughout the Warranty Period.

The SUPPLIER shall provide one (1) complete set of SHS including Vending Machine and VMS to NEA.

## **VIII. TESTING AND VERIFICATION**

### **VIII.1 Factory Acceptance Test**

The Bidder that submits Lowest Calculated Bid shall have its submitted sample undergo Factory Acceptance Test. The FAT will be undertaken prior to Notice of Award and Contract Signing.

Hence, to ensure that the goods being manufactured by the SUPPLIER comply with the requirements of the NEA, a representative(s) of the NEA will conduct a Factory Acceptance Test.

The NEA could also request the following during the inspections:

1. Inspect factory and take sample for possible future tests;
2. Inspect original certificates offered;
3. Check original laboratory certificates;
4. In case on certificates not being based in full IEC standards, but based on ISO17025 lab or in-house testing;

5. Visit the test laboratory, assess test bed and approach;
6. Confirm the test undertaken and number of samples;
7. Check results;
8. Request any short terms tests in his presence, at purchaser cost; and
9. Take photos.

The NEA shall also request the following before inspections:

1. Complete sample of the solar home system being offered to be delivered to EC main office before the conduct of Acceptance Test.

Only when NEA Representatives are satisfied with the above requirements will they release an Acceptance Certificate which will trigger the NEA’s notice to the SUPPLIER to proceed with the production and shipping of the SHS packages. If the NEA’s Representatives are not satisfied with the output of the SUPPLIER, NEA will notify the SUPPLIER of the issues which need correcting, agree on these requirements and then the SUPPLIER will have to rectify the agreed issues and request for NEA’s Representatives to undertake a second assessment.

The SUPPLIER is required to budget for this accordingly, based on a SHS expert, spatial location of factories, and test requirements depending on the technical qualifications of the SHS package as per Section XII.

### **VIII.2 Verification Checklist and Tolerances**

Installation of SHS will be carried out at households and locations within the EC service area.

The following section describes the inspections and tests that shall be performed to verify that the Solar Home Systems being supplied and installed conform to the technical specifications detailed in Technical Specifications, as well as to a high quality of workmanship.

The table in the next section outlines the inspection requirements and acceptable tolerances that form the basis of the Inspection and Tests that the verification team will perform on installed SHS.

Should an installed SHS fail to fall within the acceptable tolerances for any of the aspects or equipment outlined in the next section, or for any equipment or workmanship judged to be defective, the SUPPLIER must undertake remedial action outlined in the following table.

### **VIII.3 Inspection Requirements and Acceptable Tolerances**

The table below shows the Inspection Requirement and Acceptable Tolerances for installed SHS including remedial actions to be undertaken by the SUPPLIER in the event of unsatisfactory workmanship or defective components found during the inspection.

<b>Items</b>	<b>Acceptable Tolerance</b>	<b>Actions in the event of unsatisfactory installation or defective components</b>
<b>Solar PV Module Mounting</b>		

Exposure	Min 6 hours from 9am to 3pm	Trim trees and notify the MCO for regular trimming, relocate the PV module.
Orientation of PV module slope	+/- 10° from S	Adjust PV mounting pole orientation.
Tilt from the horizon	from 10° to 15°	Adjust the PV mounting bracket tilt/pole vertical mounting.
Mounting bracket pole attachment	Sturdy	Tighten loose clamps, bolts, nuts.
Mounting pole upper attachment	Sturdy	Fix/clamp pole to fascia board, roof frame, truss, support structure.
Mounting pole lower attachment	Sturdy	Clamp, buried on hard ground, attach in support structure
Mounting pole position	Vertical	Adjust pole attachments
PV module junction box position	Upper	Reorient the PV module
Roof penetration (if allowed by MCO)	Sealed	Seal roof against leaks
<b><u>PV Cable</u></b>		
Attachment to the bracket and pole	Strapped securely	Strap the PV cable to the pole with UV rate cable ties
Drip loop	Looped	Loop the cable on the pole before entering the house
Cable entry into the house	Secured	Secure cable entry from entry of water, insects, and pests.
Connection to controller box	Secured	Fasten PV cable for secured connection to the controller box
Excess cable length	Spooled	Spool and fasten excess cable
Chaffing of cable on roof edges	None	Adjust cable run to avoid sharp edge of the roof from chaffing the cable
<b><u>Charge Controller and Battery Enclosure</u></b>		
Location	Visible and accessible	Relocate for visibility of display and access to reload credits, radio and phone charging
Mounting	Stable	Provide stable mounting
Accessible to connections	Accessible	Adjust for accessibility
Protected from sunlight and rain	Protected	Relocate/ provide protection
Check tamperproof seal	Not tampered	Add a seal if none, inform MCO
PVM Identification label/sticker	Present	Add label/sticker on Box if none
Box integrity	No damage	Replace if damaged
<b><u>LED Lamps, wires and switches</u></b>		



Lamp (indoor) location	Indoor	Transfer indoor lamp in the house
Lamp (outdoor) location	Protected	Transfer or provide protection
Switch location	Accessible	Adjust with consent from MCO
Wire solidly and neatly fastened	Fastened	Fasted wires solidly and neatly
Excess wire lengths	Spooled	Spool and fasted excess wires
<b><u>Accessories, manuals and posters</u></b>		
USB Charging port and cable	Accessible	Provide USB charging cable
Radio	Accessible	Provide Radio
Torch and charging cable	Accessible	Provide torch w/ charging cable
Manuals and posters	Accessible	Provide manuals and posters

**Table 6: Inspection Requirement and Acceptable Tolerances**

#### VIII.4 Verification Checklist

The below table outlines the Verification Checklist that will be used as a guide whether an installed Solar Home System has successfully met the Verification requirements. A document to this effect will also be countersigned by the SUPPLIER, a designated representative of the electric cooperative, and the member-consumer-owner (household).

This will be carried out in line with the Verification Process outlined and forms the basis for the SUPPLIER's workmanship.

##### *Verification Checklist for Solar Home System equipment*

###### (a) Visual Inspection

Solar PV Module mounting	Yes / No
PV Cable	Yes / No
Charge Controller and Battery Enclosure	Yes / No
LED Lamps, wires and switches	Yes / No
Solar cable fixed well, protected from UV	Yes / No
Accessory: Mobile charger cable	Yes / No
Accessory: Radio	Yes / No
Accessory: Torch and charging cable	Yes / No
Manuals and posters	Yes / No

###### (b) Functional test

Control box indicators are OK (no fault)	Yes / No
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All lights and switches functioning	Yes / No
Phone charger functioning	Yes / No
Radio & Torch light functioning	Yes / No
Prepaid functioning	Yes / No

(c) Pictures

Member-Consumer	Yes / No
PVM Solar Module after installation	Yes / No
PVM Solar ‘Control Box’ after installation	Yes / No

**Table 7: Verification Requirements**

**IX. APPROVED BUDGET FOR THE CONTRACT (ABC)**

For and in consideration of the performance and accomplishment of the INSTALLATION OF **NINE THOUSAND EIGHT HUNDRED AND TWENTY-TWO (9,822)** 50W-SOLAR HOME SYSTEM UNITS, Purchaser shall pay the SUPPLIER the total amount of **TWO HUNDRED EIGHTY-SIX MILLION SEVENTY-SEVEN THOUSAND SIX HUNDRED SIXTY-NINE AND 90/100 CENTAVOS (PhP 286,077,669.90)** subject to pertinent laws on government contracts and auditing procedures.

The contract price is inclusive of all duties and taxes.

No changes shall be made on the Contract Price by reason of escalation in currency. Any adjustments in Contract Price shall be done in accordance with guidelines provided by law.

The payment of escalation costs shall be subject to the unilateral and written approval of the NEA and to availability of funds.

**X. ELIGIBLE BIDDERS**

**X.1** The following persons shall be eligible to participate in this bidding:

1. Duly licensed Filipino citizens/sole proprietorships;
2. Partnerships duly organized under the laws of the Philippines and of which at least sixty percent (60%) of the interest belongs to citizens of the Philippines;
3. Corporations duly organized under the laws of the Philippines, and of which at least sixty percent (60%) of the outstanding capital stock belongs to citizens of the Philippines;
4. Cooperatives duly organized under the laws of the Philippines; and
5. Persons/entities forming themselves into a Joint Venture (JV), i.e., a group of two (2) or more persons/entities that intend to be jointly and severally responsible or liable

for a particular contract: Provided, however, that Filipino ownership or interest of the JV concerned shall be at least sixty percent (60%).

- X.2** Government owned or –controlled corporations (GOCCs) may be eligible to participate only if they can establish that they (a) are legally and financially autonomous, (b) operate under commercial law, and (c) are not attached agencies of the Procuring Entity.
- X.3** The Bidder must have completed a Single Largest Completed Contract (SLCC) within ten (10) years from the date of submission and receipt of bids, similar to the Project or any energy-related project such as generation, transmission, and distribution segment, and the value of which, adjusted, if necessary, by the Bidder to current prices using the Philippine Statistics Authority (PSA) consumer price index, must be at least equivalent to fifty percent (50%) of the ABC.
- X.4** The Bidder must submit a computation of its Net Financial Contracting Capacity (NFCC), which must be at least equal to the ABC to be bid, calculated as follows:

NFCC = [(Current assets minus current liabilities) (15)] minus the value of all outstanding or uncompleted portions of the projects under ongoing contracts, including awarded contracts yet to be started, coinciding with the contract to be bid.

The values of the domestic bidder’s current assets and current liabilities shall be based on the latest Audited Financial Statements submitted to the BIR.

For purposes of computing the foreign bidders’ NFCC, the value of the current assets and current liabilities shall be based on their audited financial statements prepared in accordance with international financial reporting standards.

If the prospective bidder opts to submit a committed Line of Credit, it must be at least equal to ten percent (10%) of the ABC to be bid. If issued by a foreign universal or commercial bank, it shall be confirmed or authenticated by a local universal or commercial bank.

- X.5** Have previously worked on similar projects;
- X.6** Have demonstrated efficiency in installing previous projects with Certificate of Acceptance as proof;
- X.7** Have the ability to deliver signed weekly accomplishment report submitted on a timely manner via online;
- X.8** Submit list of completed and on-going projects, contract price of which being equal to or greater than to the ABC and with Certificate of Acceptance for each project;
- X.9** Must submit a Single Largest Completed Contract with Certificate of Acceptance;
- X.10** Must be PHILGEPS registered; and
- X.11** Submit the following additional documents (To be submitted during Post Qualification):
  - 1. SEC Certificate;
  - 2. Mayor’s Permit;
  - 3. Tax Clearance;
  - 4. DOLE Clearance;

5. Tax Payments for the last six (6) months (remittances to BIR);
6. Latest General Information Sheet;
7. Clearance from SSS, PAG-IBIG and PHILHEALTH;
8. Audited Financial Statement;
9. Latest Income and Business Tax Returns;
10. BIR Value Added Tax Registration;
11. Proof of VAT Payments for the past six (6) months preceding the date of bid submission;
12. Certificate of origin/importation/delivery proving the materials and equipment are brand new (to be submitted upon 100% delivery);
13. Certification confirming statement on delivery schedule;
14. Certification confirming statement on the installation schedule;
15. Certification confirming statement on warranty being offered;
16. Manpower Requirement and Certification Confirming the Sufficiency of the Manpower Compliment vis a vis the required Accomplishment

**XI. OTHER DOCUMENTS REQUIRED (To be submitted during Post Qualification)**

1. Certificate of origin/importation/delivery proving the materials and equipment are brand new (to be submitted upon 100% delivery)
2. Confirming statement on the delivery schedule;
3. Confirming statement on the installation schedule;
4. Confirming statement on warranty being offered; and
5. List of organic/permanent personnel including their education and relevant trainings.

**XII. TECHNICAL SPECIFICATIONS**

The following section defines the Technical Specifications and Standards required for the supply, delivery, installation, testing and commissioning, including labor, material and equipment.

This section aims to provide a strong guidance in forming the required package while also providing some flexibility by defining the specifications. Any apparatus, material, or work not indicated in the submitted plan of the SUPPLIER or any incidental accessories necessary to make the work complete and perfect in all aspects and ready for operation even if not particularly stated in this TOR, shall be provided, delivered, and installed by the SUPPLIER without additional expense to the procuring entity

Further, this section aims to provide strong guidance in forming the required whole package also providing some flexibility by defining the specifications.

It is expected that the SHS have been designed to have an operation life of at least 10 years with one battery and controller replacement.

**XII.1 System Requirement**

Total Design Load (per day)	95Wh
-----------------------------	------

**Table 8:** *System Requirements*

The designed level of service requirement is outlined in the following two tables, separated as Lighting & Accessories:

Qty	Description	Part ID	Usage	Minimum Brightness	Maximum Power	Daily Demand
			<i>Hrs/day</i>	<i>Lumens</i>	<i>Watts</i>	<i>Wh/day</i>
1	Indoor/Outdoor	LAMP1	8	100	1	8
2	Indoor Lamps	LAMP2	5	200	2	20
1	Indoor Lamps	LAMP3	3	300	3	9
4				800	8	<b>40</b>

**Table 9: Daily Home Accessories Service Requirements**

Clarification to the Table:

1. TORCH is service defined as being the charging load on the SHS battery unit to recharge the torch battery. The assumption has been made on the torch battery being no greater than 5Wh in capacity and requiring full charge daily.
2. RADIO service is defined by that required to function as such, and having access to power.
3. MOBCH service is defined by that required to charge 2x phones in one day from the SHS battery unit. The assumption is that a 1x phone requires approximately up to 4.5Wh to recharge. Alternatively, the design accounts for 1x “smart” phone charge per day, requiring up to 9Wh to recharge.
4. LEDTV service is on the assumption that the TV offering from the Manufacturer is 9W or less when operating without the LED backlight activated (indoor use). DC LED TV is not included in the package to be supplied but the consumption is included in sizing the capacity of the system for future adaption of the member consumer.

## **XII.2 Labelling and Database**

Each system and each major component (controller box, panel) shall be trackable by individual barcode reader number along with the minimum labelling requirements that are to transfer to a central database to work in unison with the Loading System.

Minimum labelling and database requirements for the SHS and their components are as follows:

1. Label for the assembled SHS to identify stock. These labels shall be permanent and indelible with the following fields:
  - a. unique barcode;
  - b. manufacturer name;
  - c. model number; and
  - d. serial number.
2. Database for each major component supplied including the following fields:

- a. unique barcode;
  - b. manufacturer name;
  - c. model number;
  - d. serial number;
  - e. supplier name;
  - f. date of manufacture (for components);
  - g. date of assembly (for SHS);
  - h. Tranche no (as shipped);
  - i. Date of installation; and
  - j. Date of warranty commencement.
3. Any other specific labelling requirements per component will be detailed below, under the component specifications.

Barcode reader information shall be included in any packing slips on the outside of the crates, to enable equipment tracking at any time during shipment and storage.

### **XII.3 Packaging and Delivery**

The SHS SUPPLIER shall provide the PV system components, pre-assemble them into integrated packaged SHS in accordance with the specified design.

All goods supplied shall be packaged to prevent shipping related damage at any point through to its final installation. The SUPPLIER is responsible for settling any shipping related damage claims and must replace any damaged systems through to installation in a timely manner.

The SUPPLIER will also be required to collect all packaging, cartons, and any other material used to transport the goods and dispose of them appropriately and in accordance with any Environmental & Social Safeguards requirements. If the SUPPLIER agrees with MCOs and/or local officials to donate the packaging materials, this must be recorded with their consent.

### **XII.4 Component Specifications and Certification Standards**

#### **1. Minimum Certification Standards**

Each component and/or appliance of the package, if not fully Lightning Global Quality Test Method (LG-QTM) verified, should comply with the minimum standard certification requirements as listed in Table , and any further requirement stipulated in each specific component section, further below. In general, the standard of the International Electro-technical Commission (IEC) is applied, but equivalent standards may be offered. A certified copy of the component’s Test Certificate shall be required from the ISO17025 accredited Test Center.

<b>Component</b>	<b>Minimum Certification Requirements</b>
PV Module (crystalline)	IEC 61215, IEC 61701, IEC 17025

Charge Controller	CE EMC
Battery	IEC 61427, IEC 60896, IEC 17025, UN 2794
LED Lights	IEC 62471, IES LM 79-19
Other Components Appliances	Declaration of Conformity

**Table 10: Component Standards**

## 2. IEC Standard Certificate

This highest certification is a full certificate from an accredited testing and certification organization acceptable to EC to confirm that the specific model of products or components offered complies with the entire referenced technical standard, based on the sampling approach of that technical standard, including.

- a. A certified copy of the component's Test Certificate from the ISO17025 accredited Test Center.
- b. A copy of the Test Center's accreditation certificate, to conduct and certify the specific tests in the standard under consideration.
- c. This level of certification is required for the following components:
  - i. PV modules (as specified in table 10)
  - ii. Lead Carbon Batteries (as specified in table 10)

## 3. Test Result Certifications Based on Testing to Partial IEC Standard

The testing of components in ISO17025 certified laboratories to the full IEC standard using the required sampling is both expensive and time-intensive. Therefore, provision is made for testing to only the relevant parts of the standard (as a second-tier level of certification). Certified test results are required from an accredited testing and certification organization acceptable to EC to confirm that the specific model of products or components offered have been tested to referenced test procedure in the standard.

- a. A copy of the test center accreditation certificate, to conduct and certify the specific tests in the standard under consideration.
- b. Detailed test results shall be provided for the specific tests conducted in the standard for all the samples tested.
- c. This form is acceptable for the following components only:
  - i. Batteries cycle life tests, but cell itself must be certified to IEC 61427
  - ii. Charge controllers
  - iii. LED lights must be certified to LM 79-19.

#### 4. Photovoltaic Modules

##### Certification standards

*Compulsory certifications are both of:*

**IEC 61215:** Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval

**IEC 61701 Ed.2:** Salt mist corrosion testing of photovoltaic (PV) modules

**IEC 17025:** testing, calibration, and sampling are in highest quality, accuracy, and Reliability

##### General requirements

The PV Modules will have an output of not less than 50Wp and will be sourced to have the following characteristics;

- a. Only silicon crystalline technology (poly or mono), thin films are not acceptable;
- b. Cells in series;
- c. Positive tolerance only on nominal power;
- d. Anodized aluminum frame required: marine grade / minimum thickness of frame 30mm;
- e. High transmission and high strength tempered glass;
- f. Equipped with a waterproof junction box (IP65) and a pre-assembled UV-resistant PV cable;
- g. All PV modules must be identical and use the same (i) production processes and construction methods; (ii) materials; and (iii) quality control procedures as a previously certified module.

#### 5. Enclosure Box and Charge Controller

##### Certification standards

Compulsory certifications are:

**CE EMC:** ensures that electrical and electronic equipment does not interfere with other devices operation and not affected by electromagnetic interference.

##### General requirements

The charge controller and battery shall be housed within a robust ‘plug & play’ enclosure/box, resistant to tampering and manufactured with all support or fixing system needed.

The **CONTROLLERS** will have the following minimum specifications:



- a. The controller shall be specifically designed for Lead Carbon battery management. The SUPPLIER shall provide proof or otherwise attest to this important point.
- b. The printed circuit boards (PCB) shall be coated with heavy-duty varnish to protect from corrosion.
- c. The controllers shall be machine manufactured (no manual assembly and welding).
- d. The controller shall have a microprocessor, with static regulation. PWM is preferred. DC-DC converter with MPPT is also possible, but not required.
- e. The controller must be well protected against short-circuits, overload, reverse polarity, and surge voltage.
- f. The controller shall be easily dismountable and replaceable by a qualified technician. In the event of replacement, the procedure to maintain the continuity of the prepayment credit and avoid loss of any purchased credit must be provided.
- g. All parts of the compartment subject to battery electrolyte contact shall be corrosion resistant.
- h. The charge controller shall have a charging regime applicable to the battery, with voltage set points preset at the factory.
- i. The controller shall be protected against short circuit of input and output terminals as well as reverse polarity.
- j. Electronic automatically resettable cut-offs are required- mechanical fuses are not acceptable.
- k. The controller shall be able to safely accept 125% of the module open circuit voltage when battery is removed.
- l. The controller shall be able to safely accept 125% of the module short circuit current.
- m. Indication of the battery state of charge (SOC) and indication of PV production shall be included and easily understandable for every customer.

#### Documentation and labelling

A **label** with main characteristics of the **Solar Package** (manufacturer/assembler, type and reference, serial number, individual ID number, battery capacity, PV peak power, standards) shall be placed on the battery box.

The charge controller must be labelled indicating at minimum:

- a. Manufacturer;
- b. Model Number;
- c. Battery (Lead Carbon);
- d. Nominal voltage;
- e. PV and Load Currents; and
- f. Barcode

## 6. Lead-Carbon Batteries

Off-grid power systems require dependable and economical energy storage solution, and lead-acid based batteries present numerous advantages in this aspect. They are economical, dependable, low-maintenance, recyclable and scalable.

Lead-Carbon batteries are types of advanced lead-acid battery, it offers cost-effective, superior performance in partial state-of-charge situations, and are perceived as safer and more environmentally sound.

AND

UN Transportation Testing (UN2794) for Lead-Acid Batteries

The expected battery life under the solar design cycling conditions (shall be determined from the certified battery cycle life curves, and shall exceed 3,600 cycles (10 years), before further de-rating for temperature conditions.

General requirements

The Lead-Carbon battery shall have a minimum storage capacity of **24Ah** and a nominal voltage of 12Vdc or 4V 50Ah @C10.

The battery controller shall control in real time the charge/discharge of each cell of the battery, and to protect the battery by preventing it from operating outside its typical safe operating range. In case of batteries in parallel, the controller is required to properly manage the energy flow and the voltage. The controller will protect the battery against full discharge by disconnecting the load when Depth of Discharge (DOD) reaches 70%.

Documentation and labelling

The SUPPLIER is required to provide the following data:

- a. Manufacturer;
- b. Type of the battery;
- c. Battery Voltage;
- d. Battery Capacity@C20 or better;
- e. Warranty information; and
- f. Barcode.

The SUPPLIER is required to provide for each battery type the following test data:

- a. Battery discharge performance curves at C10 or C20/C50 at a minimum; and
- b. Battery cycling curves or similar cycling test to 70% DoD at C20. 60% @ C30 or higher.

The SUPPLIER is required to provide the following general data:

- a. Battery discharge performance versus temperature;
- b. Battery cycle life versus depth of discharge;
- c. Battery cycle life versus battery temperature; and
- d. Product brochure.

The SUPPLIER shall provide instructions to the EC SBU on how and where to recycle worn batteries as part of the Technical Training.

7. Prepayment Controller/Loading Systems

A prepayment controller or loading system for payment activation is required to be supplied as part of the package.

### General Requirements

The overall function of the system is to enable the sale of prepaid credit tokens to end-users such as that commonly used in the “PAYG” (Pay As You Go) industry. However, for the purposes of the document this is referred to SaaS “Solar as a Service” but the principle is the same. The term “prepaid credit” refers to the digital transfer of end user money to a digital code/token that can be transferred from the Loading System Machine to that of the end-user’s SHS device by the SHS user input. The transfer of this digital code/token to the SHS device’s prepayment controller will allow the device to be used as a service until the point at which that digital code’s value has expired and all loads will turn off, as electronically programmed to the prepayment controller by the entering of the digital code/token. The digital code will expire in accordance with the value of the number of days that was purchased by the end user upon receipt of the digital code/token into the SHS prepayment controller - not that by the date of purchase of the code/token. The number of loading machines shall be one per one-hundred (100) SHS units.

The “prepayment loading system controller” is defined as the unit integrated to the SHS device in which processes the input of end-user unique code to enable the SHS charge controller to turn on or off the load outputs dependent on the status of validity of the prepaid credit or existing credit.

Seamless operation with charge controller, and not interfering with battery charging at any time;

- a) Integrated prepaid solution to the controller/battery box, not an external device;

Full numeric display of credit days available, which is easily understandable by the customer. The “Loading Machine” is defined as the device which enables the creation of prepayment credit to be transferred to the end user, managed by a loading agent. The Loading Machine should be considered as a portable device (e.g. a mobile phone, laptop computer, tablet, etc.) without requiring a fixed power supply and should be rechargeable by the SHS supplied without the use of an inverter (ie. USB or 12Vdc output) and not be confused with fixed self-service style loading machines.

The “Loading System Management Software (LMS)” is defined as the software only, as operated by the EC-SBU to manage the deployment of the solar home systems and ongoing operation. In addition, the LMS shall serve the function to allow the EC-SBU to manage payment reconciliation from end users and Loading System Machine agents. The relationship between the three components and end user outlined in this section is shown below:

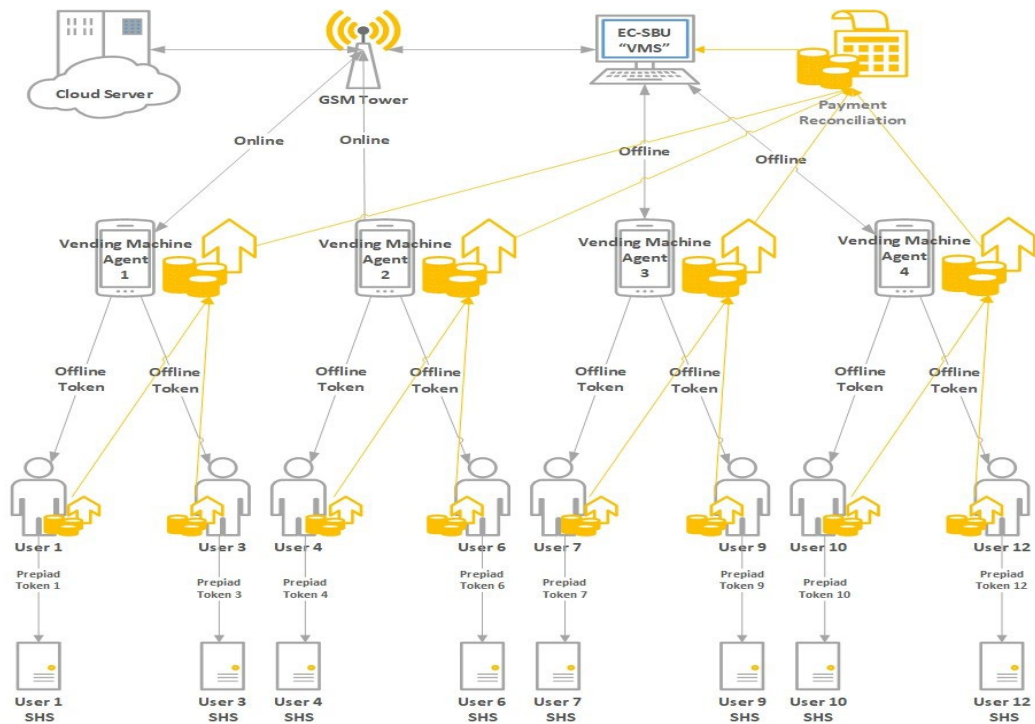


Figure 1. SHS Prepayment/Loading Machine/LMS Flow Chart

Figure 1 shows the loading process from end user to Loading Machine to Loading System Management Software. Loading System Machine operation is acceptable online/offline operations as shown in the figure above are:

- a. Operations acceptable in either online and offline mode;
  - i. Transfer of all Loading System Machine Agent data to the EC-SBU LMS, including but not limited to:
    - All end user personal and payment transaction data;
    - All agent personal and payment transaction data;
    - All SHS status and location data;
  - ii. Setting/resetting of Agent credit limit and credit availability can only be done by the Administrator (EC);
  - iii. Registration of end-users;
  - iv. Activation of SHS and assignment to end-users.
- b. Minimum operations required in offline mode:
  - i. Setting/resetting of Agent credit limit and credit availability can only be done by the Administrator;
  - ii. Registration of end users;
  - iii. Activation of SHS and assignment to end users.
- c. Minimum operations required in offline mode (that may also function online):
  - i. Creation of the prepaid digital token/token code for the end user;
  - ii. Transfer of the prepaid digital token/token code to the SHS prepayment controller using the RFID card
  - iii. Viewing end-user contact information.

Any loading machines that do not adhere to the minimum online/offline requirements outlined above will not qualify.

The software deployment of the full system (Loading System Machine and LMS) should adhere to the following minimum general requirements:

<b>Item</b>	<b>Description</b>
Compatibility	the software of the Loading System Machine should be compatible with a centrally managed PC running the compatibility Loading System Management Software.
Data integrity	the database of the LMS must either be operated from the cloud with backups maintained by the software provider or if stored on local hard drive of the PC running the LMS then the provider must supply cloud- based backup solution for the database. The cloud database associated with the system is accessible to the EC-SBU for monitoring and viewing purposes.
Security	the software for both Loading System Machine and LMS should be password protected in the event of theft. Additional security allowing the Loading System Machine to be inoperable via either remotely deactivated or via secondary methods such as requirement of a user key that can be cancelled to operate in tandem with the Loading System Machine, should be employed.
Credit Limits	the Loading System Machine shall have limits to the value of the prepayment credit (days or peso) for Loading System Machine that are set by the EC-SBU LMS. Credit limits shall only be reset once LMS has reconciled payments from the Loading System Machine agent. The mode for resetting of the credit limits should not require the transportation of the Loading System Machine to the EC-SBU LMS location and the transfer of changes to limits should be secure via wireless transfer (GSM).
Payment Reconciliation	The LMS must have payment reconciliation features in which once Loading System Machine data is uploaded into the LMS software, end user transactions can be easily summarized and when Agent payment is inserted into the LMS a balance can be obtained to determine easily and quickly if the reconciled amount received

	matches that expected as collected by the Loading System Machine agent from the end-users. Outstanding balances should carry over to any future payment collections from Agents.
Dashboard	The LMS and Loading System Machine software should present information in a summarized way so that information can be captured 'at a glance' such as amount of moneys overdue (both of Loading Machines and End Users), status of users/SHSs etc., and then be easily filtered by criteria such as date/Agents/status/locations and others.
User Management	The LMS must be able to control and edit all aspects of user management including assigning roles to users as well editing user details. The Loading System Machine must be only able to update end user information such as Name, Phone Number, Address etc. and not manage roles.
SHS Management	The LMS and Loading System Machine must be able to control and edit all aspects of SHS management including assigning status of location, deployment status, serial number database and user assignment.
Territory Management	The LMS and Loading System Machine must be able to control and edit to which Loading Station an individual MC is assigned to. The purpose being to prevent MCs relocating with their SHS to a new location without permission while also preventing prepaid load income being collected by a neighboring EC's Loading Machine. The ability to be able to transfer the MC to a new Loading Station should be only permissible with LMS administrative privileges. The LMS should also have the option to disable Territory Management.
Defaulting Users	The LMS should enable a dashboard view of total number of end users whom are 30/60/90+ days since last payment. Access to the user's data contained within these views should be easily accessible and exportable for use by EC-SBU including total paid, date of last payment, name and contact details including address/GPS co- ordinate.
Data Access	Global data of both LMS and Loading Machine software should be exportable to CSV or other file type importable

	<p>to MS Excel - minimum data to be exported should be all MC data, all loading transaction data and all SHS asset data. Should not all be available within the LMS normal operation, a letter from the software provided should be provided committing that this data can be made available upon request at any time and at no cost to EC-SBUs in the format outlined previously should be provided.</p>
Receipt Printing	<p>The Loading Machine must provide for a printed paper receipt. Providing an SMS token and receipt can be provided as an option but not as the sole method of receipt.</p>
Re-issuing Load/Token	<p>The method of token transfer should be repeatable from the Loading Machine to the MC prepayment controller, whereby should a token be lost or a wireless transfer failed - the Loading Machine may recall the last token provided to MC and re-issue to MC. This should remain a 1 time use code, so in the case of fraudulent claim of lost load/token from MC, the re-issued token should not provide additional load to the prepayment controller if the re-issued token was previously successfully loaded to the prepayment controller. Any re-issue of token should not affect the remaining balance/credit of the Loading Machine.</p>
Software Guarantee	<p>All software provided, whether it be propriety or 3rd party software, ongoing use of the software for the life of the system must be guaranteed—of no additional cost to the Procuring Entity to that of the upfront cost of the hardware <b><i>A Certification from the Supplier must be submitted to the Electric Cooperative during the Post Qualification for this effect.</i></b></p> <p>The Supplier shall commit . . . . A written commitment to this effect shall be provided in the Bid Submission.</p>
API access	<p>The Loading Management Software must be provided with an API (application programming interface) to allow access to minimum data as described above under “Data Access” for connection to the EC-SBU’s database software. Should this not be immediately available, the software provider must provide a written commitment to integrate future API access in the future at no cost to the Procuring Entity.</p>

**Table 11: Loading Machine and LMS Requirements**

Minimum Specifications

1. Prepayment Controller

<b>Particulars</b>	<b>Parameter</b>
Offline of Online Credit Validation	Offline/Online Cloud Based
Prepayment Unit Integrated to Charge Controller	Required
Type of Credit Transfer	Keypad/RFID/Other wireless (GSM accepted only in combination with offline method)
Credit Designation	Days Only (if kWh included, should be disabled)
Display of credit days available	Numeric
Status of loads during 0 days credit	Disconnected
Status of solar charging during 0 days credit	Charging
Single token for use on multiple SHS	Not Permitted
Credit recharge effect on existing credit	Accumulate

**Table 12: Minimum Prepayment Controller Specifications**

2. Loading Machine

<b>Particulars</b>	<b>Parameter</b>
Offline or Online Credit Creation	Offline/Online Cloud Based
Record Payment Records	Required
Type of Credit Transfer	RFID/ numeric token
Credit designation	Input as Pesos and automatically converted to Days Only (if kWh included, should be disabled)
Maximum credit creation per transaction	Default 30days & settable to any value by LMS only
Minimum credit creation per transaction	3days & settable to any value by LMS only
Offer User Management features	Required
SHS Management features	Repossess/ Replace/ Faulty
Dashboard or lookup values	Required
Syncing of data to LMS	Offline and Online cloud based
Portable or Fixed	Portable Only
Power Source	Internal Battery
Agent/Loading Machine Credit Limit Restrictions	Peso (Automatically converted to days)

**Table 13: Minimum Loading Machine Specifications**



### 3. Loading Management Software

<b>Particulars</b>	<b>Parameter</b>
Offline or Online Operation	Offline/Online Cloud Based
Offer User Management features	Required
SHS Management features	Repossess/ Replace
Dashboard or lookup values	Required
Syncing of Loading Machine data to LMS	Offline and Online cloud based
Portable or Fixed	Suitable for access from MS Windows7 onwards (optional access from mobile OS)
Payment Reconciliation of Agent/End User Cash	Required
Setting of Loading Machine/Agent Credit Limits	Required and option to set remotely
Asset Management of SHS (location, status)	Required
Agent/Loading Machine credit limit restriction	Peso (automatically converted to Days)
Online FAQ and Help Guide	Required

**Table 14:** *Minimum LMS Specifications*

### 8. Lamps and LED Lights

#### Certification requirements

All lanterns that are tested and found compliant with Lighting Global standard are acceptable so long as they provide the type of light service required (desk or ambient, lumen output and duration hours), as per the full General Requirements, in which case no further certifications are required.

#### Compulsory certifications

The generally applicable standards for LED luminaires and integrated LED lamps are Illumination Engineering Society's (IES). All LEDs used shall comply with these requirements:

**IES-LM-79-19:** Approved method for electrical and photometric measurements for solid-state lighting products

Lamps that do not have Lighting Global compliance certification should be supported by documentation or certificate of the following, that they provide the type of light service required (desk or ambient, lumen output and duration hours):

- Certificate stating that luminaires comply with General Requirements, as well as providing test results for light output.
- Confirmation that LED lights are constructed using LM-79-certified LED chips and drivers, as well as providing the required LM certificates.

### General requirements

Lights, Lamps and Lighting fixtures are to meet the following requirements:

- a. Each lamp shall be made of high efficiency LEDs with an efficiency of at least 90 lm/W. Each lamp shall have a minimum of 100lm with a wide light distribution angle.
- b. Light points are expected to be 100lm - 200lm - 300lm. 2 or 3 lamps of 100lm each can alternatively be provided instead of lamps of respectively 200 or 300lm.  
If a diffuser is included, the cover should be dismountable to remove dust and insects.
- c. Color of LED light shall be white.
- d. Lamps should have a way for attaching safely to ceiling or wall.

### Additional information required:

- Product brochure;
- LED brand used, model number, and certification;
- Nominal voltage range; and
- Color temperature.

## 9. Bundled Appliances

The Bidder shall include for each solar package the following bundled appliances as part of the procurement:

- a. **Phone Charger:** Minimum one USB adaptor for mobile phone charging (5V)

### General Requirements

The solar charge controller should have provision for USB outlet. Therefore, the only requirement on provision of mobile phone charger is a 5-1 cable adapter as shown in Diagram 2 below. Provision of “cigarette” style adapters is not permitted, due to the large array of heavy loads that can easily be used with this type of adapter.

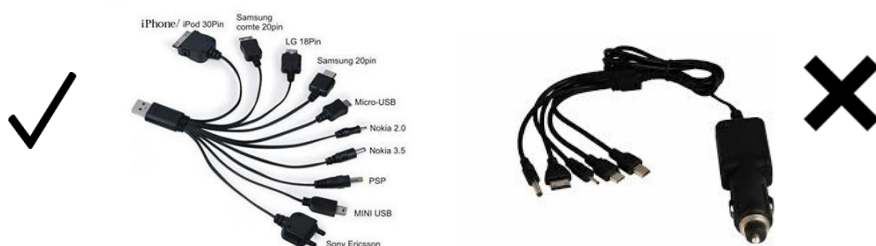


Diagram 2: Accepted Phone Charger type (L) and not accepted Phone Charger type

### Minimum Specifications

<b>Particulars</b>	<b>Parameter</b>
Type of port connection accepted	USB
USB Port minimum specification	5V 1A
USB Port maximum specification	5V2.1A
Min. number of phone types supported	5
Required phone adapter types:	Micro USB
	Mini USB
	Type-C USB

**Table 15: Minimum USB Adapter Specifications**

- b. **Radio: One AM/FM radio** (independent with an internal battery).

### General Requirements

The radio should have access to power for portability and not integrated into the SHS device.

### Minimum Specifications

<b>Particulars</b>	<b>Parameter</b>
Minimum Autonomous Runtime (at 50% volume, radio function)	5hrs
Minimum Speaker Size	3W 4ohm
Required bands	AM & FM

**Table 16: Minimum Radio Specifications**

- c. **Torch Lamp: One torch lamp** of minimum 50 Lumen and with a minimum autonomy of 5 hours.

### General Requirements

The torch shall be a rechargeable type with its own internal replaceable battery. The torch should be recharged from the USB port(s) and not from the lighting output ports. The internal battery should be sized to meet the following:

### Minimum Specifications

<b>Particulars</b>	<b>Parameter</b>
Type of port connection accepted	USB

Minimum Autonomous Runtime (full brightness)	5hrs
Minimum lumen output	50lms
Colour Temperature Range	10- 15,000K
Maximum Energy Capacity of Battery	5Wh

**Table 17: Minimum Torch Specifications**

## 10. Television-Ready Option

A DC LED TV is not required to be supplied as a part of the package (not evaluated in the basic offer), however the Bidder should submit a proposed TV-Ready option as part of their Bidding Documents and shall provide 1 television unit per EC for demonstration

The SUPPLIER must indicate if they are interested to do business alone or in joint venture with the EC SBU, wherein they might sell, lease or rent these TVs to the MCs – possibly in joint venture with the EC-SBU, a microfinance company or other third party. There is also potential to use the prepayment system being procured for instalment purchase of TVs subject to the ECs agreement

### General Requirements

A colour LED TV meeting Global Leap Certification requirements and provision in the SHS device should be made for an output port dedicated to the TV rated to carrying the maximum load requirement of the TV.

### Minimum Specification

<b>Particulars</b>	<b>Parameter</b>
Colour TV Voltage Range	10 - 16V
Maximum Power (LED backlight OFF)	9W
Maximum Standby Power	0.5W
Minimum Screen Size	15.6"
Built in Tuner & Antenna	Analog
Built in Speaker	Required
Available built in ports	USB / SD /Audio / Video
Remote Control	Required
Compliance	RoHS /CE
Operators Manuals (TV/Remote)	Required
DC Cable Length	5m
DC Cable Minimum XSA	0.75mm <sup>2</sup>
Compatible Connector with SHS Port	Required

**Table 18: Minimum DC TV Specifications**

**11. Cabling, Wiring and Switches**

Stranded and flexible insulated copper wiring shall be used. Cables used for wiring shall have three years of warranty.

a. DC solar PV module cable:

Flexible (class 5 or 6) multi-strand copper conductor, with 2 conductors in duplex configuration in flexible UV resistant sheath with polarity indication. Minimum 2.5mm<sup>2</sup> cross sectional area (XSA) conductor for 50Wp of minimum length 8m. Maximum permissible voltage drop over the length of the cable is 2%.

Should the Manufacturer find that the PV module cable type cannot fit their connector type, provision is made for a short 1m cable of 2.5mm<sup>2</sup> XSA to be joined to the cable end for final connection.

b. DC cables from Charge Controller to DC light switch:

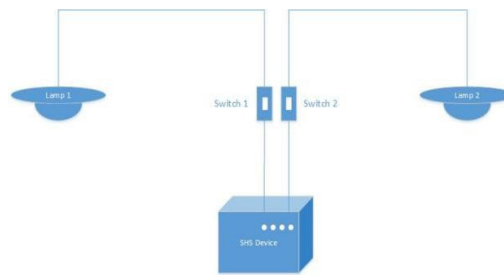
Flexible (class 5 or 6) multi-strand copper conductor, with 2 conductors in flexible polyvinyl chloride (PVC) sheath, with polarity indication. Minimum 0.5mm<sup>2</sup> cross sectional area (XSA) conductor up to maximum 25m with all lighting loads if daisy chain. Should the total wiring loom length (including that to switches) be greater than 30m, then minimum 1.0mm<sup>2</sup> cross sectional area (XSA) conductor is required up to 50m. The minimum distance from either SHS central device to light point is 5m or from light point to light point of 5m. Maximum permissible voltage drop over the length of cable is 2%.

The Manufacturer may provide one of two options (or both) for wiring & switching:

- i. "Daisy-chain" wiring loom connection to multiple light points, then each lamp shall have its own switch on the same loom and no more than 2 lamps per daisy-chain in the event of cable/connector failure;
- ii. Parallel cables from the SHS device, with each having its own input plug on the SHS device and own switch to the lamp.

Only parallel wiring loom configurations are allowed for higher quality and more functional installations can be provided, similar as shown in Figure 6. However, Bids must adhere strictly to this requirement. Where a specification is given for a cable length, if in daisy-chain configuration - the length is specified as the total length of all daisy-chain cables from the central SHS device connection to LAMP1, followed by distance from the LAMP1 to LAMP2 and so on.

### Daisy-chain parallel connection



Switches shall be pre-assembled to the cable, controlling on/off switching from the central SHS device is not acceptable. Dimming switches are not accepted in the SHS design. Additionally, all bulbs sockets shall be universal to ensure compatibility with a wide range of bulb types.

### Minimum DC Cable Specifications

Particulars	Parameter
<b><i>Solar PV Module</i></b>	
Solar PV Module Cable Length (min)	8m
Solar PV Module Cable XSA	2.5mm <sup>2</sup>
Maximum permissible voltage drop (including connectors)	2%
UV rated cable ties to suit outdoor cable	min 10pcs per cable
<b><i>Other DC Cable</i></b>	
LAMP1DC Cables LED Lamps Length	5m
LAMP2DC Cables LED Lamps Length	5m
DC Cables to LED Lamps XSA up to 25m	min 0.5mm <sup>2</sup>
DC Cables to LED Lamps XSA 25m up to 50m	min 1.0mm <sup>2</sup>
Maximum permissible voltage drop	3%
Length from SHS Device to Switch (parallel)	1m
Length from wiring loom to Switch (daisy chain/series)	min 1m
Cable clips to suit internal DC cables	min 1pcs per 0.3m of cable
<b><i>DC Cable Switches</i></b>	
Minimum Life Cycle	20,000

### 12. Cable Connectors

Field connections shall be snap connectors for joining 'play & play' cables using polarity-protected plugs. Approved plugs/sockets include:

- a. Co-axial power connectors 5.5mm OD, 2.1mm pin rated
- b. SAE connector.



Diagram 3: Approved co-axial plug/socket (left) and SAE connector (right)

### 13. Toolbox

The Bidder shall provide at least five (5) electrical toolboxes and two (2) units of GPS per EC with other necessary tools for EC Technicians to troubleshoot, repair, and replace main components such as panel, battery, charge controller, and lamp. No particular technical specifications are required for GPS device, but it must be functional. The toolbox shall contain at least the following items:

- 1 set Jewelers' screw driver
- 1pc. Philip screw driver
- 1pc. Slotted (-) screw driver
- 1pc. Side Cutter
- 1pc. Long Nose plier
- 1pc. Alligator/Square Jaw plier
- 1pc. Digital multi-meter 0-10A<sub>DC</sub>/1-200V<sub>DC</sub> with fuse protection (10A)
- 1pc. Gas/Butane Solder
- 1pc. Magnifying Glass
- 1pc. Rechargeable LED Flashlight
- 1pc. Robust Toolbox
- 1 pc. Hammer
- 1pc. Compass
- 1pc. Hacksaw
- 1pc. Strap Tensioner

The Bidder shall also include any other special tools required for right manipulations of the solar packages by the EC Technicians, e.g. adapted tool for tamperproof screws.

### 14. OTHER ACCESSORIES

The SUPPLIER shall include all necessary accessories for supporting or fixing components (module, battery box, appliances, switches, cable ties, etc.) during installation.

## XIII. INSTALLATION OF SHS

The installation of the SHS shall follow best practices suitable to the type of houses of the MCO's and the local environment of the site. This section provides the recommended

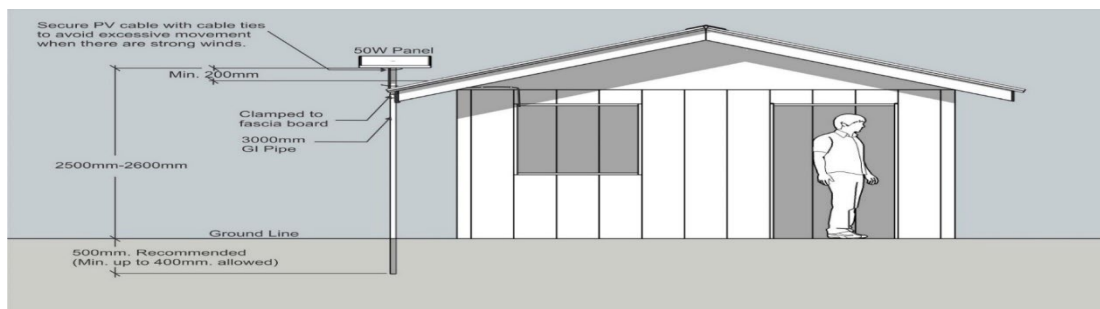
installation procedures based on earlier experiences in the implementation similar projects. These procedures serve as a guide for installers and will be the basis for the NEA for accepting the installation or for requiring corrective measures. Modification of these procedures shall be approved by NEA in consultation and in agreement with the SUPPLIER and the NEA.

### XIII.1 PV Module Mounting

The PV module shall be installed in a location within the premises of the MCO with maximum exposure to the noon sun, minimum shading from the east to the west, and securely fixed on its mounting structure against damage from strong winds. The minimum exposure of the PV module to the sun shall be 6 hours (e.g. from 9AM to 3PM). Exposure of the PV module to the morning sun is preferred over the afternoon sun if 9AM to 3PM exposure is not possible.

### XIII.2 Roof-Side Pole Mounted Option

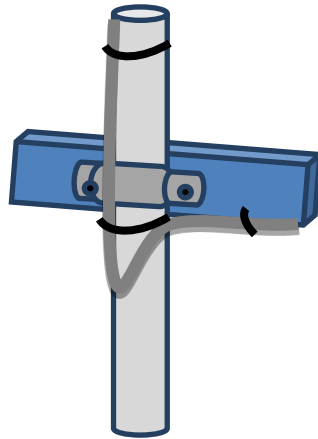
The base of the mounting pipe is buried on the ground and the upper part of the pipe is clamped to the fascia board or on a sturdy structure on the side of the roof with the solar module on top of the pipe positioned above the roof. The depth of how the pipe is buried shall allow the PV module to have a minimum vertical distance of 20cm above the roof.



**Diagram 4. Side.** Roof-side Pole mounted PV module option

The PV cable shall be securely connected to the junction box with the correct polarity and laid along the frame and strapped to the top of the post to avoid stress on the junction box. The PV cable shall be strapped on the outside part of the pipe going down and bent to make a drip loop before entering the house for connecting to the PV input of the battery enclosure.





**Diagram 5. Drip loop for PV cable.**

Care should be taken to avoid PV cable from resting on the sharp edges of the roof that could damage its insulation. The mounting straps and cable ties used to fasten the cable shall be UV rated. The PV cable shall be laid neatly and clamped on the beams and posts of the house towards the battery enclosure. The extra PV cable length shall not be cut but spooled neatly and fastened near the battery enclosure.



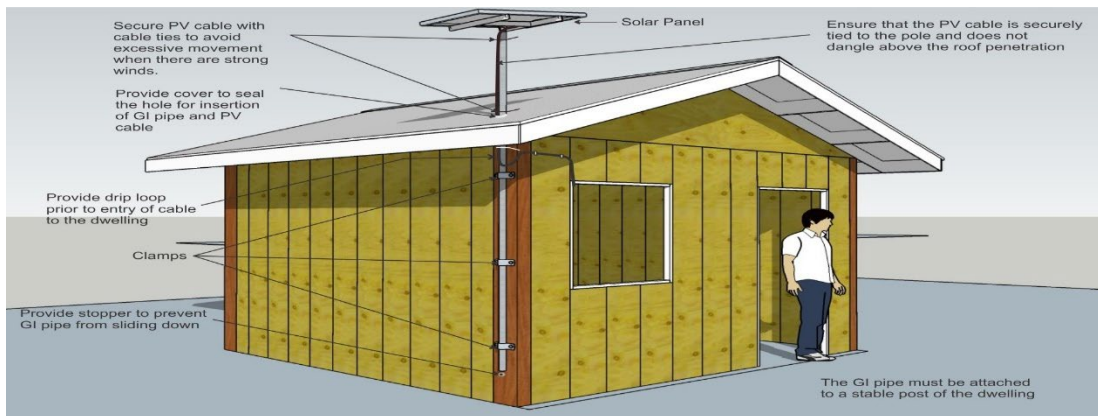
Sample Roof-side Pole mounted installation

This mounting option is preferred to avoid penetration on the roof for both GI sheet roofs and thatched (nipa or cogon) roofs. This is only possible for roofs with elevations of around 2 meters from the ground. This may not be applied for roofs with high elevation and roofs with no strong structure that will hold the pipe securely on the side.

### **XIII.3 Through-roof Pole Mounting Option**

In this type of installation, the pole is passed through the roof with the lower part of the pipe clamped on the post of the house while the upper part of the pipe is above the roof holding the PV module on its mounting bracket with a minimum vertical distance of 20cm above the roof.

This type of installation will have roof-penetration and shall only be allowed upon the consent of the house owner/MCO. The installer shall assure that all necessary materials are available to avoid any leaks on the roof.



**Diagram 6 : Through-Roof Pole mounted installations**

For houses with GI sheet roofs, the pipe can be positioned on the inside part of the house fastened to the house post passing through the GI sheet roof. The PV cable shall be laid on the side the pipe. A drip loop is made on the PV cable before making the PV cable run to the battery enclosure. The penetration on the GI roof shall be sealed against leaks using appropriate roof sealing materials.



**Diagram 7: Roof-through Pole mounted installations on GI roofs**

For thatched roof (nipa or cogon) where sealing of the roof may still have some leaks, the pipe shall be positioned on the outside part of the house to prevent leaks on the roof from entering the house. Effort should be done to seal the leaks using the same roofing material or appropriate sealing material.



**Diagram 8:** Roof-through Pole mounted installations on thatched roof

The PV cable shall be laid neatly and clamped on the beams and posts of the house towards the battery enclosure.

#### **XIII.4 Charge Controller and Battery Enclosure**

The charge controller and battery box enclosure shall be securely mounted inside the house for easy access to read the displays and indicator lights as well as entering the credits into the unit. The position of the PV cable connected to the enclosure shall avoid stresses on the connector and avoid water from dripping into the enclosure. The location of the enclosure shall be accessible to connect the lamps, accessories, and other appliances. It shall be protected from direct sunlight and exposure to rain.

#### **XIII.5 LED Lamps**

There are four LED lamps included in the system. One lamp rated at 1W is designed to be installed indoors and outdoors with the necessary protection. The rest of the lamps shall be installed inside the house protected from rain and dust. The lamps shall be positioned to provide the most effective illumination to the area. The lamps shall not be installed along the path of the household members that they can be easily be damaged. Installing the lamp directly above the cooking area shall be avoided due to the fast accumulation of soot on the lamps.

#### **XIII.6 Wires and Switches**

The LED lamps are supplied with wires and switches with a DC plug connected to the battery enclosure. The wire shall be laid neatly from the battery enclosure to the lamp with a switch positioned on an accessible location. It is recommended to install the switches with a height of 1.2m above the floor as appropriate for the house structure or as preferred by the user. The switch shall be securely mounted to prevent it from being damaged. Daisy chain looms can be used with a maximum of two lamps per circuit. Excess cable lengths shall not be cut but spooled neatly and fastened near the battery enclosure or in an appropriate location.

#### **XIV.5 Accessories**

The accessories such as the torch, the portable radio, and the cellular phone charging jacks shall be located near the battery enclosure where they are plugged to the USB port.

#### XIV. DELIVERABLES

	<b>DELIVERABLES</b>	<b>DUE DATE</b>
Factory Acceptance Test		
<b>1</b>	Factory Acceptance Test	Within thirty (30) days after receipt of Notice of Post Qualification
Training		
<b>2</b>	Conduct of training (installation and operation)	Within forty (40) days from receipt of Notice to Proceed.
On-Site Delivery of Materials		
<b>3</b>	Delivery of 100% materials on site	Within seventy-five (75) days from receipt of Notice to Proceed.
Installation of Solar Home System		
<b>4</b>	Installation of Solar Home System should be at least 22% accomplished per Electric Cooperative	Within ninety-five (95) days from receipt of Notice to Proceed.
<b>5</b>	Installation of Solar Home System should be at least 44% accomplished per Electric Cooperative	Within one hundred and fifteen (115) days from receipt of Notice to Proceed.
<b>6</b>	Installation of Solar Home System should be at least 66% accomplished per Electric Cooperative	Within one hundred and thirty-five (135) days from receipt of Notice to Proceed.
<b>7</b>	Installation of Solar home system should be at least 88% accomplished per Electric Cooperative	Within one hundred and fifty-five (155) days from receipt of Notice to Proceed.
<b>8</b>	Installation of Solar home system should be at 100% accomplished per Electric Cooperative	Within one hundred and seventy-five (175) days from receipt of Notice to Proceed.
Accomplishment Reports		
<b>9</b>	Submission of Weekly Installation Report (IR) together with the individual folder of high-resolution	Reporting starts five (5) days after the first week of installation.

	IAS and detailed per beneficiary installation pictures	
<b>10</b>	Submission of final Installation Report together with last addition of individual folder of high resolution IAS and detailed per beneficiary installation pictures	Within five (5) days after completion of installation

## **XV. OBLIGATIONS OF THE SUPPLIER**

The SUPPLIER shall assume the following obligations:

- a) Ensure timely delivery of equipment and materials to the EC's warehouse.
- b) Guarantee the safe keeping of equipment and materials until delivery to the EC's warehouse.
- c) Ensure timely installation based on the deliverables;
- d) Provide weekly accomplishment reports and final report based on the approved format and schedule;
- e) Must provide a dedicated person in-charge (PIC) as contact point and project coordinator. The PIC is liaised directly with the Solar Business Unit (SBU) of the EC. Template will be provided.

## **XVI. PAYMENT SCHEME**

Payments to the SUPPLIER shall be made based on the schedule below:

### ORIGINAL RELEASES SCHEDULE

	<b>Contract Milestones</b>	<b>% of the Total Budget</b>
<b>1</b>	<ul style="list-style-type: none"> <li>- Factory Acceptance Test Certificate with "passed" remark</li> <li>- With signed contract</li> <li>- With Notice of Award and Notice to Proceed</li> </ul>	15% *
<b>2</b>	<ul style="list-style-type: none"> <li>- Training (installation and operation) already conducted except the final training of the SBU staff</li> </ul>	50%

	<ul style="list-style-type: none"> <li>- 50% on-site delivery of materials</li> <li>- Certificate of Delivery issued by NEA</li> </ul>	
<b>3</b>	<ul style="list-style-type: none"> <li>- Installation of Solar Home System should be at least 50% accomplished with complete Installation Report (IR) and individual folder of high-resolution IAS together with detailed per beneficiary installation pictures submitted to NEA.</li> <li>- 100% on-site delivery of materials</li> <li>- Certificate of Partial Completion/Verification issued by NEA.</li> </ul>	15%
<b>4</b>	<ul style="list-style-type: none"> <li>- Installation of Solar Home System should be at least 90% accomplished with complete Installation Report (IR) and individual folder of high-resolution IAS together with detailed per beneficiary installation pictures submitted to NEA.</li> <li>- Certificate of Partial Completion issued by NEA.</li> </ul>	10%
<b>5</b>	<ul style="list-style-type: none"> <li>- Certificate of Final Inspection and Acceptance/Final Verification issued by NEA</li> <li>- Complete Final Training of the SBU staff</li> <li>- Final Installation Report (IR) and individual folder of high-resolution IAS together with detailed per</li> </ul>	10%

	beneficiary installation pictures submitted to NEA.  - Certificate of Completion submitted by the Supplier (SHS and Loading Machines)	
		<b>100%</b>

Note: \* The advance payment shall be made only upon the submission to and acceptance by the procuring entity of an irrevocable standby letter of credit of equivalent value from a commercial bank, a bank guarantee or a surety bond callable upon demand, issued by a surety or insurance company duly licensed by the Insurance Commission and confirmed by the procuring entity of equal value of the advance payment

The obligation for the warranty shall be covered by either retention money in an amount equivalent to at least one percent (1%) but not to exceed five percent (5%) of every progress payment, or a special bank guarantee equivalent to at least one percent (1%) but not to exceed five percent (5%) of the total contract price. The said amounts shall only be released after the lapse of the warranty period or, in the case of Expendable Supplies, after consumption thereof: Provided, however, That the supplies delivered are free from patent and latent defects and all the conditions imposed under the contract have been fully met.

**XVII. OTHER CONDITIONS/PROVISIONS**

It is understood that all conditions/provisions under Republic Act (RA) No. 9184 and its Revised Implementing Rules and Regulations not specified and/or not expressly explained shall be deemed incorporated into this Terms of Reference with the same meaning as provided under the law.