



REPUBLIC OF THE PHILIPPINES
NATIONAL POWER CORPORATION
(Pambansang Korporasyon sa Elektrisidad)

BID DOCUMENTS

Name of Project : SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR THE PROVINCES OF CAGAYAN AND ISABELA UNDER PV MAINSTREAMING

Project Location : BALATUBAT, CALAYAN, CAGAYAN
NAGUILIAN, CALAYAN, CAGAYAN
MINABEL, CALAYAN, CAGAYAN
DIBULOS, DIVILACAN, ISABELA

Specification No.: LUZP22Z1400Ss

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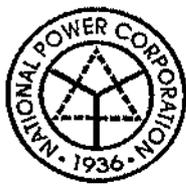
Design and Development Department



SECTION I

INVITATION TO BID





National Power Corporation

INVITATION TO BID

PUBLIC BIDDING – BCS 2022-0677

1. The NATIONAL POWER CORPORATION (NPC), through its approved Corporate Budget of CY 2022 intends to apply the sum of **(Please see schedule below)** being the Approved Budget for the Contract (ABC) to payments under the contract. Bids received in excess of the ABC shall be automatically rejected at Bid opening.

PR Nos./PB Ref No. & Description	Similar Contracts	Pre-bid Conference	Bid Submission / Opening	ABC/ Amt. of Bid Docs
SO-OPD22-020 / PB221108-JL00407 Supply, Delivery, Erection / Installation, Testing and Commissioning of 7.97 / 13.8kV Distribution Line System (Extension) Project at Various Areas in Antique (Batbatan and Sibolo) • PCAB License: License Category of at least “Category D – Electrical Works” and registration classification of at least “Small B – Electrical Works”	Supply of Transmission / Distribution Line Materials (Steel / Concrete Poles / Steel Towers, Line Conductor, Insulators, etc.) as well as the erection/installation and Test of Transmission / Distribution Line with nominal voltage of at least 7.97kV	25 October 2022 9:30 A.M	08 November 2022 9:30 A.M	₱ 15,538,000.00 / ₱ 25,000.00
HO-PIB22-012 / PB221108-JL00408 Supply and Delivery of 651 Units of Photovoltaic Solar Home System for the Provinces of Cagayan and Isabela under PV Mainstreaming	Supply and Delivery of Photovoltaic Solar Home System with at least 50Wp capacity per unit.	25 October 2022 9:30 A.M	08 November 2022 9:30 A.M	₱ 18,691,200.00 / ₱ 25,000.00

Venue: Kaňao Function Room, NPC Bldg. Diliman, Quezon City

2. The NPC now invites bids for Items listed above. Delivery of the Goods is required (see table below) specified in the Technical Specifications. Bidders should have completed, within (see table below) from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. (Instruction to Bidders).

PR No/s. / PB Ref No/s.	Delivery Period / Contract Duration	Relevant Period of SLCC reckoned from the date of submission & receipt of bids
SO-OPD22-020	Two Hundred (200) Calendar Days	-
HO-PIB22-012	One Hundred Twenty (120) Calendar Days	Ten (10) Years

3. Bidding will be conducted through open competitive bidding procedures using a non-discretionary "pass/fail" criterion as specified in the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

Bidding is restricted to Filipino citizens/sole proprietorships, partnerships, or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines, and to citizens or organizations of a country the laws or regulations of which grant similar rights or privileges to Filipino citizens, pursuant to RA 5183.

4. Prospective Bidders may obtain further information from National Power Corporation, Bids and Contracts Services Division and inspect the Bidding Documents at the address given below during office hours (8:00AM to 5:00PM), Monday to Friday.
5. A complete set of Bidding Documents may be acquired by interested Bidders from the given address and website(s) and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB. Bidding fee may be refunded in accordance with the guidelines based on the grounds provided under Section 41 of R.A. 9184 and its Revised IRR.
6. The National Power Corporation will hold Pre-Bid Conference (**see table above**) and/or through video conferencing or webcasting which shall be open to prospective bidders.

Only registered bidder/s shall be allowed to participate for the conduct of virtual pre-bid conference. **Unregistered bidders** may attend the Pre-Bid Conference at the Kañao Room, NPC subject to the following:

- a. Only a maximum of two (2) representatives from each bidder / company shall be allowed to participate during the virtual pre-bid conference.
 - b. A "No Face mask / No Entry" policy shall be implemented in the NPC premises. Face mask shall be 3-ply surgical or KN95 mask type.
 - c. The requirements herein stated including the medium of submission shall be subject to GPPB Resolution No. 09-2020 dated 07 May 2020
 - d. The Guidelines on the Implementation of Early Procurement Activities (EPA) shall be subject to GPPB Circular No. 06-2019 dated 17 July 2019
7. Bids must be duly received by the BAC Secretariat through (i) manual submission at the office address indicated below; (ii) online or electronic submission before the specified time stated in the table above for opening of bids. Late bids shall not be accepted.
 8. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in ITB Clause 14.
 9. Bid opening shall be on Kañao Function Room, NPC Head Office, Diliman, Quezon City and/or via online platform to be announced by NPC. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.
 10. The National Power Corporation reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised IRR of R.A. No. 9184, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:

**Bids and Contracts Services Division,
Logistics Department**

BIR Road cor. Quezon Avenue

Diliman, Quezon City

Tel Nos.: 8924-5211 and 8921-3541 local 5611/5211

Fax No.: 8922-1622

Email: bcsd@napocor.gov.ph / bcsd_napocor@yahoo.com

12. You may visit the following websites:

For downloading of Bidding Documents: <https://www.napocor.gov.ph/bcsd/bids.php>


RENE B. BARRUELA
Vice President, Corporate Affairs Group and
Chairman, Bids and Awards Committee

SECTION II

INSTRUCTION TO BIDDERS



SECTION II – INSTRUCTIONS TO BIDDERS

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SECTION II – INSTRUCTIONS TO BIDDERS

1. Scope of Bid

The **National Power Corporation (NPC or NAPOCOR)** wishes to receive Bids for the **SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR THE PROVINCES OF CAGAYAN AND ISABELA UNDER PV MAINSTREAMING**, with identification number **LuzP22Z1400Ss**.

The Procurement Project (referred to herein as "Project") is composed of one (1) lot and will be awarded to one (1) Bidder in one complete contract, the details of which are described in Section VI (Technical Specifications).

2. Funding Information

- 2.1. The GOP through the source of funding as indicated below for CY 2022 in the amount specified in the Invitation to Bid.
- 2.2. The source of funding is the Corporate Operating Budget of the National Power Corporation.

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manuals and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or **IB** by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have verified and accepted the general requirements of this Project, including other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, and Coercive Practices

The Procuring Entity, as well as the Bidders and Suppliers, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

- 5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.

- 5.2. Foreign ownership exceeding those allowed under the rules may participate when citizens, corporations, or associations of a country, included in the list issued by the GPPB, the laws or regulations of which grant reciprocal rights or privileges to citizens, corporations, or associations of the Philippines.

The foreign bidder claiming eligibility by reason of their country's extension of reciprocal rights to Filipinos shall submit a certification from the relevant government office of their country stating that Filipinos are allowed to participate in their government procurement activities for the same item/product. The said certification shall be validated during the post-qualification of bidders.

- 5.3. Pursuant to Section 23.4.1.3 of the 2016 revised IRR of RA No.9184, the Bidder shall have an SLCC that is at least one (1) contract similar to the Project the value of which, adjusted to current prices using the PSA's CPI, must be at least equivalent to at least fifty percent (50%) of the ABC.
- 5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.1 of the 2016 IRR of RA No. 9184.

6. Origin of Goods

There is no restriction on the origin of goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN, subject to Domestic Preference requirements under ITB Clause 18.

7. Subcontracts

- 7.1. The Bidder may subcontract portions of the Project to the extent allowed by the Procuring Entity as stated herein, but in no case more than twenty percent (20%) of the Project.

The portions of Project and the maximum percentage allowed to be subcontracted are indicated in the **BDS**, which shall not exceed twenty percent (20%) of the contracted Goods.

- 7.2. The Supplier may identify its subcontractor during the contract implementation stage. Subcontractors identified during the bidding may be changed during the implementation of this Contract. Subcontractors must submit the documentary requirements under Section 23.1 of the 2016 revised IRR of RA No. 9184 and comply with the eligibility criteria specified in ITB Clause 5 to the implementing or end-user unit.
- 7.3. Subcontracting of any portion of the Project does not relieve the Supplier of any liability or obligation under the Contract. The Supplier will be responsible for the acts, defaults, and negligence of any subcontractor, its agents, servants, or workmen as fully as if these were the Supplier's own acts, defaults, or negligence, or those of its agents, servants, or workmen.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address and/or through videoconferencing/webcasting as indicated in paragraph 6 of the **IB**.

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents comprising the Bid: Eligibility and Technical Components

10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in Section VIII (NPCSF-GOODS-01 - Checklist of Technical and Financial Documents).

10.2. The Bidder's SLCC as indicated in **ITB** Clause 5.3 should have been completed within Ten (10) Years prior to the deadline for the submission and receipt of bids.

10.3. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. Similar to the required authentication above, for Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

10.4. The Statement of the bidder's Single Largest Completed Contract (SLCC) (NPCSF-GOODS-03) and List of all Ongoing Government & Private Contracts Including Contracts Awarded but not yet Started (NPCSF-GOODS-02) shall comply with the documentary requirements specified in the **BDS**.

11. Documents comprising the Bid: Financial Component

11.1. The second bid envelope shall contain the financial documents for the Bid as specified in Section VIII (NPCSF-GOODS-01 - Checklist of Technical and Financial Documents).

11.2. If the Bidder claims preference as a Domestic Bidder or Domestic Entity, a certification issued by DTI shall be provided by the Bidder in accordance with Section 43.1.3 of the 2016 revised IRR of RA No. 9184.

11.3. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.

11.4. For Foreign-funded Procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Bid Prices

12.1. Prices indicated on the Price Schedule shall be entered separately in the following manner:

- a. For Goods offered from within the Procuring Entity's country:
 - i. The price of the Goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable);
 - ii. The cost of all customs duties and sales and other taxes already paid or payable;
 - iii. The cost of transportation, insurance, and other costs incidental to delivery of the Goods to their final destination; and
 - iv. The price of other (incidental) services, if any, listed in the **BDS**.
- b. For Goods offered from abroad:
 - i. Unless otherwise stated in the **BDS**, the price of the Goods shall be quoted delivered duty paid (DDP) with the place of destination in the Philippines as specified in the **BDS**. In quoting the price, the Bidder shall be free to use transportation through carriers registered in any eligible country. Similarly, the Bidder may obtain insurance services from any eligible source country.
 - ii. The price of other (incidental) services, if any, as listed in the **BDS**.

13. Bid and Payment Currencies

13.1. For Goods that the Bidder will supply from outside the Philippines, the bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies, shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.

13.2. Payment of the contract price shall be made in Philippine Pesos.

14. Bid Security

14.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS**

14.2. The Bid and bid security shall be valid for **One Hundred Twenty (120) calendar** days from the date of opening of bids. Any Bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

15. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

16. Deadline for Submission of Bids

16.1. The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB**.

17. Opening and Preliminary Examination of Bids

17.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

17.2. The preliminary examination of bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

18. Domestic Preference

18.1. The Procuring Entity will grant a margin of preference for the purpose of comparison of Bids in accordance with Section 43.1.2 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring Entity's BAC shall immediately conduct a detailed evaluation of all Bids rated "*passed*," using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of the 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, bidders may submit a proposal on any of the lots or items, and evaluation will be undertaken on a per lot or item basis, as the case maybe. In this case, the Bid Security as required by **ITB** Clause 14 shall be submitted for each lot or item separately.

19.3. The descriptions of the lots or items shall be indicated in **Section VI (Technical Specifications)**, although the ABCs of these lots or items are indicated in the **BDS** for purposes of the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184. The NFCC must be sufficient for the total of the ABCs for all the lots or items participated in by the prospective Bidder.

19.4. The Project shall be awarded to one (1) Bidder in one complete contract.

19.5. Except for bidders submitting a committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation, all Bids must include the

NFCC computation pursuant to Section 23.4.1.4 of the 2016 revised IRR of RA No. 9184, which must be sufficient for the total of the ABCs for all the lots or items participated in by the prospective Bidder. For bidders submitting the committed Line of Credit, it must be at least equal to ten percent (10%) of the ABCs for all the lots or items participated in by the prospective Bidder.

20. Post-Qualification

- 20.1. Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS) and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

- 21.1. The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

SECTION III

BID DATA SHEET



SECTION III - BID DATA SHEET

ITB Clause	
5.3	<p>For this purpose, similar contracts shall refer to Supply and Delivery of Photovoltaic Solar Home system with at least 50Wp capacity per unit.</p> <p>The Single Largest Completed Contract (SLCC) as declared by the bidder shall be verified and validated to ascertain such completed contract. Hence, bidders must ensure access to sites of such projects/equipment to NPC representatives for verification and validation purposes during post-qualification process.</p> <p>It shall be a ground for disqualification, if verification and validation cannot be conducted for reasons attributable to the Bidder.</p>
7.1	<p>Subcontracting may be allowed on transport, local/non-skilled labor under the supervision of the Bidder. The Bidder shall not be relieved from any liability or obligation that may arise from the performance of the Subcontractor.</p>
10.4	<p>The list of on-going contracts (Form No. NPCSF-GOODS-02) shall be supported by the following documents for each on-going contract to be submitted during Post-Qualification:</p> <ol style="list-style-type: none"> 1. Contract/Purchase Order and/or Notice of Award 2. Certification coming from the project owner/client that the performance is satisfactory as of the bidding date <p>The bidder shall declare in this form all his on-going government and private contracts including contracts where the bidder (either as individual or as a Joint Venture) is a partner in a Joint Venture agreement other than his current joint venture where he is a partner. Non declaration will be a ground for disqualification of bid.</p> <p>The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid (Form No. NPCSF-GOODS-03) shall be supported by the following documents to be submitted during Bid Opening:</p> <ol style="list-style-type: none"> 1. Contract/Purchase Order 2. Certificate of Acceptance; or Certificate of Completion; or Official Receipt (O.R); or Sales Invoice <p>The prospective bidders shall declare its Joint Venture partner during the purchase of bid/tender documents. Any single bidder/s who already procured/secured the bidding documents but want to avail the Joint Venture Agreement (JVA) shall inform the BAC in writing prior to the bid opening for records and documentation purposes. Failure to do so shall be a ground for disqualification/non-acceptance of its bid.</p>

10.5	<p>Bidders shall also submit the following requirements in their first envelope, Eligibility and Technical Component of their bid:</p> <ol style="list-style-type: none"> 1. Drawings and documents to be submitted with the Bid as specified in Clause GW-11.2 of Section VI - Technical Specifications (GW-General Works) 2. Complete eligibility documents of the proposed sub-contractor, if any
12	<p>The price of the Goods shall be quoted DDP Project Site or the applicable International Commercial Terms (INCOTERMS) for this Project.</p>
14.1	<p>The bid security shall be in the form of a Bid Securing Declaration, or any of the following forms and amounts:</p> <ol style="list-style-type: none"> a) The amount of not less two percent (2%) of ABC, if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit; or b) The amount of not less than five percent (5%) of ABC, if bid security is in Surety Bond.
19.3	<p>The Goods are grouped together in one (1) lot and will be awarded to one (1) Bidder in one complete contract.</p> <p>Partial bid is not allowed. The Goods are grouped in a single lot and the lot shall not be divided into sub-lots for the purpose of bidding, evaluation, and contract award.</p> <p>The Bidders bid offer must be within the ABC of the lot.</p> <p>Bid offers that exceed the ABC of the lot or with incomplete price, shall be rejected.</p>
19.5	<p>If the Bidder opted to submit a Committed Line of Credit (CLC), the bidder must submit a granted credit line valid/effective at the date of bidding.</p>
20.1	<p>Additional documents to be submitted during Post-Qualification:</p> <ol style="list-style-type: none"> a. Contract/Purchase Order and/or Notice of Award for the contracts stated in the List of all Ongoing Government & Private Contracts Including Contracts Awarded but not yet Started (NPCSF-GOODS-02); b. Certification coming from the project owner/client that the performance is satisfactory as of the bidding date for all ongoing contracts stated in Form NPCSF-GOODS-02; c. Drawings and documents to be submitted during post-qualification process as specified in Section VI – Part II (Technical Data Sheets – Electrical Works, EW) <p>Manufacturer's brochures, manuals and other supporting documents of equipment, materials, hardware and tools proposed by the bidders must</p>

	<p>comply with the technical specifications of such equipment, materials, hardware and tools. It shall be a ground for disqualification if the submitted brochures, manuals and other supporting documents are determined not complying with the specifications during technical evaluation and post-qualification process.</p> <p>Equipment, materials, hardware and tools proposed by the winning bidder to be supplied, which were evaluated to be complying with the technical specifications, shall not be replaced and must be the same items to be delivered/installed/used during the contract implementation. Any proposed changes/replacement of said items may be allowed on meritorious reasons subject to validation and prior approval by NPC.</p>
20.2	The licenses and permits relevant to the Project and the corresponding law requiring it as specified in the Technical Specifications, if any.
21.2	Notice to Proceed.

SECTION IV

GENERAL CONDITIONS OF THE CONTRACT



SECTION IV – GENERAL CONDITIONS OF CONTRACT

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SECTION IV – GENERAL CONDITIONS OF CONTRACT

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

Additional requirements for the completion of this Contract shall be provided in the **Special Conditions of Contract (SCC)**.

2. Advance Payment and Terms of Payment

- 2.1. Advance payment of the contract amount is provided under Annex "D" of the revised 2016 IRR of RA No. 9184.
- 2.2. The Procuring Entity is allowed to determine the terms of payment on the partial or staggered delivery of the Goods procured, provided such partial payment shall correspond to the value of the goods delivered and accepted in accordance with prevailing accounting and auditing rules and regulations. The terms of payment are indicated in the **SCC**.

3. Performance Security

- 3.1. Within ten (10) calendar days from receipt of the Notice of Award by the Bidder from the Procuring Entity but in no case later than the signing of the Contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR of RA No. 9184.
- 3.2. The performance bond to be posted by the Contractor must also comply with additional requirements specified in the **SCC**.

4. Inspection and Tests

The Procuring Entity or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Project specifications at no extra cost to the Procuring Entity in accordance with the Generic Procurement Manual. In addition to tests in the **SCC, Section VI (Technical Specifications)** shall specify what inspections and/or tests the Procuring Entity requires, and where they are to be

conducted. The Procuring Entity shall notify the Supplier in writing, in a timely manner, of the identity of any representatives retained for these purposes.

All reasonable facilities and assistance for the inspection and testing of Goods, including access to drawings and production data, shall be provided by the Supplier to the authorized inspectors at no charge to the Procuring Entity.

5. Warranty

5.1 In order to assure that manufacturing defects shall be corrected by the Supplier, a warranty shall be required from the Supplier as provided under Section 62.1 of the 2016 revised IRR of RA No. 9184.

5.2 The Procuring Entity shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall, repair or replace the defective Goods or parts thereof without cost to the Procuring Entity, pursuant to the Generic Procurement Manual.

6. Liability of the Supplier

The Supplier's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Supplier is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

SECTION V

SPECIAL CONDITIONS OF THE CONTRACT

SECTION V – SPECIAL CONDITIONS OF CONTRACT

GCC Clause	
1	<p>Delivery and Documents –</p> <p>The delivery terms applicable to the Contract is DDP delivered to the project site specified in the technical specifications, in accordance with INCOTERMS. Risk and title will pass from the Supplier to the Procuring Entity upon receipt and final acceptance of the Goods at their final destination.</p> <p>Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in Section VI – Technical Specifications. The details of shipping and/or other documents to be furnished by the Supplier are as follows:</p> <p><i>For Goods supplied from within the Philippines</i></p> <p>Upon delivery of the Goods to the Project Site, the Supplier shall notify the Procuring Entity and present the following documents to the Procuring Entity:</p> <ul style="list-style-type: none"> (i) Original and four copies of the Supplier's invoice showing Goods' description, quantity, unit price, and total amount; (ii) Original and four copies of Supplier's factory test/inspection report; (iii) Original and four copies of the certificate of origin (for imported Goods); (iv) Delivery receipt detailing number and description of items received signed by the Procuring Entity's representative at the Project Site; (v) Certificate of Completion/Inspection Report signed by the Procuring Entity's representative at the Project Site; (vi) Original and four copies of the Inspection Receiving Report signed by the Procuring Entity's representative at the Project Site; (vii) Original and four copies of the Manufacturer's and/or Supplier's warranty certificate; and (viii) Documents specified in the Technical Specifications, if any. <p><i>For Goods supplied from abroad:</i></p> <p>Upon shipment, the Supplier shall notify the Procuring Entity and the insurance company by e-mail the full details of the shipment, including Contract Number, description of the Goods, quantity, vessel, bill of lading number and date, port of loading, date of shipment, port of discharge etc. Upon delivery to the Project Site, the Supplier shall notify the Procuring Entity and present the following documents as applicable with the documentary requirements of any letter of credit issued taking precedence:</p>

- (i) Original and four copies of the Supplier's invoice showing Goods' description, quantity, unit price, and total amount;
- (ii) Original and four copies of the negotiable, clean shipped on board bill of lading marked "freight pre-paid" and five copies of the non-negotiable bill of lading ;
- (iii) Original and four copies of Supplier's factory test/inspection report;
- (iv) Delivery receipt detailing number and description of items received signed by the Procuring Entity's representative at the Project Site;
- (v) Certificate of Completion/Inspection Report signed by the Procuring Entity's representative at the Project Site;
- (vi) Original and four copies of the Inspection Receiving Report signed by the Procuring Entity's representative at the Project Site;
- (vii) Original and four copies of the certificate of origin (for imported Goods); and
- (viii) Original and four copies of the Manufacturer's and/or Supplier's warranty certificate including all other documents specified in the Technical Specifications, if any.

For purposes of this Clause the Procuring Entity's Representative at the Project Site is Vice President - Small Power Utilities Group.

Incidental Services –

The Supplier is required to provide all of the following services, including additional services, if any, specified in Section VI. Schedule of Requirements:

- a. performance or supervision of on-site assembly and/or start-up of the supplied Goods;
- b. furnishing of tools required for assembly and/or maintenance of the supplied Goods;
- c. furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;
- d. performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and
- e. training of the Procuring Entity's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.

- f. Additional requirements specified in Section VI – Technical Specifications, if any.

The Contract price for the Goods shall include the prices charged by the Supplier for incidental services and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

Spare Parts –

The Supplier is required to provide all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:

1. such spare parts as the Procuring Entity may elect to purchase from the Supplier, provided that this election shall not relieve the Supplier of any warranty obligations under this Contract; and
2. in the event of termination of production of the spare parts:
 - i. advance notification to the Procuring Entity of the pending termination, in sufficient time to permit the Procuring Entity to procure needed requirements; and
 - ii. following such termination, furnishing at no cost to the Procuring Entity, the blueprints, drawings, and specifications of the spare parts, if requested

The spare parts and other components required are listed in **Section VI (Technical Specifications)** and **Section VII (Schedule of Requirements/Bid Price Schedule)** and the costs thereof are included in the contract price.

The Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spare parts or components for the Goods for the period specified in the Technical Specifications.

Spare parts or components shall be supplied as promptly as possible, but in any case, within three (3) months of placing the order.

Packaging –

The Supplier shall provide such packaging of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in this Contract. The packaging shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packaging case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.

The packaging, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly

provided for in the Contract, including additional requirements, if any, specified below, and in any subsequent instructions ordered by the Procuring Entity.

The outer packaging must be clearly marked on at least four (4) sides as follows:

Name of the Procuring Entity
Name of the Supplier
Contract Description
Final Destination
Gross weight
Any special lifting instructions
Any special handling instructions
Any relevant HAZCHEM classifications

A packaging list identifying the contents and quantities of the package is to be placed on an accessible point of the outer packaging if practical. If not practical the packaging list is to be placed inside the outer packaging but outside the secondary packaging.

Transportation –

Where the Supplier is required under Contract to deliver the Goods CIF, CIP, or DDP, transport of the Goods to the port of destination or such other named place of destination in the Philippines, as shall be specified in this Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.

Where the Supplier is required under this Contract to transport the Goods to a specified place of destination within the Philippines, defined as the Project Site, transport to such place of destination in the Philippines, including insurance and storage, as shall be specified in this Contract, shall be arranged by the Supplier, and related costs shall be included in the contract price.

Where the Supplier is required under Contract to deliver the Goods CIF, CIP or DDP, Goods are to be transported on carriers of Philippine registry. In the event that no carrier of Philippine registry is available, Goods may be shipped by a carrier which is not of Philippine registry provided that the Supplier obtains and presents to the Procuring Entity certification to this effect from the nearest Philippine consulate to the port of dispatch. In the event that carriers of Philippine registry are available but their schedule delays the Supplier in its performance of this Contract the period from when the Goods were first ready for shipment and the actual date of shipment the period of delay will be considered force majeure.

The Procuring Entity accepts no liability for the damage of Goods during transit other than those prescribed by INCOTERMS for DDP deliveries. In the case of Goods supplied from within the Philippines or supplied by domestic Suppliers risk and title will not be deemed to have passed to the Procuring Entity until their receipt and final acceptance at the final destination.

	<p>Intellectual Property Rights –</p> <p>The Supplier shall indemnify the Procuring Entity against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof.</p>
2.2	<p>Advance payment not to exceed fifteen percent (15%) of the contract amount shall be allowed and paid within sixty (60) calendar days from effectivity of the contract and upon the submission to and acceptance by the Procuring Entity of an irrevocable letter of credit or bank guarantee issued by a Universal or Commercial Bank. The irrevocable letter of credit or bank guarantee must be for an equivalent amount, shall remain valid until the goods are delivered, and accompanied by a claim for advance payment.</p> <p>All progress payments shall first be charged against the advance payment until the latter has been fully exhausted.</p> <p>The terms of payment shall be as follows:</p> <p>1) For Supply and Delivery Pay items:</p> <p>(a) On Contract Effectivity: Advance payment of Fifteen percent (15%) of the total Contract Price shall be paid within sixty (60) days from effectivity of the Contract and upon submission of a claim and an irrevocable letter of credit or bank guarantee issued by a Universal or Commercial Bank for the equivalent amount valid until the Goods are delivered and in the form provided in Section VIII- Bidding Forms.</p> <p>(b) On Delivery: Eighty percent (80%) of the Contract Price of the delivered Goods shall be considered for payment, less the total amount of advance payment, if any and other deductions. If the amount is sufficient to fully recoup the advance payment, the remainder after deductions shall be paid to the Supplier within sixty (60) days after the date of receipt of the Goods and upon submission of the documents (i) through (vi) specified in the <u>SCC</u> provision on Delivery and Documents. Otherwise, the total delivery payment shall be charged against the advance payment and the remaining advance payment will be fully recouped from the succeeding claims.</p> <p>(c) On Acceptance: The remaining twenty percent (20%) of the Contract Price of the delivered Goods shall be paid to the Supplier within sixty (60) days after the date of submission of the acceptance and inspection certificate for the respective delivery issued by the Procuring Entity's authorized representative. In the event that no acceptance certificate is issued by the Procuring Entity's authorized representative within forty five (45) days after successful test and commissioning, if required, the Supplier shall have the right to claim payment of the remaining twenty percent (20%) subject to the Procuring Entity's own verification of the reason(s) for the failure to issue documents (vii) and (viii) as described in the <u>SCC</u> provision on Delivery and Documents.</p>

2) For Supply, Delivery, Installation, Test and Commissioning Pay Items:

- (a) On Contract Effectivity: Advance payment of Fifteen percent (15%) of the total Contract Price shall be paid within sixty (60) days from effectivity of the Contract and upon submission of a claim and an irrevocable letter of credit or bank guarantee issued by a Universal or Commercial Bank for the equivalent amount valid until the Goods are delivered and in the form provided in Section VIII- Bidding Forms.
- (b) On Delivery: Eighty percent (80%) of the price of the **delivered Goods**, excluding price for installation, test and commissioning shall be considered for payment, less the total amount of advance payment, if any and other deductions. If the amount is sufficient to fully recoup the advance payment, the remainder after deductions shall be paid to the Supplier within sixty (60) days after the date of receipt of the Goods and upon submission of the documents (i) through (vi) specified in the SCC provision on Delivery and Documents. Otherwise, the total delivery payment shall be charged against the advance payment and the remaining advance payment will be fully recouped from the succeeding claims.
- (c) On Acceptance: The remaining twenty percent (20%) of the price of the **delivered Goods** plus price for installation, test and commissioning shall be paid to the Supplier within sixty (60) days after the date of submission of the acceptance and inspection certificate for the respective delivery issued by the Procuring Entity's authorized representative. In the event that no acceptance certificate is issued by the Procuring Entity's authorized representative within forty five (45) days after successful test and commissioning, the Supplier shall have the right to claim payment subject to the Procuring Entity's own verification of the reason(s) for the failure to issue documents (vii) and (viii) as described in the SCC provision on Delivery and Documents.

3) For Supply, Delivery, Installation, Test and Commissioning Contracts where Installation, Test and Commissioning prices are included in the supply price:

- (a) On Contract Effectivity: Advance payment of Fifteen percent (15%) of the total Contract Price shall be paid within sixty (60) days from effectivity of the Contract and upon submission of a claim and an irrevocable letter of credit or bank guarantee issued by a Universal or Commercial Bank for the equivalent amount valid until the Goods are delivered and in the form provided in Section VIII- Bidding Forms.
- (b) On Delivery: Sixty percent (60%) of the price of the **delivered Goods** shall be considered for payment, less the total amount of advance payment, if any and other deductions. If the amount is sufficient to fully recoup the advance payment, the remainder after deductions shall be paid to the Supplier within sixty (60) days after the date of receipt of the Goods and upon submission of the documents (i) through (vi) specified in the SCC provision on Delivery and Documents. Otherwise, the total delivery payment shall be charged against the advance

	<p>payment and the remaining advance payment will be fully recouped from the succeeding claims.</p> <p>(c) On Acceptance: The remaining forty percent (40%) of the price of the delivered Goods shall be paid to the Supplier within sixty (60) days after the date of submission of the acceptance and inspection certificate for the respective delivery issued by the Procuring Entity's authorized representative. In the event that no acceptance certificate is issued by the Procuring Entity's authorized representative within forty five (45) days after successful test and commissioning, the Supplier shall have the right to claim payment subject to the Procuring Entity's own verification of the reason(s) for the failure to issue documents (vii) and (viii) as described in the <u>SCC</u> provision on Delivery and Documents</p>
<p>3.2</p>	<ol style="list-style-type: none"> 1. The following must be indicated in the performance bond to be posted by the Contractor: <ol style="list-style-type: none"> i. Company Name ii. Correct amount of the Bond iii. Contract/Purchase Order Reference Number iv. Purpose of the Bond: <p>"To guarantee the faithful performance of the Principal's obligation to undertake <u>(Contract/Purchase Order Description)</u> in accordance with the terms and conditions of <u>(Contract No. & Schedule/Purchase Order No.)</u> entered into by the parties."</p> 2. The bond shall remain valid and effective until the duration of the contract <u>(should be specific date reckoned from the contract effectivity)</u> plus sixty (60) days after NPC's acceptance of the last delivery/final acceptance of the project. 3. In case of surety bond, any extension of the contract duration or delivery period granted to the CONTRACTOR shall be considered as given, and any modification of the contract shall be considered as authorized, as if with the expressed consent of the surety, provided that such extension or modifications falls within the effective period of the said surety bond. However, in the event that the extension of the contract duration or delivery schedule would be beyond the effective period of the surety bond first posted, it shall be the sole obligation of the CONTRACTOR to post an acceptable Performance Security within ten (10) calendar days after the contract duration/delivery period extension has been granted by NPC. 4. Other required conditions in addition to the standard policy terms issued by the Bonding Company: <ol style="list-style-type: none"> i. The bond is a penal bond, callable on demand and the entire amount thereof shall be forfeited in favor of the Obligee upon default of the Principal without the need to prove or to show grounds or reasons for demand for the sum specified therein;

	<p>ii. The amount claimed by the Obligee under this bond shall be paid in full and shall never be subject to any adjustment by the Surety;</p> <p>iii. In case of claim, the Surety shall pay such claim within sixty (60) days from receipt by the Surety of the Obligee's notice of claim/demand letter notwithstanding any objection thereto by the Principal.</p>
4	The inspections and tests that will be conducted are specified in the Technical Specifications.
5	Guarantee for Additional Equipment Warranties are also specified in Section VI - Part I, Technical Specifications, Clause 18.0 - General Works (GW).

SECTION VI

**PART I - TECHNICAL
SPECIFICATIONS**

**PART II - TECHNICAL
DATA SHEETS**



SECTION VI

PART I - TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

CW – CIVIL WORKS

EW – ELECTRICAL WORKS



SECTION VI

**PART I - TECHNICAL
SPECIFICATIONS**

GENERAL WORKS



PART I – TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

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LuzP22Z1400Ss

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PART I – TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

GW-1.0 PROJECT DESCRIPTION

This specification covers the general technical and associated requirements for the Supply and Delivery of 651 units of 50Wp Photovoltaic Solar Home Systems under PV Mainstreaming Project. Also included in this document are the specifications for, but not limited to, the solar panels, charge controllers, batteries, lamps and LED lights, vending machines and its management system, Bundled Appliances, Prepayment Controllers, Database, PV mounting pipes, appropriate interconnection lines and its appurtenances for the safe and reliable operation of the Solar Home System.

Other materials, parts and accessories which are not specifically mentioned herein but are necessary for the proper assembly, installation, and safe operation of the system shall be furnished including special tools and all required spare parts and consumables during the warranty period.

The devices/equipment shall essentially be the standard products of the manufacturer which best meets the applicable international and regulatory standards. The Supplier shall accept full responsibility for its work in the performance, qualifications, specifications, documentation/reports, fabrication, corrosion protection, shop testing and materials handling. Field testing and commissioning including the warranty provisions shall comply with the applicable standards and the requirements of this specification.

Workmanship shall be of first-class quality and in accordance with the best modern design practice for the manufacture, assembly and test of all equipment and materials, notwithstanding any omissions from the specifications and drawings. Only qualified technicians shall be employed by the Supplier.

All necessary corrections and deviations from the specifications of the system arising either from error in the workmanship or design made by the Manufacturer/Supplier with the resulting extra expenses and related damages shall be solely charged to the account of the Supplier.

GW-2.0 DELIVERY POINT

The supplier shall deliver all 651 units of SHS including spares and tools at NPC Tuguegarao Office, CAREG Regional Center, Dalan na Matunung Street, Tuguegarao City, Cagayan, Region II.

The table below shows the quantities and installation areas of the SHS units to be supplied.



MUNICIPALITY	BARANGAY	QTY (HH)
CAGAYAN	Dalupiri, Calayan	130
	Balatubat, Calayan	68
	Naguilian, Calayan	174
	Minabel, Calayan	238
ISABELA	Dibulos, Divilacan	41
TOTAL		651

Table 1.0 Project Allocation of SHS units

GW-3.0 PROJECT DURATION

The contract period shall be **one hundred-twenty (120) calendar days** reckoned from the receipt of Notice to Proceed. The devices shall be delivered at the designated project sites.

GW-4.0 SITE INSPECTION

The Supplier is required to conduct site inspection to verify the actual condition of the designated storage facility.

Schedule of the site inspection shall be coordinated with **NPC Representatives**. The Supplier shall secure Certificate of Site Inspection duly signed by aforementioned or his authorized NPC personnel. The certificate shall be submitted during post qualification.

GW-5.0 DESIGN AND DUTY CONDITIONS

Site Condition and Design Consideration

The Supplier shall be responsible for visiting the project sites and thoroughly investigate and familiarize himself with all the site conditions, the surrounding area and take particular reference to its accessibility, means of communication and transportation, and all other factors that could hamper the smooth execution of the contract.

Any and/or all expenses arising through the lack of knowledge or understanding regarding the existing conditions of the sites shall be the responsibility of the Supplier and no additional payment thereof shall be made by NPC.

GW-6.0 SUPPLIER'S SCOPE OF WORKS

GW-6.1 General

The scope of work shall cover the Supply and Delivery of standalone prepaid modular Solar Home System units with Lithium-based batteries, vending machines and its auxiliaries, warranties of equipment, provision of spares and all tools necessary for installation, repairs, operation and maintenance training of NPC-SPUG and/or PMD personnel and/or other assigned



personnel by NPC. Additional details are provided in other sections of this specification.

It is not the intent of this specification to specify all technical requirements or to set forth those requirements covered by applicable codes and standards. The Supplier shall furnish manpower and supervision, high quality works, materials and equipment meeting the requirements of this specification and industry standards.

The Supplier's scope of work under this Project shall generally consist of but not limited to the following:

- a) Factory testing and delivery of SHS units, and its components including led lamps, etc., necessary appurtenances, tools, spare parts and associated auxiliaries;
- b) Factory testing and delivery of Vending Machines and its components, necessary appurtenances, tools, spare parts and associated auxiliaries;
- c) Delivery of materials and supplies, tools and equipment necessary for the installation of SHS including PV mounting pipe shall be supplied by the Supplier and as specified herein;
- d) Conduct training and/or training supervision for operation and maintenance of SHS units, vending machines, data base and all of the appurtenances/accessories within a given warranty period;
- e) Provide a cloud-based central database for storing of all information regarding the system's operation.
- f) Delivery of spares, replacement parts and tools to designated storage houses identified by NPC.

Solar Home System

- Scope of work shall cover the test, supply and delivery of **six hundred fifty-one (651)** sets of SHS complete with its components and appurtenances.
- The Supplier shall test, supply and deliver handheld terminals for vending machines, its management system, prepayment controllers and its appurtenances. One (1) vending machine shall be supplied for every 50 SHS units. The vending



machines shall provide Solar as a Service (SaaS) credit to ensure reliable operation of the system.

- The Supplier shall test, supply and deliver the lithium ion batteries for energy storage with a minimum storage capacity of 24Ah. It shall have integrated battery controller system to control charging/discharging of each battery cells and prevent it from operating outside its typical safe operating range. The batteries shall be enclosed in a "plug and play" housing, resistant to tampering and with all the cables and adapters needed, support and fixing system to ensure safe and reliable operation of the SHS;
- The battery enclosure box shall be of a robust "plug and play" type provided with protection against dust and water, tamper proof seals/electrical seals or any type of seal and an engraved master serial number. It shall have prefabricated entry and exit points for cables.
- The PV panels shall be designed for maximum efficiency and shall be supplied with all necessary appurtenances for safety;
- The Supplier shall test, supply and deliver the Lamps, LED lights and bundled appliances for each set of SHS;
- The Supplier shall supply and deliver all cables, wire and switches needed for wiring including safety components such as clamps, cable ties, etc. to ensure safe and reliable operation of the system.
- The Supplier shall pack and deliver the system strictly as per set. However, the solar panel and the mounting pole and its accessories can be in a separate packaging to allow easy handling and distribution. A complete SHS set can have a maximum of three boxes/packages only. One box for the battery enclosure, one box for the solar panel and its cables and one box for the mounting poles/structure.

Anything not mentioned in the technical specifications, but which are necessary to make a complete installation and to meet optimum and reliable operation shall be considered included in the scope of works.

GW-6.2 Solar Home System

a) Design Requirements

1. The Supplier is responsible for the implementation plan under this contract. The detailed design shall be based on the following minimum requirements:
 - 1.1 Design Drawings included in this Document.
 - 1.2 Technical Data sheet for Solar Panel
 - 1.3 Technical Data sheet for Module (Charge Controller, Batteries)
 - 1.4 Technical Data Sheet for Cables
 - 1.5 Technical Data Sheet for Vending Machines and its Management System



1.6 Technical Data Sheet for Bundled Appliances and in the TV Option, if offered.

2. The Supplier shall supply the SHS at minimum as specified in Table 2.0, however, the Supplier may propose larger PV modules and batteries, subject for approval of NPC.

Est. Ave. Daily Consumption (Wh/d)	Min. PV Power (Wp)	Min. Effective Battery Capacity (Ah)
80	50	24

Table 2.0: System Summary Description – minimum sizing

3. The design of SHS shall be based on Table 3.0:

Components	Qty	Usage (hrs/day)	Brightness (Lumens)	Nominal Voltage (VDC)	Maximum Power (Watts)	Total Power (Watts)	Energy Demand (Wh/day)
LED Lamp (Indoor)	2	4	300	12	3	6	24
LED Lamp (Indoor)	1	3	300	12	3	3	9
LED Lamp (Outdoor)	1	8	100	12	1	1	8
Torch Lamp	1	4	-	5	1	1	4
AM/FM DC Radio	1	5	-	5	1	1	5
Charger Ports (phone, lamp, radio)	1	3	-	5	10	10	30
TOTAL					19	22	80

Table 3.0: Daily Home Accessories and Lighting Service Requirement

4. The Solar Home System must be designed for a minimum service life of **at least (10) years** with one battery and controller replacement;
5. The Supplier shall supply Lighting Global verified solar products and batteries for this Contract. All applicable products shall meet the Lighting Global Quality Standards with a minimum quality standard referenced to IEC 62257-9-5 TS Ed. 2 Part 9-5 and passed the conditions set by IEC 61960.
6. The Supplier shall provide all the necessary protection for the Solar Home System required by Philippine Electrical Code (PEC) and other applicable regulatory agencies;



7. The Supplier shall base the design drawings of PV mounting pipe on the design drawings included in this document.
8. Equipment to be supplied including spares of the same class shall bear the same manufacturer's name and model;
9. The Supplier shall supply and deliver the mounting pipes of the solar panel that shall be made of hot-dipped galvanized steel including all nuts and bolts. The materials for mounting pipe shall conform to the requirements of NPC, as stated in Section VI – Technical Specifications – CW – Civil Works.
10. All electrical works shall be in accordance to the latest Philippine Electrical Code rules and provisions.

b) Test, Supply, and Delivery of Materials and Equipment

1. Test, Supply and Deliver of Solar Home System consisting of solar panels, batteries and charge controllers, labels and central database, lamps/torches and LED lights, radios, and PV mounting pipes;
2. Test, Supply, and Deliver of the Data base, and the Vending machines and its management system that shall work offline (independent to GSM signals) in crediting the load to the SHS. The Vending machine shall also be capable of updating certain information/status of the SHS unit and its owner offline. In addition, the vending machines shall be able to provide data transfer whenever the GSM signal is available regarding all the transactions of each SHS unit controllers. All data shall be transmitted and stored to the central database. Provide control, monitoring and data acquisition of each unit of SHS and its major components;
3. Test, Supply and Deliver of batteries and charge controllers including necessary software, services, materials and equipment for the optimum and reliable operation of the SHS;
4. Supply and deliver of all required spare parts, manufacturer's recommended tools, installation tools, special tools and appliances including all associated expenses necessary for any repair works during the warranty period;
5. Delivery of spares and replacement parts to designated storage facility by NPC.

c) Operation and Maintenance

- The Supplier shall provide training to NPC-SPUG/PMD personnel or as specified by NPC, on how to use, maintain and troubleshoot the system's components and other services such



as vending machines and its appurtenances and/or payment and its collection.

- The Supplier shall submit five (5) sets of the draft of Operation and Maintenance Manuals required for all equipment supplied under this Contract, at least forty-five (45) days prior to delivery for NPC review and approval.

Upon approval, the Supplier shall submit twelve (12) final copies of the O&M manuals to NPC and twenty-five (25) copies of installation manuals included in the toolboxes as stated in GW-11.3.4 Instruction Manuals. The manual shall include parts list and preventive maintenance schedule during the life span of the whole system and its appurtenances and shall be submitted one-month prior to the deliveries.

- The Supplier shall provide user manual included in the SHS package per household. The manual shall bear information on the proper care and usage of the whole system and its appurtenances, basic troubleshooting and repair, etc. of the SHS, vending machines, its components, auxiliaries and appurtenances. This shall be printed in sticker paper and attached to every battery enclosure box.

d) Other Allied Services

- The Supplier shall conduct actual site inspections of the project sites and make assessment on its physical condition and determine the extent of the scope of works required for the delivery of the SHS, Vending Machines and all its components, auxiliaries and appurtenances.
- The Supplier shall inspect the designated storage facility by NPC to assess its capability and capacity.
- The Supplier shall supply and deliver all the major components with at least minimum labeling requirements. Each set shall also have its master serial code aside from the codes assigned to each component. It shall be engraved/burned in the enclosure box, shall be easy to locate and shall be clear. The master serial number shall contain all the serial numbers, or any other codes used in labeling each major components of the unit such as the solar panels, charge controllers, batteries, etc. All spare parts shall also be supplied and delivered with the labeling requirements attached.
- The Supplier shall provide, secure, and test the central data base and all necessary appurtenances that shall work with the vending machines and its management system. The database shall be accessible remotely and locally and shall ensure the proper storage/collection of all transactions of the SHS units and vending machines such as the payment, loading/reloading, maintenance, repair, replacement, etc.;
- The Supplier shall provide the host for the cloud-based central database and the responsibility shall remain with the Supplier



in rendering the host's service for the entire project's life span. However, in case wherein the Supplier may not be able to continue rendering the host's service reasonably or after the specified duration herein, NPC may take over such responsibility with the host, provided that the Supplier prepares and submits all necessary documentation for the continuation of the service.

- The Supplier shall ensure that the vending machine and its management system will work properly OFFLINE and ONLINE depending on the application it is intended. Transferring of credit from the vending machines to the SHS units shall be done OFFLINE. Updating and accessing the information of the units' status such as the owner's name, etc. shall also be done OFFLINE. However, whenever there is GSM signal detected by the vending machine, it shall automatically transfer the data stored towards the central database.
- The Supplier shall ensure that all SHS units are **pre-loaded of at least fourteen (14) days' worth of credit** to allow the consumers the usage of the system as soon as it is installed.
- The Supplier shall ensure that all SHS units with its prepayment controller are capable in providing at least one (1) day free which allows the user to utilize the SHS without reloading the credit after it expires, provided that the consumer has loaded at least 30 days' worth of credit either full or staggered as long as it is continuous. The free day credit shall not expire.
- The Supplier shall conduct operation and maintenance training to NPC-SPUG/PMD personnel or as specified by NPC. Supervision during the training of household beneficiaries, Vending machine operators/collectors is recommended to be provided by the Supplier. The training aims to provide information of at least the parts list, basic care and usage and basic troubleshooting to beneficiaries and vending machine agents under the supervision of the Supplier. The beneficiaries and vending machine operators/agents shall also be well informed on the "Do's and Don't's" on the equipment.
- The Supplier shall supply and deliver the Tool Kits to NPC designated area and/or personnel to ensure proper O&M in maintaining the performance of all installed SHS. The Tool Kit shall have the minimum requirements specified in GW – 8.0 Tools and Appliances.
- Supply and delivery of Special Tools and Equipment as specified in the Specifications and as recommended by the manufacturer including toolbox required for installation, operation, testing, troubleshooting and normal maintenance of Solar Home System and its appurtenances. It shall include the supply of back-up copies of control programs (firmware and other configuration software).
- The Supplier shall supply and deliver all spare parts to storage facility specified by NPC. This is also applicable for the tool kits.



- The Supplier shall inform and train NPC-SPUG/PMD personnel or as specified by NPC regarding the proper installation of the SHS unit based on the following minimum criteria:

Mounting and Panel Installation:

1. PV Panels shall be oriented to have optimum solar power collection. It shall be securely fixed on its mounting pipe against damage from strong winds.
2. The minimum exposure of the PV module to the sun shall be 6 hours (i.e. 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.
3. The PV mounting pipe shall have an inclination angle of 10°. The structure shall be facing South and shall be installed as shown in the bid drawings unless otherwise directed by NPC.
4. The base of the mounting pipe is buried on the ground with a minimum depth of 500mm and the upper part of the pipe is clamped on a sturdy structure within the side of the house of the consumers with the solar module on top of the pipe and positioned above the roof. The depth of how the pipe is buried shall allow the PV module to have a minimum vertical distance of 200mm above the roof as shown on the bid drawings.

Electrical Equipment and Cable Installation

1. All electrical equipment shall be located inside the house excluding the solar panel with its accessories and 3W outdoor rated lamp.
2. The 1 x 1W LED lamp shall be installed outside of the house depending on the preference of the customer.
3. The LED lamps shall be well-positioned to provide the most efficient and effective illumination to the area. Indoor lamps shall not be located directly above the cooking area due to the fast accumulation of soot around the lamps.
4. Two lamps in a circuit shall be permitted, however, the size of the wire shall be adjusted as necessary and each lamp shall have its own ON/OFF switch (dimmer switch is prohibited).
5. The wires shall be laid neatly from the SHS unit enclosure box to the lamps with a switch positioned on an accessible location.
6. The switch shall be securely mounted to prevent it from being damaged.
7. The PV cable shall be spirally wired along the mounting pipe, fixed with UV rated cable ties and shall have a bend to make a drip loop (prior to entry to the house)



- before fastening it to the fascia board or any sturdy structure.
8. The excess PV cable shall not be cut but spooled neatly and fastened near the battery enclosure or in any appropriate location.
 9. The cable from the pipe support to the SHS unit enclosure box shall be supported by cable clips or other approved type.
 10. The SHS Unit Enclosure Box shall be located as nearest as possible from wire inlet (coming from the solar panel) and away from direct heat exposure (sun's rays) and damp/wet areas.
 11. The SHS accessories such as the torch, the portable radio, and the cellular charging jacks shall be located near the SHS unit enclosure box where they are plugged to the USB ports when charging.
- The Supplier shall assist on the required programming of Vending Machines during its installation when needed. However, vending machines shall be ready for use when delivered. This is to ensure that all vending machines provided are functioning and serving its purpose, as described in this document including the use of magnetic cards and communication/data transfer between each vending machines and the cloud server.
 - On-call service system and equipment breakdown during the warranty period as specified in GW-18.0 Guarantee. The Supplier shall have an established service center with experienced personnel that will promptly and efficiently cater to the repair and maintenance requirements of the supplied devices/components during the warranty period. Supplier shall provide contact details & response/resolution time for service/parts replacement requests.

GW-7.0 SPARE PARTS

General

The Supplier shall have an established service center with experienced technical personnel that will promptly and efficiently cater to the repair and maintenance requirements of the supplied equipment during the warranty period. Supplier shall provide the contact details & response/resolution time for service/parts replacement requests.

Spare parts shall include all the items that are expected to be consumed or replaced during the installation.

All the spare parts shall be delivered in the designated storage facility, together with the main equipment and others under this Contract.

All spare parts shall be delivered into storage area nominated by NPC and the delivery will be deemed to be complete when the packages have been opened by the Supplier, their contents checked by NPC and articles re-protected and replaced by the Supplier to the satisfaction of such representatives or assembled into units at NPC's option and stored as directed by NPC. Damaged or incorrect item shall be replaced by the Supplier at his own cost.

All bidders are required to submit in their proposal the detailed list of spare parts to be supplied with its corresponding costs. This list is preliminary and subject to changes in order to conform with the final design without any additional cost. The final list of spare parts shall be submitted to NPC for approval not later than one (1) month prior to the delivery of the SHS units.

Spare Parts for Solar Home System

Spare Parts shall be delivered to the designated storage facility by NPC. The Supplier shall supply the following and shall maintain the NPC stock at this level throughout the Warranty Period:

SHS System

Component/ Accessories	Spare Requirement (% of Actual Use)
SHS units/kits	0.25
PV Modules	2
Battery	2
Battery Enclosure Box	2
Charge Controller	2
Vending Machine (hand terminal) complete with all the attachments	15
RFID Card	5
PV Module Mounting Hardware	1
Torch and Charging Cable	2
3W LED Lamp	6
1W LED Lamp	3

Table 4.0 Spare Requirement of SHS units and components

Note: Quantity of spares in fraction shall be rounded up to the next higher integer.

GW-7.1 Rejection of Faulty Equipment

If ten percent (10%) or more of any class or equipment supplied fails based on the record-keeping of NPC within the first twelve (12) months of the Warranty Period, NPC may, at its own discretion, have the right to demand from the Supplier the replacement of all that class of component and/or material throughout the entire set of equipment being supplied and/or installed according to this Contract.



GW-8.0 TOOLS AND APPLIANCES**General**

The tools and appliances recommended by the manufacturer and are deemed required for the following specific purpose of the equipment to be supplied under this Contract shall be provided and shall be delivered at the designated areas by NPC. The Supplier shall include the tools that are specified below.

- a) Manufacturer's standard and special tools and instruments required for installation, operation, testing, troubleshooting and normal maintenance of Solar Home System, Vending machines and its appurtenances/auxiliaries furnished by the Supplier.
- b) Any special tools or appliances required solely for installation purposes. Special tools are defined as all tools required for installation, assembling, dismantling and adjustment of all the works and usually not available in a standard machine shop or retailing store.

Each tool or appliance is to be clearly marked with its sign for purposes of identifying the function of each tool and the specific item(s) for which it is used. Each set of tools and appliances listed above shall be fitted into a custom-built lockable box that is clearly marked with the name of the item or equipment for which they are used and with a list of the tools contained to be attached on the box.

Every special tool and instrument shall be accompanied or furnished with maintenance or instruction manuals in English language.

All tools and appliances supplied shall be handed over to NPC in perfect condition at the time of taking over.

All bidders are required to submit in their proposal the detailed list of special tools to be supplied. This list is preliminary and subject to changes in order to conform with the final design without any additional cost. The final list with the corresponding brochures/catalogues shall be submitted to NPC for approval not later than one (1) month prior to the delivery of the equipment.

1. Tools for Solar Home System

Tools for Solar Home System shall be supplied by the Supplier which shall consist of at least the following:

a) Manufacturer's Recommended Tools

The Supplier shall supply and deliver all the manufacturer's recommended tools for installation and maintenance of the SHS system.

A complete list shall be included in the bid/proposal.



b) Installation/Decommissioning Tools

These tools are to be supplied in 25 sets. Each set shall be contained in the toolbox (specification of the toolbox is given in the table below) and shall be named **Installation/Decommissioning Tools**, and shall have the following:

TOOLS	QTY
Digital Multimeter 0-10Adc / 1-200Vdc with Fuse Protection	1 pc
Claw Hammer, 13" Overall length, Heavy duty	1 pc
Phillips Screw Driver (positive) – (#1)	1 pc
Slotted Screw Driver (negative) –(3/16")	1 pc
Hand Gloves	2 pairs
Leather Tool Holster	1 pcs
8" Adjustable Wrench	2 pcs
Rechargeable LED Headlamp	2 pcs
Magnetic Compass	1 pc
MC4 Connectors Disconnect Tool Spanner with Wrench	1 pc
MC4 Ratchet Crimping Tool, 2.5 – 6.0mm ²	1 pc
9" Torpedo Level Tool with Magnetic Strip	1 pc
Manual Crank Drill with at least two (2) – 10mm Wood Drill Bit	1 pc
3-Step Multipurpose Foldable Ladder, 150kg Safe Load	1 pc
Robust Toolbox, minimum of 10" W x19" H	1 pc

Table 5.0 Quantities of Tools for Installation/Decommissioning

c) Maintenance Tools

These tools are to be supplied in 8 sets. Each set shall be contained in the toolbox (specification of the toolbox is given in the table below), shall be named **Maintenance Tools**, and shall have the following:

TOOLS TO BE SUPPLIED IN 15 SETS	QTY
Jeweler's Screw Drivers (#0, #1, #2, #3)	1 set
Side Diagonal Cutting Pliers, 6" long, Heavy duty	1 pc
Side Diagonal Cutting Pliers, 6" long, Heavy duty	1 pc
Wire Stripper Pliers, 0.2-6mm stripping capability, Heavy duty	1 pc
Long Nose Pliers, 6" long, Heavy duty	1 pc
Lineman Pliers, 7" long, Heavy duty	1 pc
Adapted tool for tamperproof lock	1 pc
Robust Toolbox, minimum of 10" W x19" H	1 pc

Table 6.0 Quantities of Tools for Maintenance



The following tools are not included in the toolbox.

OTHER TOOLS	QTY
Tamperproof Lock	651 pcs
Backup copies of control programs/software and/or firmware and other configuration software for the vending machines	1 lot
Other Standard/Special Tools recommended by Manufacturer	1 lot

Table 7.0 Quantities of Other Tools

2. Toolboxes

The supplier shall supply heavy duty toolboxes containing complete set of necessary tools as indicated in the Contract. These toolboxes shall be delivered as indicated in the table of distribution below.

CONTENT	QTY
TOOLS FOR INSTALLATION/DECOMMISSIONING ONLY including Manufacturer’s Recommended Tools for Installation	25
TOOLS FOR MAINTENANCE and SPECIAL TOOLS ONLY	8

Table 8.0 Quantity of Toolboxes

GW-9.0 AFTER SALES SERVICE (POST-INSTALLATION)

No other obligations on site will be demanded from the Supplier except for the Warranties and other works to be given or supplied under the Warranty Period.

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

GW-10.0 PACKING, SHIPMENT AND STORAGE

GW-10.1 Packing/Crating

The Supplier shall pack the SHS units and its appurtenances as per set. However, for easy handling and distribution, the solar panels and the mounting pipes can be packed separately but shall be stored and bundled together with its corresponding partner components.

The Supplier shall effect proper packing/crating to ensure that equipment and components are adequately protected from damage during shipment and subsequent storage. Utmost care shall be observed in packing/crating delicate equipment and electronic devices such as battery controller, solar panels and other sensitive parts or components.



All openings and machined surfaces shall be provided with protection to prevent damage, corrosion and entrance of foreign matter during shipment and storage.

Threaded or socket weld connections shall be protected with screwed or snap on type, securely held plastic protectors. Cast iron plugs are not acceptable for protection unless part of the permanent assembly. Covers, straps or fasteners shall not be welded to equipment.

Equipment shall be adequately supported for shipment. All loose parts shall be crated or boxed for shipment and appropriately identified. Where shipment is braced internally, it shall be marked conspicuously, "Remove internal braces before testing and operating".

All large and heavy shipping units shall have suitable skids for moving. Crating shall also be adequate for lifting with slings. If location of slings is critical, these locations shall be marked accordingly.

All equipment belonging to the same system/skid shall be properly marked and packed in the same crate as much as practicable. The Supplier shall not mix equipment and parts of one system with another to avoid confusion during assembly.

All spare parts shall be packed in a sealed container including special and standard tools in their separate sealed toolboxes.

All packages, crate boxes, drums, bags, bundles, or other containers or any loose pieces shall carry the following identification marks on the two (2) sides in black with a stencil proof ink or paint by means of block letters not less than 30mm high, i.e.

NATIONAL POWER CORPORATION

CONTRACT NO.	:	_____	
ITEM NO.	:	_____	
PORT OF DISCHARGE:		_____	
DESCRIPTION	:	_____	
OF CONTENT	:	_____	
NET WEIGHT	:	_____	kgs.
GROSS WEIGHT	:	_____	kgs.
DIMENSION	:	_____	m ³
CRATE NO.	:	_____	

All packages shall be forwarded with a copy of packing list placed inside the package and another copy thereof contained in a waterproof envelope placed outside the package. The packing list shall give all information on the package such as package no., packing appearance, net weight, gross weight, dimension, measurement, and description of the equipment including storage and handling instructions with descriptions for periodic inspection and/or storage maintenance to ascertain that no deterioration will occur during storage.



Prior to shipment, the Supplier shall furnish NPC advance copies of all packing lists and other pertinent documents.

The Supplier shall employ methods that will warrant safe delivery of equipment to its ultimate destination, with careful consideration given to the type of commodity, method of transportation, destination, storage time, and storage facilities at point of destination.

GW-10.2 Shipment/Transport

The Supplier shall be responsible for the sea and land transportation of the equipment, materials and supplies required under this Specification and shall ensure that they are safely and timely delivered to the specified site. Supplier shall be deemed to have visited the site and other area on the route of delivery, including port facilities, inter-island shipping facilities, island transport, access roads and bridges and to have acquainted themselves with all factors that will affect the cost of shipping and freight to Site. Any damages to the roads, bridges, railways, ports, etc. arising out of neglect of Supplier shall be the responsibility of the Supplier. Likewise, any additional claim attributable to Supplier's lack of knowledge or understanding on existing conditions of the site shall not be given due credence.

The Supplier shall ship the materials and equipment on clear commercial bill of lading and the cost of all freight, insurance, shipping, handling and road transport charges shall be included in the Bid Price.

Upon arrival of equipment and materials at site, NPC and the Supplier or their authorized representatives, shall jointly verify the plant equipment to be stored at site following the steps below:

- a) Inspection and verification of the packing list;
- b) Visual inspection of the condition of the packing and its surfaces; and
- c) Partial opening of the crates and plastic sheet protection to verify the content and its physical condition and to check pilferage or damage during shipment and storage.

A record shall be prepared carefully noting all eventual shortages, defects or damages, signed by the Supplier and concurred by NPC. All shortages and damages noted shall be immediately replaced by the Supplier at his own cost and shall ensure the timely delivery of replacement without affecting the agreed overall project implementation schedule.

Shipment of equipment and materials to be supplied by the Supplier should be through Philippine Flag Carrier. However, a non-Philippine Flag Carrier may be used, provided a certification of its non-availability is issued by the nearest port authority within ten (10) calendar days from the date the goods are ready for shipment.

GW-10.3 Storage

The Supplier shall inspect the storage facility specified by NPC for its capability and capacity.

The Supplier shall treat the wooden equipment crates/packages and the soil under the equipment and immediate surroundings to make it impervious and toxic to subterranean termites, often referred to as white ants or "anay" by application of soil poison solutions. Materials to be used shall be a solution commonly used by licensed companies or entities engaged in pest control or pest eradication. Banned solutions must never be applied. Applications of the solution shall be in accordance with the manufacturer's recommendation.

The Supplier shall provide temporary shelter/cover such as tarpaulin or equivalent type of cover for protection of the equipment during the storage, if needed.

GW-11.0 DOCUMENTS/DRAWINGS AND INSTRUCTION MANUALS

GW-11.1 Drawings Contained in the Tender Document

The drawings contained in relevant section of this tender document shall be the Bid Drawings and/or Reference Drawings which shall be utilized for bidding purposes only unless otherwise stated. They are considered as defining the minimum requirements for the design of the equipment to be furnished and to show the general layout and equipment arrangement which indicate limiting or mandatory dimensions and elevations. However, if such indicated dimensions are found deemed inadequate during the implementation stage, changes or adjustments may be made subject to NPC's review and approval.

Bid drawings which show the work to be done as definitely and in as much detail as possible may be used as guide by the Supplier in the performance of his works. Accordingly, soft copies of said bid drawings may be furnished upon receipt of request by the Supplier for their ready reference/perusal.

Anything mentioned in the specifications and not shown on the drawings or shown in the drawings but not mentioned in the specifications, but which are obviously necessary to make a complete installation shall be considered/included under the Supplier's Scope of Works.

Discrepancies between the drawings and actual field conditions or between drawings and specifications shall immediately be brought to the attention of NPC for proper resolution. All works involving discrepancies shall not be started without NPC's formal approval.

All drawings submitted by the Supplier or by any Sub-Supplier shall contain in the lower right-hand corner, in addition to the Supplier's name with signature, the date, drawing scale, drawing number and title, and contract number as given in the Specification. Drawing Title Blocks per NPC standard specifications shall be provided to the Supplier during the contract stage.

The drawings shall be adequate to demonstrate full compliance with the Contract requirements and provide NPC complete understanding of the equipment and its associated auxiliaries and associated works.



All data and information to be submitted shall be in the English language and all drawings shall be drawn using the metric system as unit of measurement.

GW-11.2 Drawings and Documents to be Submitted with the Bid

The Supplier shall submit with his Bid the required copies of all the documents specified in Section VI – (Part II) Technical Data Sheets, under the Section IX - Bid Drawings and other documents specified in the relevant Clauses of the bid documents (Refer to Form No. NPCSF-GOODS-01-Checklist of Technical and Financial Envelope Requirements for Bidders, Section VIII-Bidding Forms).

Drawings and other data or information that the Bidders may deem useful in the evaluation of their bids may be submitted with the bid.

GW-11.3 Supplier's/Manufacturer's Drawings and Instruction Manuals

GW-11.3.1 General

Prior to the procurement of all equipment to be supplied, the Supplier shall submit for NPC's review, approval, and/or reference, five (5) copies of prints of drawings (outline/arrangement drawings of equipment and its auxiliaries, wiring diagrams), plans calculations as required, codes and standards, operation and maintenance instructions, training program, and all other documents necessary for rendering the Works, prior to fabrication, manufacturing and/or purchasing all equipment and materials to be supplied under this Contract. The sequence of submission shall be such that information is available for checking or approval of each drawing or document received.

To provide the basis for programming the checking of the Supplier's drawings, the Supplier shall, within fifteen (15) calendar days from effectivity date of the contract, prepare and submit to NPC for approval a drawing and document lists summarizing the drawings he proposes to submit in accordance with the requirements specified herein, together with the dates on which he proposes to submit such drawings. These lists shall be updated monthly to show the status of the drawings and documents submitted and any additional proposed drawings. NPC shall have the right to require the Supplier to submit additional information as may reasonably be required.

The name and signatures of the Supplier/Manufacturer's designer and approving officer who process the drawing for NPC's approval shall be included in the title block for each drawing/document submitted.

Drawings approved by NPC shall in no way relieve the Supplier from entire responsibility for engineering, design, workmanship, material and all other liabilities under the Contract.

Any manufacturing, test, installation of equipment and appurtenances and construction of any particular structure or portion thereof prior to the approval of drawings pertinent thereto shall be at the Supplier's risk. The Supplier shall be responsible for any extra cost that may arise in consequence to such



risks or in correcting the work already done to conform with the drawings as revised and approved.

The Supplier shall be responsible for any discrepancies, errors or omissions in the drawings and other particulars supplied by him whether such drawings and particulars have been approved by NPC or not, provided that such discrepancies, errors or omissions are not due to inaccurate information or particulars furnished in writing to the Supplier by NPC.

NPC shall have the right to require the Supplier to make any changes to the drawings necessary to make the works conform to the intent of the Contract.

Should an error be found in the Supplier's drawings during approval, or during construction/erection, the correction including any field change considered necessary shall be noted on the drawings and shall be resubmitted for approval.

NPC reserves the right to reproduce any drawings or prints received from the Supplier as may be required despite any notice prohibiting the same appearing on the drawing or the print. All drawings are preferred in a computer-aided format. However, if unable to comply with this requirement, manual drafted drawings will be acceptable. All CAD produced drawings are to be submitted in Autocad formats. All other computer-generated documents are to conform to Microsoft Office.

GW-11.3.2 General and Detailed Drawings and Specifications for Electrical Equipment

Before proceeding with the manufacture of the equipment, the Supplier shall submit for approval the applicable designs, design computations as required, brochures, detailed specifications or equipment data sheets, general assembly drawings, outline/arrangement drawings, system drawings (flow diagrams), and sufficient sub-assembly drawings, schematic and control wiring diagrams, training program, test procedures, test reports and details to demonstrate fully that all parts will conform with the provisions and intent of the Specifications and with the requirements of their installation, operation and maintenance. The drawings shall show all necessary dimensions and tolerances, field joints, and sub-assemblies in which the equipment will be shipped, terminal boxes and wire sizes for electrical circuits and wiring diagram for power and control circuits.

Formats and symbols for electrical drawings and logic diagram shall be standardized for all the plant systems under this Contract subject to NPC's approval.

GW-11.3.3 General and Detailed Design Drawings for Civil Works

The above drawings shall indicate, besides relative calculations and instructions, all data necessary for the design of supporting structures such as dimensions, weights, loads and stresses under operating conditions, dimensions and weights for installation, assembly and maintenance.



In addition, these drawings shall indicate all necessary details such as foundations, anchor, tie rods, and supports and any other data used in the design of Civil Works.

The structures shall not substantially differ from those shown in the bid drawings.

GW-11.3.4 Instruction Manuals

Supplier shall submit five (5) sets of the draft of Operation and Maintenance Manuals of the SHS kits and vending machines including Installation Manual and the remote access of database required under this Contract, at least forty-five (45) days prior to test and commissioning for NPC review and approval. Upon approval, the supplier shall submit twelve (12) final copies of the O&M and installation manuals.

The distribution of approved manuals are as follows:

	AREAS FOR DISTRIBUTION	QTY
1	Minabel Diesel Power Plant	2
2	Balatubat Diesel Power Plant	2
3	Calayan Diesel Power Plan	2
4	Maconacon Diesel Power Plant	2
5	Workshop Maintenance Technical Services Division	2
6	Marinduque/Quezon/North Luzon Operations Division	1
7	Luzon Operations Department	1

Table 9.0 Allocation of Instruction Manuals

The Manuals shall include Parts List, and Preventive Maintenance Schedule/ Procedure and Troubleshooting during the life span of the SHS, vending machine and its components and shall be submitted at least one (1) month prior to the delivery of the Solar Home System.

Detailed Instruction Manuals (for NPC personnel only) shall contain data relevant to the device or system design and its installation, operation, preventive maintenance, troubleshooting, testing and repair. The manuals shall be furnished by the Supplier and assembled on standard metric A4 sheets. Drawings and schedules which are to be bound into the manual shall be printed in A3 folded to A4. Covers and binders to be used for the manuals shall be robust and oil-resistant.

The following requirements shall be included but not limited to:

- a) List of all components and systems supplied and its accessory components complete with respective descriptions, operating requirements at all processes and ambient conditions, storage requirements, reference codes and standards, Supplier's/manufacturer's specification or technical data sheets supported with illustrative catalogues and brochures as applicable;
- b) Applicable drawings including equipment outline drawings, assembly drawings, system flow diagrams, single line diagram, schematic and control circuit diagrams (alarm and trip), interconnection diagrams and other relevant drawings;



- c) Instrument lists (including switches and probes) itemizing function, set points, type, catalogue number, and range;
- d) Operating procedures and instructions shall provide the consumers, NPC personnel and CBTs with information that tells them when and how to operate the device/system, including precautions, limitations and set points. Procedures shall be listed in step-by-step sequence. Troubleshooting charts and tables shall be used to list likely evidence of malfunction and what could be responsible. The effect of loss of normal power and effect of electrical malfunctions shall be addressed;
- e) Preventive Maintenance Schedule for all equipment with servicing procedures including instructions for dismantling and/or replacing components, performance check and tests and checks for cleaning, otherwise caring for equipment. These procedures shall include maintenance of interlocks and other safety features;
- f) Special and standard tools list;

For NPC Personnel

Aside from the twelve (12) final copies of approved manuals (O&M and detailed Instruction Manuals for installation and data base) provided to NPC, the Supplier shall also provide twenty-five (25) installation manuals to be included in each tool boxes to be supplied containing **tools for installation only** as specified in GW 8.0-Tools and Appliances Item 3 - Toolboxes.

For Beneficiaries/Consumers

User Manual to be distributed to the consumers shall be on graphical stickers and shall be attached and/or placed on accessible location of the enclosure box. The sticker shall be water and oil resistant. However, the user manual for vending machine shall be printed in Tagalog or any language predominantly used in the area and shall be included in the box.

These user manuals shall only contain instructions on how to properly use and care the SHS kits, vending machines and the basic troubleshooting of the devices without the intention for them to tamper any of these devices.

Support Materials

The Supplier shall be responsible to deliver the following materials:

1. Visual aids for training team – this can be large posters, comic strips, video clips, power point presentations, etc.)
2. User Manual shall be printed on water and oil resistant graphic sticker attached to the enclosure box and shall not be easily removed for SHS kits while the manual for vending machine shall be printed.
3. NPC marking/logo shall also be engraved or burned in the enclosure box to avoid removal.
4. SHS kits/battery enclosure box shall be provided with any tamper proof seals.

The Supplier shall base the information written on the instruction manual/posters in the following:



1. The instructions are dedicated to rural beneficiaries whom have little or no technical background.
2. The instructions shall be very simple and straightforward presenting key information that is very easy to understand.
3. Language of the User Manual shall be Tagalog or in the native language predominantly used in the project area.
4. The demo/training shall be conducted in Tagalog or in the native language predominantly used in the project area, with the presence of a technician able to translate when needed.

GW-11.4 Documents for NPC's Records

The Supplier shall furnish five (5) copies of the following documents for NPC's records:

- a) Material Data, Material Certifications and Test Reports required by governing Codes and Standards; and
- b) Factory/Performance Test Results

GW-11.5 Processing of Drawings/Documents

All documents and drawings to be prepared by the Supplier for NPC's review and approval shall be on A4 size and A3 size folded to A4 respectively, and submitted to, except otherwise mutually agreed during the implementation stage:

The Manager, (Design and Development Department)
National Power Corporation
BIR Road corner Quezon Avenue,
Diliman, Quezon City 1100

NPC shall review, comment or note corrections to be made and return two (2) copies to the Supplier within twenty (20) calendar days after receipt of the drawing. If corrections are required, the Supplier shall make all necessary corrections and re-submit within fourteen (14) calendar days for NPC's review and approval.

Five (5) prints with dark lines on a white background shall be furnished to NPC for each drawing submitted for approval. Two (2) copies will be returned to the Supplier either marked "Approved", "Approved with Corrections Indicated", or "Returned for Corrections". Prints marked "Approved" or "Approved with Corrections Indicated" authorize the Supplier to proceed with the procurement/fabrication, assembly and construction of the works shown on the drawings, with corrections, if any, indicated thereon.

When prints of drawings are marked "Approved with Corrections Indicated" or "Returned for Corrections", the Supplier shall finalize the drawings and re-submit it in five (5) copies each for final approval. Every revision shall be shown by number, date and subject in a revision block.

If minor revisions are made after a drawing has been approved, the Supplier shall incorporate the corrections on the as-built drawings to be submitted by



the Supplier. No major revision affecting the design shall be made after a drawing has been marked "Approved" without re-submitting the drawing for formal approval of said revision.

Drawings and documents marked "Noted" without comments are deemed approved. If comments/corrections are indicated thereon, the Supplier shall finalize the drawings/documents and resubmit for NPC review and reference.

Failure of the Supplier to submit the approved "As-Built" Drawings and "Operation and Maintenance" Manuals to NPC on the respective dates specified in this section, NPC shall withhold Five percent (5%) of contract amount from payments due to the Supplier.

GW-12.0 INSPECTION AND TESTS

GW-12.1 General

The Supplier shall perform at his own expense all tests required to ensure adequacy of material, workmanship and conformance of equipment to the guaranteed data and other requirements of the Specifications and standards. The Supplier shall submit five (5) copies of test procedures for NPC's review/approval for all equipment covered by the Contract at least thirty (30) calendar days prior to the conduct of actual test.

NPC and/or its duly authorized representatives shall be entitled to attend and witness all applicable tests detailed in the relevant sections. NPC shall be notified by the Supplier thirty (30) days in advance about any tests requiring the presence of NPC. NPC's acceptance of the work by waiving the inspection of tests and receipt of the Supplier's Certified Test Reports and Inspection & Testing Certificate shall in no way relieve the Supplier of his responsibility in accordance with the requirement of the Specifications.

Tests not requiring the presence of NPC shall be, in any case, notified in advance. In such case, the Supplier shall then proceed with the tests and shall submit test reports in five (5) copies to NPC at least two (2) weeks after the conduct of the tests.

For inspected or tested goods that fail to conform with the Specifications, the Supplier shall replace the goods to meet the requirements of the Specifications at no costs to NPC.

The Supplier shall carry out all tests in accordance with the requirements of the Specifications and test procedures duly approved by NPC.

GW-12.2 Tests at Supplier's Premises

GW-12.2.1 Inspection at Supplier's Premises

NPC reserves the right to inspect all shop and assembly work associated with the Works, verify quantities consigned to stores and inspect quality control and assurance records as well as shop and purchase order records. When scheduled, and as often as NPC deems appropriate, progress will be



monitored with respect to Milestone Dates in the Contract Schedule and the sequence of events and activities on the Supplier's Detailed Contract Schedule.

GW-12.2.2 Factory Acceptance Tests (FAT)

Prior to shipment and final inspection, each equipment supplied by the Supplier shall be given the manufacturer's standard factory test and/or as required in the relevant sections of the technical specifications.

The Supplier shall carry out tests, as may be required by the specified Standards and the Quality Control and Assurance Program, as well as the entire test program approved by NPC. Prior to the witnessing of Factory Test, the Supplier shall remove all faults found and correct all failures noted to the best of his knowledge such that no functional or procedural errors will occur during the test.

The Supplier shall immediately advise NPC should failures occur, take remedial action subject to NPC's approval, and proceed with the Factory Test as and when directed by NPC. It shall be NPC's prerogative to order a repeat of all such tests that he deems may have been affected by the failure. The Supplier shall ensure that during the test, all hard copies from output devices are retained and that no outside parties interfere in any way with testing, equipment or test instruments, fixtures and jigs for the entire duration of the Factory Test. Only Supplier's personnel who are needed on the testing of the equipment shall be allowed in the test area.

The Supplier shall also be responsible that an accurate record of tests is kept and each individual test is duly initialed and dated by the Supplier and stamped or marked either "passed" or "failed" with annotations of antecedents and observations concerning the test. For each day of testing, the Supplier shall submit to NPC the proposed disposition of each criterion that failed during the previous day of testing, prior to commencement of the tests scheduled for that day. Tests witnessed by NPC will be initialed accordingly by him on the test record. The test record and dispositions, and any other pertinent supporting data and documents shall form part of a test report to be submitted in accordance with the specification.

Solar Home System

Each equipment/component of the Solar Home System supplied by the Supplier shall be given the manufacturer's standard factory test and in accordance with specified codes and standards.

Batteries

The Batteries as defined in section EW-1.3 and its succeeding sections shall be given the manufacturer's standard factory test and performance test in accordance with specified codes and standards. Due to shipping/handling restrictions, lithium batteries of similar make and model may be used in the tests.



GW-12.3 Site Acceptance Test (SAT)**Solar Home System**

Performance test of the Solar Home System (as a whole system) shall be carried-out in accordance with the manufacturer's instructions and specified codes and standards. The test is performed upon delivery and prior to NPC acceptance at each designated warehouse/storage facility. The sampling method shall be in accordance with ANSI/ASQ Standard Z1.4-2003 under General Inspection Level II per delivery point.

The test shall be performed and lead by a qualified SHS installer or technician who is knowledgeable regarding SHS and vending machines and its associated electrical equipment to ensure safety during the conduct of test. The test shall be witnessed by NPC.

GW-12.3.1 Testing

Testing of solar home system should be conducted in accordance with NFPA 70E, Electrical Safety in the Workplace, published by the National Fire Protection Association. To mitigate electrical hazards, workers must employ personal protective equipment commensurate with the electrical energy present, follow proper procedures and use appropriate tools. The DC circuit tests shall be performed, preferably in this order:

- a) Test continuity of equipment grounding conductors and system grounding conductors (if applicable).
- b) Test polarity of all DC cables and check for correct cable identification and connection.
- c) Test open-circuit voltage [Voc] for each PV source circuit.
- d) Test short-circuit current [Isc] for each PV source circuit.
- e) Test functionality of major system components (modules, batteries, charge controllers, etc.)
- f) DC conductor Insulation resistance test

GW-12.3.2 Tests Failures

If any equipment or component fails to pass any test during the SAT, the Supplier shall replace the defective unit/component. NPC shall be given the list of serial numbers of all units/components to be replaced. Any and all expenses due to additional tests or retests made necessary by failure of Supplier's supplied equipment/component, i.e. failure to meet the guarantees and other requirements of the specification, shall be borne by the Supplier. The costs of witnessing the Factory Tests by NPC or its representative(s) as a result of re-test to be conducted on the equipment shall also be borne by the Supplier.

If the results of the performance test that the supplied equipment failed to meet the technical specifications, guarantees and/or Acceptance Quality Level (AQL), NPC has the right to reject the lot and the Supplier shall be given two (2) weeks maximum from the completion date of the performance test to replace the affected unit(s) before conducting the retest. The Supplier



may request time extension subject to NPC's evaluation/approval of corresponding justification for such extension. One (1) retest is allowed only during the required two (2) weeks maximum period including trial runs. If the results of the latest test/retest failed to meet the guarantees, then these results shall become the basis in applying the applicable penalties, if any.

Penalties specified in the relevant sections of the Specifications shall be applied in case tests or retests at the warehouse for the SHS and its appurtenances.

GW-12.3.4 Test Reports/Certificates

Five (5) certified copies of the reports of all NPC's specified tests and other manufacturer standard tests shall be furnished to NPC within a maximum of fifteen (15) days following the completion of the tests.

Test certificates shall include, in addition to the test results, the following information:

- a) Date of the performance of test;
- b) Equipment data; and
- c) The equipment serial number

The Supplier shall bear the cost of furnishing these records and reports.

GW-12.3.5 Waiver of Factory Tests Witnessing/Inspection by NPC

If NPC opted not to witness the Factory Tests, NPC will issue a Certificate of Waiver of Tests Witnessing/Inspection for the equipment and materials. In such case, the Supplier shall proceed with the Factory Tests in accordance with the requirement of the specification and the manufacturer's test procedures as approved by NPC.

Issuance of the Certificate of Waiver of Tests Witnessing/Inspection for equipment required to be witnessed by NPC or its authorized representative(s) however, shall in no way relieve the Supplier of his responsibility to conform to the approved test procedures and the requirements of the Specifications.

GW-13.0 TRAINING OF NPC PERSONNEL AND TECHNICIANS

GW-13.1 General

The Supplier shall extend all possible assistance and cooperation to NPC regarding the transfer of technology and developing expertise in the area of engineering, operation and maintenance of the SHS, Vending Machines and its appurtenances.

The Supplier shall provide comprehensive and properly documented training to NPC personnel and the recommended supervision of training to Beneficiaries, Technicians and Vending machine operators/vendors.



Community-based Technicians (CBT) act as the first line of O&M addressing more complex troubleshooting issues than what the beneficiaries are instructed in recognizing and fixing themselves. CBTs shall refer to NPC if the issue is beyond their scope such as repairing or replacing parts. NPC is responsible for the post-installation services on full operation and maintenance of the SHS and vending machines and all Warranty claims.

It is mandatory that the Supplier shall have on-hand SHS unit and vending machine identical to that being supplied and installed for the demonstration during trainings wherein it can be assembled and disassembled to show the various parts, function, simulate troubleshooting, repair, etc.

The Supplier shall provide the training prior to the delivery of the SHS units and vending machines. The Bidder shall propose on its bid a detailed Training Program organized in four (4) parts as stated in GW-13.1.1 to GW-13.1.4.

The Supplier shall provide the following support materials during the entire duration of the training.

1. Training materials, posters, tools, etc.
2. Demo kits of the SHS packages installed and vending machine
3. Guidelines for the technicians
4. Training certificates for qualified technicians who passed the training

Training programs shall be submitted to NPC for approval.

The timing of the training should be such that the participants will be equipped with sufficient know-how on how to operate and maintain the SHS unit, vending machine and its appurtenances.

The cost of training of all involved NPC personnel and during the recommended supervision shall be borne by the Supplier and shall be included in the bid price.

NPC personnel and/or CBTs are responsible to conduct training/seminar/workshop to the consumers under their area. The Supplier is recommended to be present during such trainings to supervise and guide the NPC personnel/CBTs with the conduct of the training.

GW-13.1.1 Basic Solar Kit Training Workshop for Community-Based Technicians

The training shall be conducted at a suitable venue designated by NPC. This shall be done for at least one (1) day. The Supplier shall ensure that the CBTs are properly and well-equipped on handling their respective scope in the SHS units and vending machines.

The training shall inform them the following knowledge:

1. Basics on Solar Energy, Solar PV systems, etc. (Theory)
2. Pre-payment and Credit Vending System
3. Basics on Installation and Operation
4. Basics on Maintenance and Troubleshooting

5. Vending Machine Troubleshooting
6. Safety and Proper handling of the equipment

GW-13.1.2 Advanced Solar Kit Training Workshop for NPC Personnel/Technicians

The training shall be conducted at a suitable venue designated by NPC. This shall be done for at least two (2) days. The Supplier shall ensure that the NPC technicians are properly and well-equipped on handling their respective scope in the SHS units and vending machines.

The training shall inform them the following knowledge:

- Basics on Solar Energy, Solar PV systems, sizing, etc. (Theory)
- Vending System
- Installation and operation
- Pre-payment and Credit
- Management Software System (The software used to configure, manage and report on operational procedures)
- Training and Management of Vending Agents at selling points
- Installation of SHS
- Operation and Maintenance
- Inspection and Maintenance Report (log sheet)
- Troubleshooting and replacement
- Data collection and reporting & Database Management
- Warranty Services Claims Training
- Component Testing; repair and replacement
- Claims process (provide claims forms)
- Warranty hotline
- Stock and Inventory Management
- Basic Training and Management of CBTs

GW-13.1.3 Vending Machine System Training

This training shall be conducted with various NPC personnel/CBTs, vending machine operators/vendors if possible, at a suitable venue designated by NPC, for the training whenever required for proper operation and maintenance. The Supplier shall ensure that the CBTs are properly and well-equipped on handling their respective scope in the SHS units and vending machines.

The training shall inform them the following knowledge:

1. Operation and management of Vending machines for online and offline operations including trouble shooting for Vendors and CBTs and diagnosis for NPC personnel/technicians.
2. Operation and management of management software – The software used to configure, manage and report on operational procedures.
3. Basic accounting requirements for agents/vendors.

GW-13.1.4 Final Workshop

This training is for the NPC personnel to be conducted on a suitable venue designated by NPC. The training duration shall be at least one (1) day and will ensure that the technicians are properly and well-equipped on handling their respective scope in the SHS units and vending machines.

The following are to be done in this training:

1. Review of learning
2. Open Forum
3. Evaluation
4. Presentation of certificates to qualified technicians (those who passed)

GW-13.2 Technical Guidelines for NPC and CBTs

The Supplier shall provide Technical Guidelines on SHS and vending machine installation, O&M, training and troubleshooting as described above for those attending the training. The guideline shall be prepared before the trainings are conducted and shall be approved by NPC before duplication.

A simplified version of the guideline shall also be prepared for the CBTs as reference material when practicing in the field. Always note that the level of previous training for the CBTs could be close to none, thus, the instructions in the simplified version shall be clear and simple to understand.

The guidelines for NPC is dedicated for them who have at least basic electrical background, have basic knowledge on solar PV system, how it works, how to diagnose breakdowns and faults, and to some extent, repair and replace some parts, if allowed.

The guideline shall be based on the requirements stated below.

- The guideline shall help NPC to conduct maintenance, repairs, moving and new installations of solar packages and vending machines, beyond the training provided by the Supplier.
- The guideline shall also help NPC to train the vending agents in the field with the credit selling terminals/tools provided by the Supplier.
- The guideline shall be simple and well-illustrated (can use pictures and drawings) for easy understanding of the instruction.
- The guideline shall be prepared in English Language but it shall allow easy translation of the content.

The guideline shall cover at least the following topics:

1. Complete List of components including system sub-items with associated specifications, manufacturers' warranties and ordering references.



2. Complete Installation Instructions
 - Detailed instructions to choose the best locations/places for components and to install the solar module, the wiring and the lamps. Clearly illustrate the Do's and Don't's.
 - A recommended post-installation acceptance test procedure, including appropriate test procedures.

3. Complete User-manual Instructions
 - Explain to the user the system's operating principles, load management requirements, warranties and limits of the system, impact of shading/dirt on the solar panel 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.
 - Explain to the vending agent how to operate and manage the vending machines, the credit sales to customers and the reporting to NPC (transaction data transfer).

4. Complete O&M instructions
 - A recommended routine maintenance schedule with inspection/maintenance instructions.
 - Specific care and maintenance guide for the system and its components (controller, battery, PV module, lamps, vending machines, etc.).
 - A detailed troubleshooting guide referencing all the system sub-items. This shall include diagnostic procedures, repairs and replacements. Repairs and procedures not to be attempted by non-electricians and/or electricians unfamiliar with photovoltaic systems shall also be clearly identified.
 - Recycling procedure for main components, if allowed and recommended.
 - Complete list of all system components with associated manufacturers' literature, specifications and warranties.
 - Functional block diagram showing the placement of all hardware and ratings of all components and a physical layout diagram.
 - Instructions on handling and management of used and damaged SHS packages, spare parts and wastes from the packing/staging materials.
 - Detailed instructions on the use of vending machines and their software to manage SHS and its associated beneficiaries, including:
 1. Registration of the beneficiary
 2. Registration of SHS
 3. Linking and unlinking of the beneficiary to the unit
 4. Vending of credit to the beneficiary
 5. Reports on registered beneficiaries, SHS, total vending activity (for vendor cash reconciliation), vending activity of the beneficiary and non-vending exception reports
 6. Issuance of maintenance tokens to NPC personnel/technicians/CBTs



7. Upload, download and back-up of all data on a weekly basis to NPC
 8. Black log sheet template
5. Procedures on how to take Warranty Claim
- The guideline shall comply with RA 6969 and related national regulations for recycling and/or special disposal of batteries including proper handling, battery collection, storage and recycling schemes. Disposal through a DENR registered transport storage and disposal facility (TSD) will need to be clearly stated.
 - The Supplier shall also provide technical support/assistance on the operation and maintenance of the supplied SHS and vending machines to NPC personnel throughout the Contract Term. NPC will designate a venue for the training.
 - A minimum of five (5) NPC personnel/or as specified by NPC will attend the trainings to be trained by the Supplier.

GW-13.3 Operating and Configuration Editor Software Program

All software and configuration editor software program including licenses shall be supplied and included in the cost of the equipment in the Bid Price Schedule. A set of each type of software including licenses plus instruction manuals shall be provided by the Supplier.

GW-14.0 CORROSION PROTECTION AND PAINTING

GW-14.1 General

The Supplier shall apply corrosion protection and painting to all equipment and materials to be furnished in accordance with the minimum requirements specified in this section.

Generally, the equipment shall be shop primed and finish coated in accordance with the Manufacturer's standard practice. An adequate supply of touch-up paint shall be supplied by the Manufacturer/Supplier which shall be used for painting surfaces that will be damaged during transport and installation works including surfaces that show signs of corrosion. Color of Final painting shall be as approved by NPC.

The Supplier shall be responsible for the adoption of preparation procedures and protective coating systems which are suitable for the environment experienced by the various components/elements of the system.

Where a specific coating system is mentioned elsewhere in the Specifications, the Supplier shall accept responsibility for the suitability for such system. The Supplier has the option to nominate an alternative coating system for the approval of NPC.



GW-14.2 Treatment for Shipping

The various items which do not fall under the paintings or lining specifications in the documents shall be surface treated for shipping.

The various items to be shipped shall be thoroughly cleaned before shipment so as to eliminate dirt, rust and grease, all welding slugs and spatters, and loose metals.

All metallic machined surfaces shall be covered with a protective coating. This coating shall be effective against salty air and shall be easily removable at site.

GW-15.0 QUALITY ASSURANCE REQUIREMENTS**GW-15.1 General**

The Supplier shall have a well-organized Quality Management System which is relevant for the Works covered under the Contract to assure that items and services, including subcontracted items and services, will comply with this specification.

Within thirty (30) days of the Effective Date of Contract, the Supplier shall submit six (6) copies of his complete quality control and assurance procedures, and manuals for review and approval by NPC. The manual shall include pro-forma checklists for all requirements of the Supplier's quality control and assurance program and those called for in this Specification.

GW-15.2 Quality Assurance Program

The Supplier shall, for all work covered by the Contract:

- a) Establish procedures for adequate planning and resourcing of all quality related activities including the preparation of quality plans;
- b) Establish measures for the identification and control of items throughout all stages of the Contract. This shall include measures to maintain traceability as identified in agreed quality plans;
- c) Arrange for the protection of the quality of the product to include delivery to the specified destination; and
- d) Control their measuring and test equipment in accordance with the established procedures for measurements and calibration systems and ensure that such equipment that may be used by Sub-Suppliers to verify work is similarly controlled.

Where testing works are involved, the Supplier shall prepare contract-specific quality assurance procedures in agreement with NPC prior to commencement of such works.



The Supplier shall ensure that all computer systems and software to be utilized on the project is qualified for the application under consideration and such qualification is documented.

GW-15.3 Quality Plan

The Supplier shall establish and implement quality plans detailing the specific activities, design reviews, operations, control procedures, inspections, testing, approvals and certification requirements applicable. All procedures, which support the quality plan shall be referenced and distributed to NPC together with the quality plan. Quality plans shall be submitted to NPC for review and approval.

GW-15.4 Records

The Supplier shall generate records as required by the quality assurance system and quality plans. Records, including audit reports shall be made available for inspection by NPC.

All records shall be concisely compiled, indexed and cross-referenced to the project contract number and the relevant subcontract numbers. They shall be clearly identifiable to the individual parts and assemblies to which they refer.

All records generated during the course of the Contract, including those generated as evidence of effective implementation of the quality assurance program of the Supplier and his Sub-Suppliers, shall be retained by the Supplier for a minimum period of five (5) years from the date of contract completion. These records shall be made available to NPC on request during the retention period.

GW-15.5 Reporting and Corrective Action

The Supplier's quality assurance program shall provide for prompt detection and correction of all conditions adversely affecting quality, including failures, malfunctions, incidents, trends, deficiencies, deviations, non-conformances, and defective materials.

GW-16.0 MEASUREMENT OF PAYMENT

Measurement of payment for all works shall be based on the requirements specified in the relevant clauses of the technical specifications or the bid price of each item as shown in the Schedule of Requirements. The cost shall cover all works required and described in the pertinent provisions of the specifications and for the satisfactory completion of each work.

GW-17.0 CERTIFICATE OF COMPLETION AND ACCEPTANCE

When all the works and services have been satisfactorily completed as required in the Contract, the Supplier may give notice to this effect to NPC. Such notice shall be deemed to be the basis for NPC to issue a Certificate of



Completion in respect of the Works within fifteen (15) days of receipt of such notice. If defects had developed, said defects should have been corrected to the satisfaction of NPC and have undergone another warranty period reckoned after correction.

The warranty period for the completed works shall commence on the date of issuance of the Certificate of Completion.

After the lapse of the warranty period, provided that there are no defects found and/or pending repair works (including completion of the required Supplier's Service Personnel specified in Clause GW-18.0 as certified by (Authorized NPC Personnel), NPC shall issue the Certificate of Final Acceptance.

The issuance of Final Acceptance Certificate shall entitle the Supplier to Final Payment and to full release of retention money.

GW-18.0 GUARANTEE

The Supplier shall guarantee that he will repair, and/or replace, at his own expense, **equipment and machineries, against defect in design, workmanship and materials** and shall include labor, parts and travel time for necessary repairs at the plant site effective from date of issuance of Certificate of Completion for a period of **twelve (12) months**. Within this Parts Warranty, the Supplier shall assist NPC through every means possible to ensure the replacement of faulty parts (covered by the Warranty) within **three (3) business days**. However, for the vending machines and its management system and the data base, the Supplier shall be able to respond to NPC's queries and provide solution within **twenty-four (24) hours**.

The Warranty Period is an additional requirement to the standard Component Warranties.

The Warranty Period shall commence on the day of Acceptance of the completion of the Project received by the Supplier from NPC.

The Supplier shall bear full transportation costs of faulty equipment and replacements of such parts being claimed under the Warranty for the entire duration on the Warranty Period.

The Supplier shall be the focal point for the life of the Warranties and all claims shall be undertaken through the Supplier for replacements, components and accessories.

The Supplier shall provide on-call support for issues beyond the technical capability of NPC as specified in the scope of works. If issues cannot be fixed or solved by telephone support, the Supplier must be able to send to the project site their appropriate staff within seventy-two (72) hours after NPC has notified the Supplier. The Supplier shall also identify and submit the name(s) and contact numbers of their local partner(s) in where NPC could acquire part(s) of the system.



This shall include any maintenance/repair services rendered upon request of NPC in the event of any abnormality occurs within the warranty period. For the minor repairs/replacements/adjustments as determined by the supplier, CBTs and/or NPC who had undergone training conducted by the supplier may perform the necessary repairs/replacements/adjustments, if authorized by the supplier through any means of available communications, provided that such repair shall not relieve the supplier of its obligation under the contract if such repair is not done properly.

The applicable guarantee period shall be exclusive of any downtime attributable to the Supplier. In case of equipment downtime occurs during the warranty period due to fault of the Supplier, the downtime hours shall be added to the required warranty period. Hence, the warranty period is extended with the equivalent downtime attributable to the Supplier.

Provided further that the release of the warranty bond/security is without prejudice to the terms provided by GW-18.0 and shall be done after the warranty period plus downtime attributable to Supplier, if any as certified by the concerned end-user.

Accordingly, the warranty bond shall be extended.

The Supplier guarantees that when the equipment and/or material are placed in operation and/or use, it will perform in the manner as set forth in the Contract.

GW-18.1 Component Warranties

The warranty against defect in design, workmanship and materials for the following components are as follows:

The components' manufacturers' warranties shall start at the same time the System Warranty commenced as detailed in GW-18.0 Guarantee.

Components	Warranty (yr)
PV Modules	10
PV Module Mounting Hardware	10
Batteries	5
Charge Controllers	5
Vending Machines	3
LED Bulbs	2
Other appliances not mentioned above	1

Table 10.0 Number of Years of Component's Warranty



SECTION VI

**PART I - TECHNICAL
SPECIFICATIONS**

CIVIL WORKS



PART I – TECHNICAL SPECIFICATIONS

CW – CIVIL WORKS

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PART 1 – TECHNICAL SPECIFICATIONS

CW – CIVIL WORKS

CW-1.0 PV MOUNTING PIPE

CW-1.1 General

This section covers the fabrication and hot dip galvanizing of mounting pipe assemblies in accordance with the AISC "Manual of Steel Construction" and the ASTM "American Society of Testing & Materials" referred to herein. In the AISC "Manual of Steel Construction", the specification for the fabrication and construction for the structural steel and in the ASTM "American Society of Testing & Materials", the specification for the standards and services of the structural steel materials to be used shall be considered a part thereto.

CW-1.1.1 Submittals

Shop Drawings of mounting pipe assemblies in five (5) copies for approval prior to fabrication of structural steel with complete information necessary for the fabrication and assembly of the component parts of the mounting pipe including the type and size of all bolts and welds, member sizes and lengths, and cuts shall be submitted accordingly.

Assembled Plan consists of descriptive data to illustrate the mounting pipe assembly procedure including the sequence of assembly, and written description of the detailed sequence of all welding, including each welding procedure to be performed shall likewise be submitted accordingly.

Certificates of Conformance for the following:

- Bolts, Nuts and Washers
- Welding Electrodes and Rods
- Steel
- Galvanizing
- Certified Test Reports

Chemical Analysis and Tensile Strength Test of structural steel in accordance to ASTM A53.

For high strength bolts and nuts, the Supplier shall also submit chemical analysis, including tensile strength and hardness tests as required by ASTM A325.

CW-1.1.2 Delivery and Storage

All materials shall be handled, shipped and stored in a manner that will prevent distortion or other damages. Materials shall be stored in a clean and properly drained location and out of contact with the ground. Damaged materials shall be repaired/replaced at no additional cost to NPC.



CW-1.2 Materials

All the materials shall be of the best quality of their kind, well graded and within the allowable distortions. They shall be free from flakes, corrosion, scale or fragments that could reduce the resistance and durability or injure the external appearance.

Except as modified herein, blast clean surfaces in accordance with SSPC SP6. Wash clean surfaces that become contaminated with rust, dirt, oil, grease or other contaminants with solvents until thoroughly clean.

CW-1.2.1 Steel

Materials shall conform to the respective specifications specified herein. Materials not otherwise specified herein shall conform to the AISC "Manual of Steel Construction".

Structural Steel:	ASTM A36
Steel Pipe:	ASTM A53, Type E or S, Grade B, ASTM A501

CW-1.2.2 Bolts, Nuts and Washers

All bolts, nuts and washers shall be of hot-dip galvanized steel, in accordance with the following:

- Bolts: ASTM A307, Grade C or ASTM A36 for Anchor Bolts; ASTM A325 for Fastening Bolts
- Nuts: ASTM A563, Grade A, heavy hex style, except nuts less than 38mm may be provided in hex style
- Washers: ANSI B18.22.1, Type B

CW-1.2.3 Accessories

Welding electrodes and steel structural members shall use:

- Rods E70XX electrodes

CW-1.3 Execution

CW-1.3.1 Fabrication

PV mounting pipe fabrication shall be in accordance with the applicable provisions of the Specification set forth in the AISC "Manual of Steel Construction".



To ensure identification after galvanizing, piece mark shall be supplemented with metal tags for all items where fit-up requires matching specific pieces.

CW-1.3.2 Welding of Structural Steel Work:

All welding works shall be as indicated in the drawings and shall conform to AWS D1.1 - 77 "Structural Welding Code". Unless specified on the drawings, fillet welds shall be a minimum of 5mm (3/16") and welding electrodes shall be with a tensile strength of 485MPa.

All welding works shall be executed by the AWS D1.1 qualified welders, welding operators and trackers, whose workmanship shall be subject to the approval of NPC.

CW-1.3.3 Hot Dip Galvanizing

Hot Dip Galvanized Coating: Mounting pipe assemblies shall be galvanized by hot dip process in the shop according to AASHTO M111. Coating weight, surface finish, appearance and adhesion shall conform to requirements of ASTM A 385, ASTM F2329 and AASHTO M111, as appropriate.

Bolts, nuts, and washers shall be galvanized according to ASTM F 2329.

Any high spots of zinc coating, such as metal drip lines and rough edges, left by the galvanizing operation in areas that are to be connected or in areas that are to be painted shall be removed by cleaning per SSPC-SP2 (Hand Tool Cleaning) or SSPC-SP3 (Power Tool Cleaning). The zinc shall be removed until it is level with the surrounding area, leaving at least the minimum required zinc thickness.

Repair of Hot Dip Galvanized Coating: Surfaces with inadequate zinc thickness shall be repaired in the shop according to ASTM A 780 and AASHTO M111.

Surfaces galvanized steel that are damaged after the galvanizing operation shall be repaired according to ASTM A780. Damage that occurs in the shop shall be repaired in the shop. Damage that occurs during transport/delivery to NPC designated storage facility shall be repaired/replaced. All damages shall be repaired/replaced at no additional cost to NPC.

Connection Treatment: After galvanizing prior to shipping, contact surfaces for any bolted connections shall be roughened by hand wire brushing or according to SSPC-SP7 (Brush-Off Blast Cleaning). Power brushing is not allowed.

All bolts holes shall be reamed or drilled to their specified diameters after galvanizing. All bolts shall be tested to fit accordingly in the mounting structure prior to delivery.



CW-1.3.4 Basis for Installation

The basis for installation of the mounting pipe assemblies in the field is specified in GW-6.2 - Solar Home System Item d) – Other Allied Services and as shown on the drawing. For parts cannot be supplied properly in accordance to this Contract, the Supplier shall seek approval of such changes to NPC in writing prior to the delivery of material. Such changes shall follow the methods of correction for straightening, including members of steel conforming to ASTM A514.

Connections: Connections shall be executed as shown on drawing. In case, connections are not detailed, it shall be designed in accordance with AISC “Manual of Steel Construction”.

Tolerances: Structural steel shall be furnished in accordance to the drawings included in this Contract.

Tolerances on structural steel shall be in accordance with the “Code of Standard Practice” of the AISC “Manual of Steel Construction”.

CW-1.3.5 Tests and Inspections

Visual Inspection of Welding: After the welding is completed, hand or power wires brush welds, thoroughly clean them before the inspector makes the check inspection. Inspect welds with magnifiers under strong, adequate light for surface cracking, porosity, and slag inclusions; excessive roughness; unfilled craters; gas pockets; undercuts; overlaps; size and insufficient throat and concavity. Inspect the preparation of groove welds for adequate throat opening and for snug positioning of backup bars.

Non-Destructive Testing¹: In accordance with AWS D1.1 Twenty-five percent (25%) of the total number of joints, as selected by the NPC, shall be tested. If more than 20 percent (20%) of welds contain defects identified by testing, then all welds shall be tested by radiographic or ultrasonic testing, and to be approved by the NPC. When all welds made are required to be tested, magnetic particle testing shall be used only in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

Testing of Hot Dip Galvanized Coating: Inspection and Testing of hot dip galvanized coatings shall follow the guidelines provided in the American Galvanizers Association publication “Inspection of Products Hot Dip Galvanized After Fabrication” or as specified in accordance to AASHTO M111.

CW-1.4 Measurement and Payment

Measurement and payment for PV Mounting Pipe shall be made on a lot basis unless otherwise specified in the Schedule of Requirements. Payment shall include all necessary list for furnishing labor, equipment and incidentals to successfully supply and deliver the PV mounting pipe.

¹Not applicable on non-critical structures/joints and as directed/required by NPC Design Engineer.



SECTION VI

**PART I - TECHNICAL
SPECIFICATIONS**

ELECTRICAL WORKS



PART I – TECHNICAL SPECIFICATIONS

EW – ELECTRICAL WORKS

SOLAR HOME SYSTEM

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PART I – TECHNICAL SPECIFICATIONS

EW – ELECTRICAL WORKS

EW-1.0 SOLAR HOME SYSTEM

This section provides the definition, scope of works, functional/ performance requirements, technical specifications and standards for the Solar PV modules, Charge Controllers, Vending Machines and Vending Management System, Lamps and LED Lights, Bundled Appliances, Cables and Wires, Communication Interface, etc.

The complete package of the Solar Home System Unit, or as per component basis, shall be designed, manufactured and tested in accordance to the latest edition of the Lighting Global Quality Standard for Solar Home System Kit. Proof of conformance/certification to the said standard shall be submitted during post-qualification.

EW-1.1 Solar PV Modules

- a) Rated Capacity of the Solar Home System shall be based on the rated output power of the solar PV module at standard test condition.
- b) The modules to be supplied shall have the same manufacturer and model for all project sites as required in this document, including the required number of spares. All PV modules shall be identical and use the same:
 - 1) Materials;
 - 2) Production processes and construction method; and
 - 3) Quality control procedures as a previously certified module
- c) The cells of the module to be supplied shall be in "series" and the module shall have positive tolerance only on nominal power.
- d) The modules shall be marine grade anodized aluminum frame with high transmission and high strength tempered glass
- e) The Solar PV modules shall be of the crystalline silicon type. The Supplier shall provide PV modules of the same type, brand, capacity and specifications to avoid mismatch losses. PV modules shall have a minimum efficiency of 14%. Each module shall be rated at least 50Wp.
- f) The Solar PV modules shall be designed, manufactured and tested in accordance with, but not limited to, the latest issue of the following codes and standards:

IEC	61215	Crystalline silicon (c-Si) terrestrial PV modules – Design qualification and type approval
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		AND
EN	50380	European health, safety, and environmental protection standards
		AND
IEC	61701	Salt mist corrosion testing of photovoltaic (PV) modules

A copy of the type qualification/test certificates of the solar PV module issued by ISO 17025 accredited test center in accordance with the abovementioned standards shall be submitted during post-qualification. Use of other standards shall be subject to the approval of the National Power Corporation.

- g) The Solar PV modules shall be mounted on structures that are specified in this document and shall comply with NPC requirements.
- h) Each Solar PV Module’s datasheet and nameplate shall provide the following minimum information:
 - 1. Name and logo of original manufacturer or supplier
 - 2. Type designation and serial number
 - 3. Maximum system voltage
 - 4. Rated nominal power (Pmax) at STC
 - 5. Short circuit current (Isc) at STC
 - 6. Open circuit voltage (Voc) at STC
 - 7. Voltage at maximum power point (Vmpp) at STC
 - 8. Current at maximum power point (Impp) at STC
- i) Protective devices against surges at the PV module shall be provided. By-pass diode shall be provided in the PV modules.
- j) Module junction box shall be designed for outdoor operation and shall have a protection rating of IP 65 or any approved equivalent. The connected DC cables in the module junction box shall be in accordance to EW-1.8.
- k) The manufacturer of the Solar PV module shall be **ISO 9001 and ISO 14001** certified. A copy of the valid ISO certification shall be submitted during post qualification.

EW-1.2 Solar Home System Unit Enclosure Box

EW-1.2.1 General

The Solar Home System Unit Enclosure Box shall be a robust “plug and play” type enclosure. It will house all the appurtenant equipment such as charge controller, prepayment controller, batteries and other circuit protection necessary for safe and reliable operation of the system. Other descriptions and specifications of the enclosure box shall be determined hereunder.

EW-1.2.2 Characteristics and requirements

- a) The SHS Unit Enclosure Box shall have dust and water droplets protection rating adequate to not interfere the operation of the system.



- b) It shall be equipped with electrical seal or other equivalent means to avoid unauthorized access. Each seal shall have unique serial. Type of lock mechanism shall be subject for approval of NPC.
- c) The SHS Unit Enclosure box be prefabricated designed to cater to provisions for entry/exit points of cables, USB outlets, lighting source sockets and radio.
- d) Each SHS Unit Enclosure Box shall have distinctive serial number engraved/burned to the box itself.
- e) The location of the Enclosure Box shall be placed and installed in a readily accessible location of the house.

EW-1.3 Charge Controllers and Prepayment Controllers

EW-1.3.1 General

- a) The charge controller and batteries shall be housed within a robust “plug and play” Solar Home System Unit Enclosure Box, resistant to tampering and manufactured with all support or fixing system needed.
- b) The controller shall be specifically designed for Lithium-based battery management; the supplier shall provide proof or otherwise attest to this important point.
- c) The printed circuit boards (PCB) shall be coated with heavy duty varnish to protect from corrosion.
- d) The controllers shall be machine manufactured (no manual assembly and welding).
- e) The controller shall have a microprocessor, with static regulation; PWM is preferred; DC-DC converter with MPPT is also possible, but not required.
- f) The controller must be well protected against short-circuits, overload, reverse polarity and surge voltage.
- g) 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.
- h) All parts of the compartment subject to battery electrolyte contact shall be corrosion resistant.
- i) The charge controller shall have a charging regime applicable to the battery, with voltage set points preset at the factory.



- j) The charge controllers shall be designed, manufactured and tested in accordance with, but not limited to, the latest issue of the following codes and standards:

IEC	62509	Performance and functioning of photovoltaic battery charge controllers OR
IEC	62093	BOS Components – Environmental reliability testing – Design qualification and type approval

A copy of the type qualification/test certificates of the charge controller issued by ISO 17025 accredited test center in accordance with the abovementioned standards shall be submitted during post-qualification. Use of other standards shall be subject to the approval of the National Power Corporation.

- k) The controllers shall have CE Markings for electronics.
- l) Electronic automatically resettable cut-offs are required - mechanical fuses are not acceptable.
- m) The controller shall be able to safely accept 125% of the module open circuit voltage when battery is removed.
- n) The controller shall be able to safely accept 125% of the module short circuit current.
- o) Solar home system unit enclosure box shall have provision for USB outlets. Indication of the battery state of charge (SOC) and PV production be included and very didactic (easily understandable for every customer).

EW-1.3.2 Prepayment Requirements of the Controller

- a) Off-line, GSM-free, using Radio-Frequency Identification (RFID) cards only.
- b) Unit of sale shall be daily (not kWh) and should be fully programmable to suit the NPC's desires.
- c) Compatible with Vending machine and Vending Machine token/SHS charge/credit code.
- d) Seamless operation of charge controller without interfering with battery charging/discharging at any time.
- e) Only an integrated prepaid solution to the controller/battery box is acceptable, not an external device.



- f) Full display on credit level and shall be included and very didactic (easily understandable for every customer).
- g) The prepayment system shall allow free credit(s) of at least one day, allowing the system to be used without reloading credit after it expires. The free credit shall be given for every thirty days of credit purchased. This should be managed/programmed through the software and not the hardware.

EW-1.3.3 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 the following:

- Manufacturer
- Model Number
- Battery Li-ion and type (LiFePO₄, NMC and LTO)]
- Nominal voltage
- PV and Load Currents
- Barcode

EW-1.4 Batteries

EW-1.4.1 General

- a) The Lithium based battery shall have a minimum of 24Ah storage capacity.
- b) For the protection of battery module, the charge controller shall control, in real time, the charge/discharge of battery module and shall prevent the batteries from operating outside its typical safe operating range. In case of batteries connected in parallel, the charge controller is required to manage the energy flow and the voltage. The charge controller shall protect the battery against full discharge by disconnecting the load when Depth of Discharge (DoD) reaches 90% and also changing power direction for overcharging protection.
- c) Usable Energy of the batteries shall be at least (*refer to Section VI – GW-6.0 Supplier's Scope of Works*) within the warranty period. Testing shall be performed during factory acceptance and at least once a year, or as the need arises to ascertain the amount of usable energy. Bidder/manufacturer shall provide all test procedures subject to review and approval of the National Power Corporation.
- d) Acceptable battery chemistries are Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt Oxide and Lithium Titanate.
- e) Batteries' expected life under the solar design cycling conditions shall be based on the battery cycle life curves and shall have a cycle lifetime exceeding 1,000 cycles (3 years) @ nominal C-rate @25°C, before de-rating for temperature conditions.



f) The batteries shall be designed, manufactured and tested in accordance with, but not limited to, the latest issue of the following codes and standards:

IEC	62133	Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells and for batteries made from them, for use in portable applications
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UL	1642	Standard for Lithium-ion batteries
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AND

IEC	61960-3	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for portable applications - Part 3: Prismatic and cylindrical lithium secondary cells and batteries made from them
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IEC	61427-1	Secondary cells and batteries for renewable energy storage - General requirements and methods of test - Part 1: Photovoltaic off-grid application
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A copy of the type qualification/test certificates of the Battery issued by ISO 17025 accredited test center in accordance with the abovementioned standards shall be submitted during the post-qualification. Use of other standards shall be subject to the approval of the National Power Corporation.

g) The manufacturer of the Battery shall be **ISO 9001/14001** certified. A copy of the valid ISO certification shall be submitted during post qualification.

EW-1.4.2 Documentation and Labeling

The Supplier is required to provide the following data in the Battery Box being offered:

- 1) Manufacturer's Name
- 2) Battery Capacity
- 3) Type of the battery;
- 4) Battery Voltage;
- 5) Battery Capacity;
- 6) Warranty Information; and
- 7) Barcode

The Supplier is also required to provide the following test data for each Battery Type:



- 1) Battery discharge performance curves at C10 and C50, at a minimum
- 2) Battery cycling curves against IEC 61427-1:2013 or similar cycling test to 90% DoD.

EW-1.5 Vending Machines and Vending Management System

EW-1.5.1 General

The Vending Machine and Management System must be designed to provide Solar as a Service (SaaS) crediting scheme patterned to the commonly used Pay as You Go (PAYG) but the SHS unit installment purchasing model of PAYG shall not be applied in this contract. The SaaS is responsible in deactivating the SHS when the credit balance turns to zero. Credits shall be purchased by end-users at the designated "Selling Points".

The Vending Machine System shall include the following:

- 1) Prepayment software to be operated by the NPC personnel;
- 2) Appropriate Selling Point hardware/Vending Machine (e.g. smartphone, tablet or POS);
- 3) A centrally managed database portal operated on a computer by NPC personnel, and all the accumulated data shall be backed up on a cloud server.; and
- 4) Synchronicity with the prepayment meter installed as part of the SHS,

EW-1.5.2 Specifications

The Vending Machine, Vending Management System and the Crediting Scheme shall meet the following specifications:

A. Vending Machine

1. The vending machine shall operate without reliance on any mobile signal being present either at the MC's house or at the selling point. However, once a reliable mobile signal is detected by the vending machine, it shall be able to automatically upload vending data on a weekly basis to NPC's vending management system. Regardless whether or not there is mobile signal at the selling point, the vending machine shall be mobile so that uploading can be done by swapping units on a weekly basis.
2. Whenever the Supplier deemed to furnish smartphone or tablet as a vending machine, the Supplier shall meet the following minimum system requirement:

Operating System	:	Kitkat or Higher
RAM	:	4GB
ROM (Memory Storage Capacity)	:	32GB (Expandable to 64GB)
Battery Life	:	4500 mAh

Adjustment and/or upgrade in the basic specifications necessary for the reliable function of vending machine and for the



compatibility with the vending management system software shall be modified by the Supplier.

3. For more efficient crediting process, the Supplier may opt to furnish the RFID card reader/writer whenever the vending machine (Smartphone or tablet only) to be supplied is listed for near-field communication (NFC) ready.

B. Vending Management System

1. The vending software or app used to generate the code (or equivalent support) shall include a database that registers and maintains a separate customer account number and SHS package serial number for the records. The vending machine shall generate a code that is unique to the combination of the customer account number and SHS package serial number. When and if the NPC retracts the SHS package from the beneficiary, for whatever reason, they must be able to reset the SHS units by programming the unit to work with a new account number, for which the prepayment load is unique to.
2. Provide an SHS package's unique Maintenance Code to be used when a technician needs to undertake troubleshooting or O&M for no longer than a 30-minute period together with an alternative Maintenance Code for periods of up to 1 hour but limited to 5 times, preventing the undermining of the program.
3. Database shall record every vending transaction. Every transaction should include at least: Customer account number, SHS unit number, date and time of transaction, and amount of credit bought.
4. All transaction data shall be accessible by NPC and shall be exportable in a standard, non-proprietary format (e.g. CSV file type) to be used by NPC in their own customer management software. The file format is not imposed but shall be compatible with Microsoft Office or equivalent software.
5. Customer and SHS unit records and cumulative transaction histories should be captured during weekly backup and copied to master vending management software maintained centrally at the NPC Head Office either by uploading if mobile signal is present and reliable at the selling point, or by physically swapping out the vending machine and transferring it to the NPC Selling Point Office for upload. It is the responsibility of the NPC Selling Point Office to maintain global backups and to set-up and ensure compliance with individual vendor back up processes.
6. The software should provide data and dashboards for monitoring individual customers, individual SHS units and vendor sales.



7. All file formats must be fully open and accessible at the lowest level of data granularity collected by the vending machines to ensure interoperability of the central database if future SHS deployments use vending machines from a different supplier. Suppliers should include with their bid a data model showing all the data fields captured and maintained and organized by beneficiary, asset (SHS) and transaction (vend).

C. Crediting Scheme

1. The way to reload the credit shall be simple and reliable (thru RFID card that is dedicated for a particular SHS unit only) tapped into the SHS.
2. Credit should be generated in “days of operation”. The number of days' credit purchased shall be in pre-defined denominations of days with the smallest being 1 day and the largest being 30 days.
3. Purchase of new credit should not overwrite or cancel any existing credit but should simply be added to it.
4. Free credit shall not have an expiration and shall be simply added to the available/bought credit to the SHS unit.

The minimum number of Vending Machine shall be determined by the ratio of one (1) unit of Vending Machine for every fifty (50) SHS units in the project location.

EW-1.6 Lamps and LED Lights

EW-1.6.1 General

Lights, lamps and lighting fixtures shall have the following requirements:

1. Each lamp shall be made of high efficiency LEDs with an efficacy of at least 90lm/W with a wide light distribution angle.
2. Lamps to be supplied shall have a socket type of E27. If a diffuser is included, the cover should be dismountable to remove dust and insects.
3. All LED luminaires and integral LED lamps shall comply with the Illumination Engineering Society (IES) generally applicable standards.

IES-LM-79-08 Approved method for electrical and photometric measurements for solid state lighting products

IES-LM-80-08 Approved method for measuring lumen maintenance of LED light sources



IES-LM-21-11

Projecting long term lumen maintenance of
LED light sources

All lanterns compliant with Lighting Global Standard IEC 62257-9-5 are acceptable as long as they provide the type of light service required herein.

Lamps that do not have Lighting Global Compliance Certification shall be supported by documentation or certificate stating that they provide the type of light service required.

- 1) Certificate stating that luminaires comply with general requirements as well as providing the test results for light output
- 2) Confirmation that LED lights are constructed using LM-79/80-certified LED chips and drivers, as well as providing the required KM certificates

A copy of the qualification/test certificates of the lights and issued by ISO 17025 accredited test center in accordance with the abovementioned standards shall be submitted during post-qualification. Use of other standards shall be subjected to the approval of the National Power Corporation.

4. Lumen maintenance as per IES-LM-80 and IES-LM-21: The lifetime of the LED package must exceed 20,000 hours when operating at rated voltage (at 25 deg. C). At the end of 20,000 hours, lumen output should be at least 70% of nominal value.
5. The switches shall withstand high cycle level as per IES-LM-80.
6. Temperature of the heat sink of the driver circuit of the LED lamp should be tested and at still air condition, increase in temperature of the heat sink should not be more than 20° Celsius after one-hour operation.
7. The rated color temperature of the supplied LED light shall be with the range of 5000 – 6000 K.
8. Lamps should have a way for attaching safely to ceiling or wall.
9. Each lamp shall have its own dedicated switch even for lamps connected in a daisy chain. Switches shall have ON/OFF function only. Dimmer switch is prohibited.

EW-1.6.2 Documentation and Labeling

Lamps shall be indelibly marked with the following information.

- Manufacturer's name



- Model
- Voltage and Power
- Date of Manufacture and/or Batch Number

Additional Requirements

All lights, lamps, LEDs shall have the following:

- Product brochures
- Luminous flux
- LED brand used, model number and certification
- Nominal voltage range
- Color temperature

EW-1.7 Bundled Appliances

Each unit of SHS shall have the following bundled appliances as part of the package.

EW-1.7.1 Phone Charger

The charge controller shall have provision for USB outlet and a 5-in-1 cable adapter for charging mobile phones. “Cigarette” style adapter is not acceptable due to the large array of heavy loads that can easily be used with this type of adapter.

Minimum Specifications

Particulars	Parameter
Type of Main Connector/Adapter	Type A
USB Port minimum specs	5V, 1A
USB Port maximum specs	5V, 2.1A
Minimum Number of Phone Adapter Types Supported	5
Required phone adapter types	Micro USB
	Mini USB
	Nokia Type 2.0
	Nokia Type 3.4
	Type C

EW-1.7.2 Radio: One AM/FM Radio

The one AM/FM radio shall be rechargeable type with its own internal replaceable battery for portability. In the case of the supplied SHS device has an integrated radio, it is not required to be removed. However, it is required for the Supplier to provide a separate device.

The radio shall be recharged through the USB port(s) and not through the lighting output ports.



Minimum Specifications

Particulars	Parameter
Type of port connection accepted	USB
Minimum autonomous run time (at 50% volume, radio function)	5 hours
Minimum speaker size	3W, 4Ohms
Required bands	AM and FM
Minimum energy capacity of battery	5Wh

EW-1.7.3 Torch Lamp

One torch lamp shall be supplied with a minimum of 50 Lumens and with a minimum autonomy of 5 hours.

The torch shall be rechargeable type with its own internal replaceable battery. It shall be recharged through the USB port(s) and not through the lighting output ports.

Torch Lamp shall also be supplied as a separate device from the SHS unit. If the SHS unit has an integrated torch to it, it is not required to be removed.

Minimum Specifications

Particulars	Parameter
Type of port connection accepted	USB
Minimum autonomous run time (full brightness)	5 hours
Minimum lumen output	50 lms
Color temperature range	3.1 – 10,000 K
Maximum energy capacity of battery	5Wh

EW-1.8 Cables and Wires

The wiring of the SHS shall use stranded and flexible insulated coppers.

Solar Cables

Exposed Solar DC Cables shall be multi-stranded copper conductors covered by flexible UV resistant sheath with polarity indication. It shall be sunlight and damp resistant with a minimum cross-sectional area of 2.5mm² with a maximum length of 8m for 50Wp.

Duplex Cables

Lighting system shall use multi-stranded copper conductors, with 2 parallel conductors in flexible UV resistant sheath and with polarity indication. From the charge controllers to the LED Lamps, DC cables shall have a minimum cross-sectional area of 0.5mm² with a maximum length of 10m for individual 3W-light and 5m for two 3W-light connected in parallel. For a circuit with a longer looms and has a greater number of parallel-connected LED lights, the cross-sectional area of the cable to be used shall be adjusted to 1.0mm².



EW-1.8.1 Cable Connectors

Snap connectors shall be used for field connections in joining “play & play” cables with polarity protected plugs.

Approved plugs/sockets include:

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

EW-1.9 Other Accessories

The supplier shall include all necessary accessories needed for a safe and reliable operation of the SHS. These include, but not limited, to those needed in supporting and fixing the SHS components (module, battery box, appliances, switches etc.) to be used during installation.

Each Solar Home System Unit shall be included with at least three (3) UV resistant cable ties and at least ten (10) polyethylene cable clips appropriate for the solar cables size. Include at least fifteen (15) cable clips to support cables for lighting system installation.

EW-2.0 MEASUREMENT OF PAYMENT

Measurement of payment for all electrical works shall be based on the bid price of each item as shown in the Schedule of Requirements – Electrical Works, Section VII of the Bid Document. The cost of each item shall cover all works required and described in the pertinent provisions of the specifications.

SECTION VI

PART II - TECHNICAL DATA SHEETS

DOCUMENTS TO BE SUBMITTED DURING THE BID
DRAWINGS AND DOCUMENTS TO BE SUBMITTED DURING POST
QUALIFICATION



SECTION VI

**PART II - TECHNICAL
DATA SHEETS**

**DOCUMENTS TO BE SUBMITTED
DURING THE BID**



PART II – TECHNICAL DATA SHEETS

EW- ELECTRICAL WORKS

Documents to be Submitted with the Bid

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PART II - TECHNICAL DATA SHEETS

EW – Electrical Works

Technical Requirements

1. The Bidder is required to provide all the information required under the column "Supplier's Data". Although not given by NPC, the Supplier's Data shall be based on the International Standard.
2. NPC's requirements are indicated below. The Supplier shall indicate their data corresponding to the said NPC requirements to facilitate evaluation of Supplier's compliance to the specifications.
3. All data and information specified in the requirements shall be in English language.

ANNEX A - DRAWINGS AND DOCUMENTS TO BE SUBMITTED WITH THE BID

The following *Drawings* and *Documents* shall be submitted by the Supplier in **sequential order** as listed hereunder and shall be attached in the bid documents as **Annexes**. All data and information shall be in English language.

Letter of Authorization and Guarantee Statement for the following:

- A.1 Solar PV (SPV) Module
- A.2 Battery
- A.3 Solar Home System Unit Enclosure Box
- A.4 Vending Machine

The Letter of Authorization and Guarantee Statement shall be from:

1. Original Equipment Manufacturer (OEM) or
2. Licensee of the OEM accompanied by a Certification from OEM as a Licensee or the Licensee Agreement or
3. Authorized Distributor (accompanied by a Certificate of Authorized Distributorship from the OEM/ Licensee of the OEM. If from the Licensee, a Certification from the OEM as a Licensee or the Licensee Agreement must also be submitted).

Note: Documents or brochures submitted must be in English language as stated in Section II-ITB Clause 11.0.

ANNEX B - DRAWINGS AND DOCUMENTS TO BE SUBMITTED WITH THE BID

The following *Drawings* and *Documents* shall be submitted by the Supplier in **sequential order** as listed hereunder as **Annexes** during the bid process. All data and information shall be in English language and shall be drawn using the metric system as unit of measurement.

Annex B	Schematic Diagram of the Proposed Solar Home System showing all equipment/components to be furnished.
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Note: Failure to submit drawings and documents listed hereunder Annex B shall be ground for disqualification.



ANNEX C.1 – SOLAR HOME SYSTEM

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
C-1.1	Calculated Demand Load of Solar Home System (W)	22	

ANNEX C.2 – SOLAR PV MODULES

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
C-2.1	Manufacturer	By Supplier	
C-2.2	Model	By Supplier	
C-2.3	Place of Manufacture	By Supplier	
C-2.4	Cell Type	Crystalline Silicon	
C-2.5	Rated Power (Wp) at STC	At least 50	
C-2.6	Module Efficiency	At least 14%	

ANNEX C.3 – BATTERY

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
C-3.1	Manufacturer	By Supplier	
C-3.2	Model	By Supplier	
C-3.3	Chemistry	Refer to EW-1.4.1(d)	
C-3.4	Nominal Capacity (Ah)	At least 24	

ANNEX C.4 – CHARGE CONTROLLER

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
C-4.1	Manufacturer	By Supplier	
C-4.2	Model	By Supplier	
C-4.3	Place of Manufacture	By Supplier	
C-4.4	Charging/Discharging Method	PWM/MPPT	



ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
C-4.5	Nominal Output Voltage (V)	12	

ANNEX C.5 – VENDING MACHINE

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
C-5.1	Manufacturer	By Supplier	
C-5.2	Place of Manufacture	By Supplier	
C-5.3	Type of Selling Point Hardware	Refer to EW-1.5.1 Item 2	
C-5.4	Crediting Scheme	RFID	
C-5.5	Central Database	Required	
C-5.6	Technical & Functional Requirements as stated in EW-1.5	Required	



SECTION VI

**PART II - TECHNICAL
DATA SHEETS**

**DRAWINGS AND DOCUMENTS
TO BE SUBMITTED DURING
POST QUALIFICATION**

PART II – TECHNICAL DATA SHEETS**EW- ELECTRICAL WORKS****Documents to be Submitted during Post-Qualification****TABLE OF CONTENTS**

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Annex E.9	DC Cables	5
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Annex E.11	Standard / Special Tools for Solar PV System (Minimum Requirements as Specified in The Technical Specifications and Manufacturer's Standard and Recommended Tools)	7
Annex E.12	List of Other Documents To Be Submitted in Addition To The Technical Data Sheets	8

PART II - TECHNICAL DATA SHEETS

EW – Electrical Works

Technical Requirements

1. The Bidder shall complete and submit this document during the post-qualification which shall serve as reference for the review and approval of brochure/drawings. The Bidder shall use additional sheets as necessary for any other additional information following the format shown herein or by reproducing the same.
2. The Bidder is required to provide all the information required under the Column "Supplier's Data". Although not given by NPC, the Supplier's Data shall be based on the International Standard.
3. NPC's requirements are indicated below. The Supplier shall indicate their data corresponding to the said NPC requirements to facilitate evaluation of Supplier's compliance to the specifications. The data required are technical features and characteristics of the Equipment to be provided by the bidder which shall at least be equal or superior to NPC's requirements.
4. The bidder shall provide copies of the manufacture's and equipment certifications as listed in this document
5. Non submission of the required documents shall be a ground for disqualification.

ANNEX E.1 – SOLAR PV MODULES

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-1.1	Solar PV Module Service Life	By Supplier	
E-1.2	Rated Voltage (V) at STC	By Supplier	
E-1.3	Rated Current (A) at STC	By Supplier	
E-1.4	Open Circuit Voltage (Voc) at STC	By Supplier	
E-1.5	Short Circuit Current (Isc) at STC	By Supplier	
E-1.6	Dimension (L x W)	By Supplier	
E-1.7	Weight (kg)	By Supplier	
E-1.8	Junction Box IP Rating	IP65	

ANNEX E.2 – BATTERY

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-2.1	Nominal Terminal Voltage (Voc)	12	
E-2.2	Nominal C-rate @ 25°C	1	
E-2.3	Cycle Lifetime	At least 1000	
E-2.4	Dimension, Length x Width x Height (m)	By Supplier	
E-2.5	Gross Weight (kg)	By Supplier	

ANNEX E.3 – CHARGE CONTROLLER

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-3.1	Technical and Functional Requirements as stated in EW-1.3	Required	
E-3.2	Nominal Charge / Discharge Current (A)	By Supplier	

Name of Firm	Name & Signature of Representative	Designation
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ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-3.3	Maximum Charging Current (A)	By Supplier	
E-3.4	Maximum Discharge Current (A)	By Supplier	
E-3.5	Short Circuit Protection	Required	
E-3.6	Overload Current Protection	Required	
E-3.7	Reverse Polarity Protection	Required	
E-3.8	Surge Voltage Protection	Required	

ANNEX E.4 – LAMPS AND LED LIGHTS

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-4.1	Manufacturer	By Supplier	
E-4.2	Model	By Supplier	
E-4.3	Wattage (W)	1 & 3	
E-4.4	Nominal Voltage (V _{oc})	12	
E-4.5	Luminous Flux (Lm/W)	At least 90	
E-4.6	Color Temperature Range (K)	5,000 – 6,000	
E-4.7	Life Hours (Hr)	20,000	
E-4.8	Socket Type	E27	

Name of Firm _____ Name & Signature of Representative _____ Designation _____



ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
	c) Nokia Type 2.0	Required	
	d) Nokia Type 3.4	Required	
	e) Type C	Required	

ANNEX E.7 – AM/FM RADIO

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-7.1	Manufacturer	By Supplier	
E-7.2	Model	By Supplier	
E-7.3	Type of Port Connection Accepted	USB	
E-7.4	Minimum Autonomous Run Time @ 50% Volume (Hr)	5	
E-7.5	Minimum Speaker Size	3 W, 4Ohms	
E-7.6	Required Bands	AM & FM	
E-7.7	Minimum Energy Capacity of Battery (Wh)	5	

ANNEX E.8 – TORCH LAMP

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-8.1	Manufacturer	By Supplier	
E-8.2	Model	By Supplier	
E-8.3	Type of Port Connection Accepted	USB	
E-8.4	Minimum Autonomous Run Time @ Full Brightness (Hr)	5	
E-8.5	Luminous Flux (Lm)	At least 50	

Name of Firm

Name & Signature of Representative

Designation



ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-8.6	Color Temperature Range (K)	3.1 – 10,000	
E-8.7	Maximum Energy Capacity of Battery (Wh)	5	

ANNEX E.9 – DC CABLES

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
Solar Cable			
E-9.1	Manufacturer	By Supplier	
E-9.2	Brand	By Supplier	
E-9.3	Minimum Conductor Size (mm ²)	2.5	
E-9.4	Ampacity (A)	By Supplier	
E-9.5	Rated Operating Temperature (°C)	By Supplier	
E-9.6	Conductor Material	Copper Stranded Wire	
E-9.7	Type of Insulation	Refer to EW-1.8	
E-9.8	Polarity Indication	Required	
Duplex Cable			
E-9.9	Manufacturer	By Supplier	
E-9.10	Brand	By Supplier	
E-9.11	Cable Type	Duplex	
E-9.12	Ampacity (A)	By Supplier	
E-9.13	Rated Operating Temperature (°C)	By Supplier	
E-9.14	Conductor Material	Stranded Copper	

Name of Firm _____ Name & Signature of Representative _____ Designation _____



ANNEX E.11 – STANDARD / SPECIAL TOOLS FOR SOLAR HOME SYSTEM² (Minimum Requirements as Specified in the Technical Specifications and Manufacturer's Standard and Recommended Tools)

ITEM	DESCRIPTION	QTY.	UNIT PRICE	TOTAL PRICE
For Installation				
E-11.1	Digital Multimeter 0-10Adc / 1-200Vdc with Fuse Protection	25		
E-11.2	Claw Hammer, 13" Overall length, Heavy duty	25		
E-11.3	Phillips Screw Driver (positive) – (#1)	25		
E-11.4	Slotted Screw Driver (negative) – (3/16")	25		
E-11.5	Hand Gloves	50 pairs		
E-11.6	Leather Tool Holster	25		
E-11.7	8" Adjustable Wrench	50		
E-11.8	Rechargeable LED Headlamp	50		
E-11.9	Magnetic Compass	25		
E-11.10	MC4 Connectors Disconnect Tool Spanner with Wrench	25		
E-11.11	MC4 Ratchet Crimping Tool, 2.5 – 6.0mm ²	25		
E-11.12	9" Torpedo Level Tool with Magnetic Strip	25		
E-11.13	Manual Crank Drill with at least two (2) – 10mm Wood Drill Bit	25		
E-11.14	3-Step Multipurpose Foldable Ladder, 150kg Safe Load	25		
E-11.15	Robust Toolbox, minimum of 10" W x19" H	25		
For Maintenance				
E-11.16	Jeweler's Screw Drivers (#0, #1, #2, #3)	3 sets		
E-11.17	Side Diagonal Cutting Pliers, 6" long, Heavy duty	3		

² Refer to GW-8.0 Tools and Appliances

Name of Firm _____ Name & Signature of Representative _____ Designation _____



SECTION VI – TECHNICAL SPECIFICATION

LuzP22Z1400Ss

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
	ISO 14001 Certificate of the Manufacturer		

Equipment Certification Requirements

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
SOLAR PV (SPV) MODULE			
E-12.4	IEC 61215 - Crystalline Silicon Terrestrial Photovoltaic (PV) Modules- Design Qualification and Type Approval	Required	
E-12.5	EN 50380 - European health, safety, and environmental protection standards	Required	
E-12.6	IEC 61701 - Salt mist corrosion testing of photovoltaic (PV) modules	Required	
CHARGE CONTROLLER			
E-12.7	IEC 62509 - Performance and functioning of photovoltaic battery charge controllers OR IEC 62093 - BOS Components – Environmental reliability testing – Design qualification and type approval	Required	
BATTERIES			
E-12.8	IEC 62133 - Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells and for batteries made from them, for use in portable applications OR UL 1642 - Standard for Lithium-ion batteries		

Name of Firm

Name & Signature of Representative

Designation



SECTION VI – TECHNICAL SPECIFICATION

LuzP22Z1400Ss

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-12.9	<p>IEC 61960-3 - Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for portable applications - Part 3: Prismatic and cylindrical lithium secondary cells and batteries made from them</p> <p>OR</p> <p>IEC 61427-1 - Secondary cells and batteries for renewable energy storage - General requirements and methods of test - Part 1: Photovoltaic off-grid application</p>	Required	

LAMPS AND LED LIGHTS			
E-12.10	IES-LM-79-08 - Approved method for electrical and photometric measurements for solid state lighting products	Required	
E-12.11	IES-LM-80-08 - Approved method for measuring lumen maintenance of LED light sources	Required	
E-12.12	IES-LM-21-11 - Projecting long term lumen maintenance of LED light sources	Required	

NOTE: Refer to EW-1.6.1 for other approved equivalent standards.

Other Requirement

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
E-12.13	Proof of conformance/certification to Lighting Global Quality Standard for Solar Home System Kit.	Required	

Name of Firm

Name & Signature of Representative

Designation



SECTION VII

SCHEDULE OF REQUIREMENTS



SECTION VII-SCHEDULE OF REQUIREMENTS

SECTION VII - SCHEDULE OF REQUIREMENTS
BPS.1 - Breakdown of Prices
PROVINCES OF CAGAYAN AND ISABELA

Item No.	Description of Work or Materials	QTY. - UNIT	UNIT PRICE FOR GOODS AND RELATED SERVICES TO BE SUPPLIED FROM ABROAD				UNIT PRICE FOR GOODS AND RELATED SERVICES TO BE SUPPLIED FROM WITHIN THE PHILIPPINES			TOTAL PRICE			
			Unit Price of Goods or Services Foreign Currency ()**	Import Duties & other Levies Imposed by Phil. Govt. (Phil. Peso)	Value Added Tax and other Taxes Imposed by Phil. Govt. (Phil. Peso)	Local Transport from Port to Delivery Site *** (Phil. Peso)	Unit Price of Goods or Services (Phil. Peso)	Value Added Tax and other Taxes Imposed by Phil. Govt. (Phil. Peso)	Local Transport to Delivery Site *** (Phil. Peso)	Forex Currency (E x C)	Local Currency Portion (Phil. Peso) ((F+G+H) x C) or ((I+J+K) x C)		
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	
A	SOLAR HOME SYSTEM												
1.0	CIVIL WORKS												
1.1	PV Mounting Pipe: Hot-dipped galvanized 40MM & 50MM steel pipe, angle bars, anchor bolts, u-belts and other accessories including excavation												
2.0	ELECTRICAL WORKS												
2.1	Solar Panel, Crystalline Silicon Modules including Terminal Cables, Junction Box with Embedded Bypass and other appurtenances as described in the Technical Specifications, Technical Data Sheet and as shown on the Bid Drawings.	651 Sets											
2.2	Solar Home System Unit Enclosure box with corresponding female USB ports, DC-DC converter for 16-bit LED/LCD Screen, Key pad, RFID Card, Lighting Outlet of 5.5mmØ Co-axial Power Connector, 2.1mm Pin Rated, Female, Battery Cells, Terminal Lugs/Clips, Linking Conductors, Charge Controller, Pre-payment Controller with Battery Protection System complete with the required accessories as described in the Technical Specifications and Technical Data Sheet.												
2.3	Lighting system of the Solar Home complete with the required Lamps, Lighting Fixtures/Outlets, Switches, Cables as described in the Technical Specifications and as shown on the Bid Drawings.												
2.4	Bundled Appliances including 5-in-1 Phone Charger Cord, AM/FM Radio, Torch Lamp and other accessories as described in the Technical Specifications and Technical Data Sheet.												
2.5	Power, Control & Instrumentation Cables complete with the required accessories for cabling works to interface the supplied equipment to the 12Vdc System as described in the Technical Specifications, Technical Data Sheet and as shown on the Bid Drawings.												
a.	Pre-cutted 2.5 mm ² Multi Stranded Copper Conductor, 1000Vdc, UV Resistant DC Cable												
b.	Pre-cutted 0.5 mm ² Multi Stranded Copper Conductor, 12Vdc, UV Resistant Duplex DC Cable												
2.6	Conduits, cable connector and switches complete with the required accessories for cabling works as described in the Technical Specifications and Technical Data Sheets as shown on the Bid Drawings.												
a.	MC4 Connector, Male & Female												
b.	5.5 mm Ø Co-axial Power Connector, 2.1 mm Pin Rated, Male												
c.	DC Switch												
d.	Bolts and Nuts, Screws, Plastic Box, Washer, Cable Clips, Cable Ties Connecting/ Data Cables and other needed materials or equipment for the completion of the SHS installation												
3.0	VENDING MACHINE AND VENDING MANAGEMENT SYSTEM												
3.1	Vending Machine such as a cellphoneable or any POS device with attached/installed RFID Card Reader, Keypad, Display Screen, Control Program and Vending Management System complete with the required accessories such as receipt/code printer and thermal paper, protection logics and other appurtenances as described in the Technical Specifications and Technical Data Sheet.	13 Sets											
3.2	Data base Management and Storage System with host service for cloud storage	1 Lot											
SUB-TOTAL A				(Amount in Words)									

Notes: Final delivery site of all equipment/materials shall be at the plant site stated above.

* Bidders shall enter a code representing the Country of Origin of all imported equipment, materials and accessories.

** Cost of equipment, freight, insurance, etc. up to Phil. port of entry. Refer to ITB-16.1.(b).

*** Unit Price for Local Transportation, insurance and other local costs incidental to delivery of the goods from the Phil port of entry or Local Manufacturing Plant to final delivery site.

Code	Country of Origin
US	United States

Name of Bidder

Name and Signature of Authorized Representative

Designation



SECTION VII-SCHEDULE OF REQUIREMENTS

SECTION VII - SCHEDULE OF REQUIREMENTS
BPS.1 - Breakdown of Prices
PROVINCES OF CAGAYAN AND ISABELA

Item No.	Description of Work or Materials	QTY.- UNIT	C O D E	UNIT PRICE FOR GOODS AND RELATED SERVICES TO BE SUPPLIED FROM ABROAD				UNIT PRICE FOR GOODS AND RELATED SERVICES TO BE SUPPLIED FROM WITHIN THE PHILIPPINES			TOTAL PRICE		
				Unit Price of Goods or Services Foreign Currency (F)**	Import Duties & other Levies Imposed by Phil. Govt. (Phil. Peso) (F)	Value Added Tax and other Taxes Imposed by Phil. Govt. (Phil. Peso) (G)	Local Transport from Port to Delivery Site *** (Phil. Peso) (H)	Unit Price of Goods or Services - (Phil. Peso) (I)	Value Added Tax and other Taxes Imposed by Phil. Govt. (Phil. Peso) (J)	Local Transport to Delivery Site *** (Phil. Peso) (K)	Forex Currency (E x C) (L)	Local Currency Portion (Phil. Peso) ((F+G+H) x C) or ((I+J+K) x C) (M)	
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	
B	SPARES												
1.0	SHS units/kits complete with auxiliaries and accessories as described in Item Letter A	2 sets											
2.0	PV Modules	14 pcs											
3.0	Battery	14 pcs											
4.0	SHS Unit Enclosure Box complete with ancillary equipment and components as described in Technical Specifications	14 sets											
5.0	Charge Controller	14 pcs											
6.0	Vending Machine (Hand Terminal) complete with all the attachments	2 sets											
7.0	3W, 12Vdc LED Lamp with receptacle as described in Technical Specifications and Technical Data Sheets	118 sets											
8.0	1W, 12Vdc LED Lamp with receptacle as described in Technical Specifications and Technical Data Sheets	20 sets											
9.0	Torch including its Charging Cable	14 sets											
10.0	PV Module Mounting Hardware	7 sets											
11.0	RFID Card	33 pcs											
12.0	Other spare parts recommended by Manufacturer	1 Lot											
SUB-TOTAL B				(Amount in Words)									
C	TOOLS												
INSTALLATION													
1.1	Digital Multimeter 0-10Aac / 1-200Vdc with Fuse Protection	25 pcs											
1.2	Claw Hammer, 13" Overall length, Heavy duty	25 pcs											
1.3	Phillips Screw Driver (positive) - (#1)	25 pcs											
1.4	Slotted Screw Driver (negative) - (3/16")	25 pcs											
1.5	Hand Gloves	50 pairs											
1.6	Leather Tool Holster	25 pcs											
1.7	8" Adjustable Wrench	50 pcs											
1.8	Rechargeable LED Headlamp	50 pcs											
1.9	Magnetic Compass	25 pcs											
1.10	MC4 Connectors Disconnect Tool Spanner with Wrench	25 pcs											
1.11	MC4 Ratchet Crimping Tool, 2.5 - 6.0mm ²	25 pcs											
1.12	9" Torpedo Level Tool with Magnetic Strip	25 pcs											
1.13	Manual Crank Drill with at least two (2) - 10mm Wood Drill Bit	25 pcs											
1.14	3-Step Multipurpose Foldable Ladder, 150kg Safe Load	25 pcs											
1.15	Robust Toolbox, minimum of 10" W x 19" H	25 pcs											
MAINTENANCE													
2.1	Jeweler's Screw Drivers (#0, #1, #2, #3)	8 set											
2.2	Side Diagonal Cutting Pliers, 6" long, Heavy duty	8 pcs											
2.3	Wire Stripper Pliers, 0.2-6mm stripping capability, Heavy duty	8 pcs											
2.4	Long Nose Pliers, 6" long, Heavy duty	8 pcs											

Notes: Final delivery site of all equipment/materials shall be at the plant site stated above.
 * Bidders shall enter a code representing the Country of Origin of all imported equipment, materials and accessories.
 ** Cost of equipment, freight, insurance, etc. up to Phil. port of entry. Refer to ITB-15.1(b).
 *** Unit Price for Local Transportation, Insurance and other local costs incidental to delivery of the goods from the Phil port of entry or Local Manufacturing Plant to final delivery site.

Code	Country of Origin
US	United States

Name of Bidder

Name and Signature of Authorized Representative

Designation



SECTION VII-SCHEDULE OF REQUIREMENTS

SECTION VII - SCHEDULE OF REQUIREMENTS
BPS.1 - Breakdown of Prices
PROVINCES OF CAGAYAN AND ISABELA

Item No.	Description of Work or Materials	QTY.- UNIT		UNIT PRICE FOR GOODS AND RELATED SERVICES TO BE SUPPLIED FROM ABROAD				UNIT PRICE FOR GOODS AND RELATED SERVICES TO BE SUPPLIED FROM WITHIN THE PHILIPPINES			TOTAL PRICE	
				UNIT PRICE OF GOODS OR SERVICES FOREIGN CURRENCY ()**	IMPORT DUTIES & OTHER LEVIES IMPOSED BY PHIL. GOVT. (Phil. Peso)	VALUE ADDED TAX AND OTHER TAXES IMPOSED BY PHIL. GOVT. (Phil. Peso)	LOCAL TRANSPORT FROM PORT TO DELIVERY SITE *** (Phil. Peso)	UNIT PRICE OF GOODS OR SERVICES (Phil. Peso)	VALUE ADDED TAX AND OTHER TAXES IMPOSED BY PHIL. GOVT. (Phil. Peso)	LOCAL TRANSPORT TO DELIVERY SITE *** (Phil. Peso)	FOREX CURRENCY (E x C)	LOCAL CURRENCY PORTION (Phil. Peso) ((F+G+H) x C) or ((I+J+K) x C)
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
2.5	Lineman Pliers, 7' long, Heavy duty	8	pcs									
2.6	Tamperproof Lock	651	pcs									
2.7	Adapted tool for tamperproof lock	8	pcs									
2.8	Robust Toolbox, minimum of 10" W x 19" H	8	pcs									
2.9	Backup copies of control programs/software and/or firmware and other configuration software for the vending machines	1	Lot									
2.10	Other Standard/Special Tools recommended by Manufacturer for Installation and Maintenance	1	Lot									
SUB-TOTAL C		(Amount in Words)										
GRAND TOTAL		(Amount in Words)										

- Notes: Final delivery site of all equipment/materials shall be at the plant site stated above.
 * Bidders shall enter a code representing the Country of Origin of all imported equipment, materials and accessories.
 ** Cost of equipment, freight, insurance, etc. up to Phil. port of entry. Refer to ITB-16.1.(b).
 *** Unit Price for Local Transportation, insurance and other local costs incidental to delivery of the goods from the Phil port of entry or Local Manufacturing Plant to final delivery site.

Code	Country of Origin
US	United States

 Name of Bidder

 Name and Signature of Authorized Representative

 Designation



SECTION VIII

BIDDING FORMS



SECTION VIII – BIDDING FORMS

TABLE OF CONTENTS

NPCSF-GOODS-01	- Checklist of Technical and Financial Envelope Requirements for Bidders
NPCSF-GOODS-02	- List of all Ongoing Government & Private Contracts Including Contracts Awarded but not yet Started
NPCSF-GOODS-03	- Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid
NPCSF-GOODS-04	- Computation of Net Financial Contracting Capacity (NFCC)
NPCSF-GOODS-05	- Joint Venture Agreement
NPCSF-GOODS-06a	- Form of Bid Security : Bank Guarantee
NPCSF-GOODS-06b	- Form of Bid Security : Surety Bond
NPCSF-GOODS-06c	- Bid Securing Declaration Form
NPCSF-GOODS-07	- Omnibus Sworn Statement (Revised)
NPCSF-GOODS-08	- Bid Letter
Sample Form	- Bank Guarantee Form for Advance Payment
Sample Form	- Certification from DTI as Domestic Bidder

Standard Form No: NPCSF-GOODS-01

Checklist of Technical & Financial Envelope Requirements for Bidders**A. THE 1ST ENVELOPE (TECHNICAL COMPONENT) SHALL CONTAIN THE FOLLOWING:****1. ELIGIBILITY DOCUMENTS****a. (CLASS A)**

➤ Any of the following:

- PhilGEPS Certificate of Registration and Membership under Platinum Category in accordance with Section 8.5.2 of the IRR;

OR:

- The following updated and valid Class "A" eligibility documents enumerated under "Annex A" of the Platinum Membership:
 - Registration Certificate from the Securities and Exchange Commission (SEC) for corporations, Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives;
 - Mayor's/Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas.
In cases of recently expired Mayor's/Business permits, it shall be accepted together with the official receipt as proof that the bidder has applied for renewal within the period prescribed by the concerned local government unit, provided that the renewed permit shall be submitted as a post qualification requirement in accordance with Section 34.2 of the Revised IRR of RA 9184.
 - The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission.
 - Tax clearance per Executive Order 398, Series of 2005, as finally reviewed and approved by the BIR or as stated under GPPB NPM-039-2014, for Non-Resident Foreign Corporation (NRFC) and Non-Resident Alien Not Engaged in Trade or Business (NRANETB), a Delinquency Verification Certificate may be submitted as a form of Tax Clearance;

OR:

- A combination thereof
- Statement of all its ongoing government and private contracts if any, whether similar or not similar in nature and complexity to the contract to be bid (*NPCSF-GOODS-02*)
- The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, and whose value, adjusted to current prices using the Philippine Statistics Authority (PSA) consumer price index, must be at least 50% of the ABC (*NPCSF-GOODS-03*) complete with the following supporting documents:
 1. Contract/Purchase Order
 2. Certificate of Acceptance; or Certificate of Completion; or Official Receipt (O.R); or Sales Invoice

(The Single Largest Completed Contract (SLCC) as declared by the bidder shall be verified and validated to ascertain such completed contract. Hence, bidders must ensure access to sites of such projects/equipment to NPC representatives for verification and validation purposes during post-qualification process.

It shall be a ground for disqualification, if verification and validation cannot be conducted for reasons attributable to the Bidder.)

Standard Form No: NPCSF-GOODS-01

- Duly signed computation of its Net Financial Contracting Capacity (NFCC) at least equal to the ABC (NPCSF-GOODS-04) or a Committed Line of Credit (CLC) at least equal to ten percent (10%) of the ABC, issued by a Universal or Commercial Bank; If the Bidder opted to submit a Committed Line of Credit (CLC), the bidder must submit a granted credit line valid/effective at the date of bidding.
- b. **(CLASS B)**
- For Joint Venture (if applicable), any of the following:
 - Valid Joint Venture Agreement (NPCSF-GOODS-05)
OR
 - Notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA, if awarded the contract
- Certification from the relevant government office of their country stating that Filipinos are allowed to participate in their government procurement activities for the same item/product *(For foreign bidders claiming eligibility by reason of their country's extension of reciprocal rights to Filipinos)*

2. Technical Documents

- Bid Security, any one of the following:
 - Bid Securing Declaration (NPCSF-GOODS-06c)
OR
 - Cash or Cashier's/Manager's check issued by a Universal or Commercial Bank – 2% of ABC;
OR
 - Bank draft/guarantee or irrevocable letter of credit issued by a Universal or Commercial Bank: (NPCSF-GOODS-06a) - 2% of ABC;
OR
 - Surety Bond callable upon demand issued by a reputable surety or insurance company (NPCSF-GOODS-06b) - 5% of ABC, with
 - Certification from the Insurance Commission as authorized company to issue surety
- Duly signed, completely filled-out and notarized Omnibus Sworn statement (Revised) (NPCSF-GOODS-07), complete with the following attachments:
 - For Sole Proprietorship:
 - Special Power of Attorney
 - For Partnership/Corporation/Cooperative/Joint Venture:
 - Document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)
- Drawings and documents to be submitted with the Bid as specified in Clause GW-11.2 of Section VI - Technical Specifications (GW-General Works)
- Complete eligibility documents of the proposed subcontractor, if any

Standard Form No: NPCSF-GOODS-01

B. THE 2ND ENVELOPE (FINANCIAL COMPONENT) SHALL CONTAIN THE FOLLOWING:

- Duly signed Bid Letter indicating the total bid amount in accordance with the prescribed form (NPCSF-GOODS-08)
- Duly signed and completely filled-out Schedule of Requirement (Section VII) indicating the unit and total prices per item and the total amount in the prescribed Price Schedule form.
- For Domestic Bidder claiming for domestic preference:
 - Letter address to the BAC claiming for preference
 - Certification from DTI as Domestic Bidder in accordance with the prescribed forms provided

CONDITIONS:

1. *Each Bidder shall submit one copy of the first and second components of its Bid. NPC may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.*
2. *In the case of foreign bidders, the eligibility requirements under Class "A" Documents (except for Tax Clearance) may be substituted by the appropriate equivalent documents, if any, issued by the country of the foreign bidder concerned. The eligibility requirements or statements, the bids, and all other documents to be submitted to the BAC must be in English. If the eligibility requirements or statements, the bids, and all other documents submitted to the BAC are in foreign language other than English, it must be accompanied by a translation of the documents in English. The documents shall be translated by the relevant foreign government agency, the foreign government agency authorized to translate documents, or a registered translator in the foreign bidder's country; and shall be authenticated by the appropriate Philippine foreign service establishment/post or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines.*

These documents shall be accompanied by a Sworn Statement in a form prescribed by the GPPB stating that the documents submitted are complete and authentic copies of the original, and all statements and information provided therein are true and correct. Upon receipt of the said documents, the PhilGEPS shall process the same in accordance with the guidelines on the Government of the Philippines – Official Merchants Registry (GoP-OMR).
3. *A Bidder not submitting bid for reason that his cost estimate is higher than the ABC, is required to submit his letter of non-participation/regret supported by corresponding detailed estimates. Failure to submit the two (2) documents shall be understood as acts that tend to defeat the purpose of public bidding without valid reason as stated under Section 69.1.(j) of the revised IRR of R.A. 9184.*

Standard Form Number: NPCSF-GOODS-03

The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid

Business Name : _____
 Business Address : _____

Name of Contract	a. Owner's Name b. Address c. Telephone Nos.	Nature of Work	Contractor's Role		a.Amount at Award b.Amount at Completion c.Duration	a. Date Awarded b. Contract Effectivity c. Date Completed
			Description	%		

- Notes: 1. The bidder must state only one (1) Single Largest Completed Contract (SLCC) similar to the contract to be bid.
 2. Supporting documents such as Contract/Purchase Order and any of the following: Certificate of Acceptance; or Certificate of Completion; or Official Receipt (O.R); or Sales Invoice for the contract stated above shall be submitted during Bid Opening.

Submitted by : _____
 (Printed Name & Signature)
 Designation : _____
 Date : _____

Standard Form Number: NPCSF-GOODS-04

NET FINANCIAL CONTRACTING CAPACITY (NFCC)

- A. Summary of the Supplier's/Distributor's/Manufacturer's assets and liabilities on the basis of the income tax return and audited financial statement for the immediately preceding calendar year are:

		Year 20__
1.	Total Assets	
2.	Current Assets	
3.	Total Liabilities	
4.	Current Liabilities	
5.	Net Worth (1-3)	
6.	Net Working Capital (2-4)	

- B. The Net Financial Contracting Capacity (NFCC) based on the above data is computed as follows:

NFCC = [(Current assets minus current liabilities) x 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 for this Project.

NFCC = P _____

Herewith attached is certified true copy of the audited financial statement, stamped "RECEIVED" by the BIR or BIR authorized collecting agent for the immediately preceding calendar year.

Submitted by:

Name of Supplier / Distributor / Manufacturer

Signature of Authorized Representative

Date : _____

Standard Form Number: NPCSF-GOODS-05

JOINT VENTURE AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

That this JOINT VENTURE AGREEMENT is entered into by and between: _____, of legal age, *(civil status)* _____, authorized representative of _____ and a resident of _____.

- and -

_____, of legal age, *(civil status)* _____, authorized representative of _____ a resident of _____.

That both parties agree to join together their capital, manpower, equipment, and other resources and efforts to enable the Joint Venture to participate in the Bidding and Undertaking of the hereunder stated Contract of the **National Power Corporation**.

NAME OF PROJECT

CONTRACT AMOUNT

That the capital contribution of each member firm:

NAME OF FIRM	CAPITAL CONTRIBUTION
1.	P
2.	P

That both parties agree to be jointly and severally liable for their participation in the Bidding and Undertaking of the said contract.

That both parties agree that _____ and/or _____ shall be the Official Representative/s of the Joint Venture, and are granted full power and authority to do, execute and perform any and all acts necessary and/or to represent the Joint Venture in the Bidding and Undertaking of the said contract, as fully and effectively and the Joint Venture may do and if personally present with full power of substitution and revocation.

That this Joint Venture Agreement shall remain in effect only for the above stated Contract until terminated by both parties.

Name & Signature of Authorized Representative

Official Designation

Name of Firm

Name & Signature of Authorized Representative

Official Designation

Name of Firm

Witnesses

1. _____ 2. _____

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Standard Form Number: NPCSF-GOODS-06a

FORM OF BID SECURITY (BANK GUARANTEE)

WHEREAS, (Name of Bidder) (hereinafter called "the Bidder") has submitted his bid dated (Date) for the [name of project] (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We (Name of Bank) of (Name of Country) having our registered office at _____ (hereinafter called "the Bank" are bound unto National Power Corporation (hereinafter called "the Entity") in the sum of [amount in words & figures as prescribed in the bidding documents] for which payment well and truly to be made to the said Entity the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20____.

THE CONDITIONS of this obligation are that:

- 1) if the Bidder withdraws his Bid during the period of bid validity specified in the Bidding Documents; or
- 2) if the Bidder does not accept the correction of arithmetical errors of his bid price in accordance with the Instructions to Bidder; or
- 3) if the Bidder, having determined as the LCB, fails or refuses to submit the required tax clearance, latest income and business tax returns and PhilGEPs registration certificate within the prescribed period; or
- 4) if the Bidder having been notified of the acceptance of his bid and award of contract to him by the Entity during the period of bid validity:
 - a) fails or refuses to execute the Contract; or
 - b) fails or refuses to submit the required valid JVA, if applicable; or
 - c) fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders;

we undertake to pay to the Entity up to the above amount upon receipt of his first written demand, without the Entity having to substantiate its demand, provided that in his demand the Entity will note that the amount claimed by it is due to the occurrence of any one or combination of the four (4) conditions stated above.

The Guarantee will remain in force up to 120 days after the opening of bids or as it may be extended by the Entity, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

(Signature, Name and Address)

Standard Form Number: NPCSF-GOODS-06b

FORM OF BID SECURITY (SURETY BOND)

BOND NO.: _____ DATE BOND EXECUTED: _____

By this bond, We (Name of Bidder) (hereinafter called "the Principal") and (Name of Surety) of (Name of Country of Surety), authorized to transact business in the Philippines (hereinafter called "the Surety") are held and firmly bound unto National Power Corporation (hereinafter called "the Employer") as Obligee, in the sum of (amount in words & figures as prescribed in the bidding documents), callable on demand, for the payment of which sum, well and truly to be made, we, the said Principal and Surety bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

SEALED with our seals and dated this ____ day of _____ 20 _____

WHEREAS, the Principal has submitted a written Bid to the Employer dated the ____ day of _____ 20 _____, for the _____ (hereinafter called "the Bid").

NOW, THEREFORE, the conditions of this obligation are:

- 1) if the Bidder withdraws his Bid during the period of bid validity specified in the Bidding Documents; or
- 2) if the Bidder does not accept the correction of arithmetical errors of his bid price in accordance with the Instructions to Bidder; or
- 3) if the Bidder, having determined as the LCB, fails or refuses to submit the required tax clearance, latest income and business tax returns and PhilGEPs registration certificate within the prescribed period; or
- 4) if the Bidder having been notified of the acceptance of his bid and award of contract to him by the Entity during the period of bid validity:
 - d) fails or refuses to execute the Contract; or
 - e) fails or refuses to submit the required valid JVA, if applicable; or
 - f) fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders;

then this obligation shall remain in full force and effect, otherwise it shall be null and void.

PROVIDED HOWEVER, that the Surety shall not be:

- a) liable for a greater sum than the specified penalty of this bond, nor
- b) liable for a greater sum than the difference between the amount of the said Principal's Bid and the amount of the Bid that is accepted by the Employer.

Standard Form Number: NPCSF-GOODS-06b
Page 2 of 2

This Surety executing this instrument hereby agrees that its obligation shall be valid for 120 calendar days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived.

PRINCIPAL _____ SURETY _____

SIGNATURE(S) _____ SIGNATURES(S) _____

NAME(S) AND TITLE(S) _____ NAME(S) _____

SEAL _____ SEAL _____

Standard Form No: NPCSF-GOODS-06c

REPUBLIC OF THE PHILIPPINES)
 CITY OF _____) S.S.

BID-SECURING DECLARATION
SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR THE PROVINCES OF CAGAYAN AND ISABELA UNDER PV MAINSTREAMING, (LuzP22Z1400Ss)

To: **National Power Corporation**
 BIR Road cor. Quezon Ave.
 Diliman, Quezon City

I/We¹, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid-Securing Declaration.
2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the Procuring Entity for the commission of acts resulting to the enforcement of the Bid Securing Declaration under Sections 23.1 (b), 34.2, 40.1 and 69.1, except 69.1 (f) of the IRR of R.A. 9184; without prejudice to other legal action the government may undertake.
3. I/We understand that this Bid-Securing Declaration shall cease to be valid on the following circumstances:
 - (a) Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
 - (b) I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right;
 - (c) I am/we are declared as the bidder with the Lowest Calculated and Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/we have hereunto set my hand this ____ day of ____ 20____ at _____, Philippines.

*[Name and Signature of Bidder's Representative/
 Authorized Signatory]
 [Signatory's legal capacity] Affiant*

[Jurat]
[Format shall be based on the latest Rules on Notarial Practice]

¹ Select one and delete the other. Adopt same instruction for similar terms throughout the document.

Standard Form No: NPCSF-GOODS-07

Omnibus Sworn Statement (Revised)

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.

AFFIDAVIT

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. *[Select one, delete the other:]*

[If a sole proprietorship:] I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

[If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. *[Select one, delete the other:]*

[If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached duly notarized Special Power of Attorney;

[If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. *[Select one, delete the rest:]*

[If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a partnership or cooperative:] None of the officers and members of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. *[Name of Bidder]* complies with existing labor laws and standards; and
8. *[Name of Bidder]* is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:
 - a. Carefully examining all of the Bidding Documents;
 - b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
 - c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
 - d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the *[Name of the Project]*.
9. *[Name of Bidder]* did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.
10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of ___, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]

[Insert signatory's legal capacity]
Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Standard Form No: NPCSF-GOODS-08

BID LETTER

Date: _____

To: **THE PRESIDENT**
National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

Gentlemen:

Having examined the Bidding Documents including Bid Bulletin Numbers *[insert numbers]*_____, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to perform **SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR THE PROVINCES OF CAGAYAN AND ISABELA UNDER PV MAINSTREAMING (LuzP22Z1400Ss)** in conformity with the said Bidding Documents for the sum of *[total Bid amount in words and figures]*_____ or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Bid.

We undertake, if our Bid is accepted, to supply and deliver the goods and perform other services, if required within the contract duration and in accordance with the scope of the contract specified in the Schedule of Requirements and Technical Specifications.

If our Bid is accepted, we undertake to provide a performance security in the form, amounts, and within the times specified in the Bidding Documents.

We agree to abide by this Bid for the Bid Validity Period specified in Bid Documents and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your Notice of Award, shall be binding upon us.

We understand that you are not bound to accept the Lowest Calculated Bid or any Bid you may receive.

We certify/confirm that we comply with the eligibility requirements pursuant to the Bidding Documents.

We likewise certify/confirm that the undersigned, *[for sole proprietorships, insert: as the owner and sole proprietor or authorized representative of [Name of Bidder]*_____ has the full power and authority to participate, submit the bid, and to sign and execute the ensuing contract, on the latter's behalf for the *[Name of Project]*_____ of the National Power Corporation *[for partnerships, corporations, cooperatives, or joint ventures, insert: is granted full power and authority by the [Name of Bidder]*_____ to participate, submit the bid, and to sign and execute the ensuing contract on the latter's behalf for *[Name of Project]*_____ of the National Power Corporation.

We acknowledge that failure to sign each and every page of this Bid Letter, including the attached Schedule of Requirements (Bid Price Schedule), shall be a ground for the rejection of our bid.

*[name and signature of authorized signatory]*_____
[in the capacity of]

Duly authorized to sign Bid for and on behalf of _____
[name of bidder]

Bank Guarantee Form for Advance Payment

To: **THE PRESIDENT**
National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

[name of Contract]

Gentlemen and/or Ladies:

In accordance with the Advance Payment Provision, of the General Conditions of Contract, *[name and address of Supplier]* (hereinafter called the "Supplier") shall deposit with the PROCURING ENTITY a bank guarantee to guarantee its proper and faithful performance under the said Clause of the Contract in an amount of *[amount of guarantee in figures and words]*.

We, the *[name of the universal/commercial bank]*, as instructed by the Supplier, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the PROCURING ENTITY on its first demand without whatsoever right of objection on our part and without its first claim to the Supplier, in the amount not exceeding *[amount of guarantee in figures and words]*.

We further agree that no change or addition to or other modification of the terms of the Contract to be performed thereunder or of any of the Contract documents which may be made between the PROCURING ENTITY and the Supplier, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition, or modification.

This guarantee shall remain valid and in full effect from the date the advance payment is received by the Supplier under the Contract and until the Goods are accepted by the PROCURING ENTITY.

Yours truly,

Signature and seal of the Guarantors

[name of bank or financial institution]

[address]

[date]

CERTIFICATION AS A DOMESTIC BIDDER

This is to certify that based on the records of this office, (Name of Bidder) is duly registered with the DTI on _____.

This further certifies that the articles forming part of the product of (Name of Bidder) which are/is (Specify) are substantially composed of articles, materials, or supplies grown, produced or manufactured in the Philippines. (Please encircle the applicable description/s).

This certification is issued upon the request of (Name of Person/Entity) in connection with his intention to participate in the bidding for the (Name of Project) of the National Power Corporation (NPC).

Given this ___ day of _____ 20__ at _____, Philippines

Name

Position

Department of Trade & Industry

SECTION IX

BID DRAWINGS

CW - CIVIL WORKS

EW - ELECTRICAL WORKS



SECTION IX

BID DRAWINGS

CIVIL WORKS

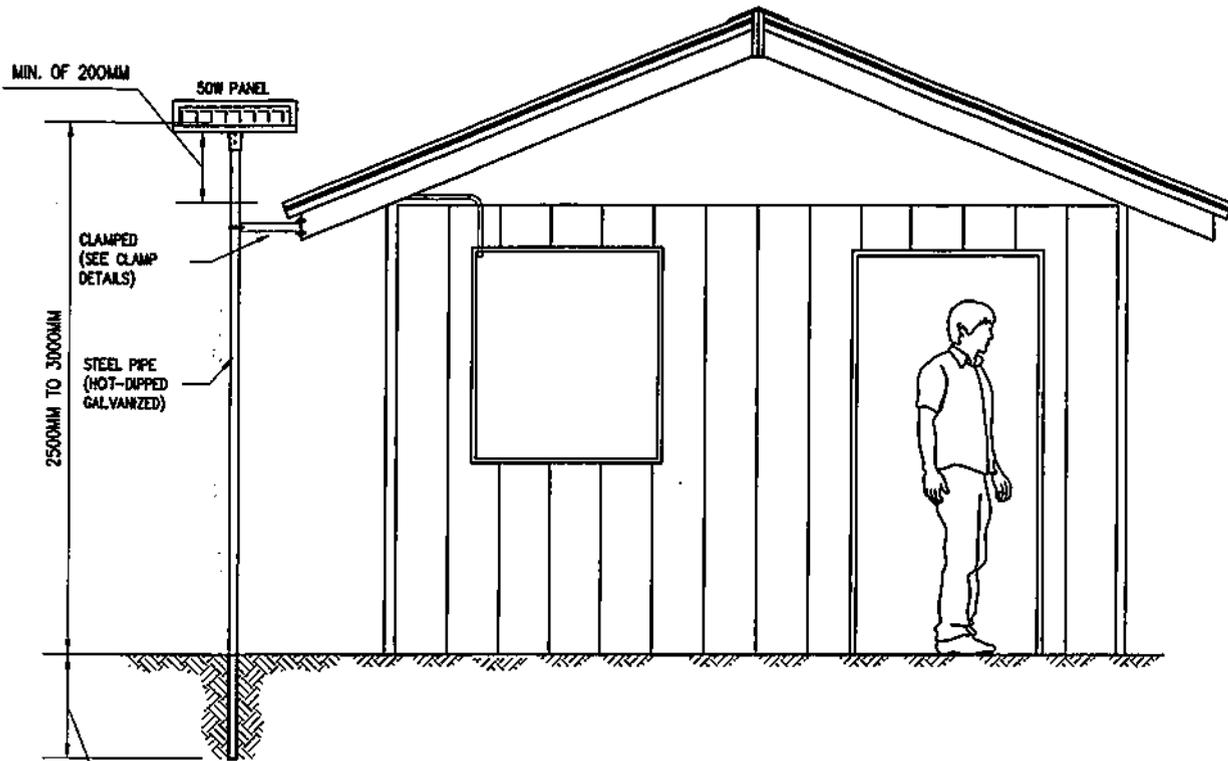


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BID DRAWINGS**

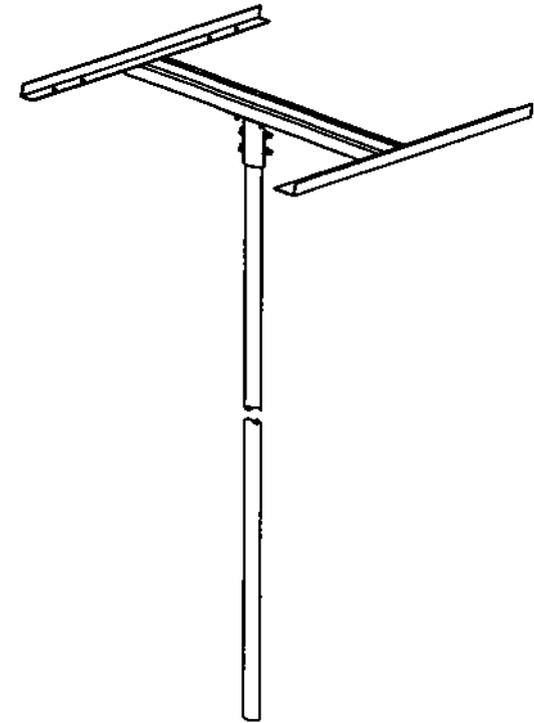
CW – CIVIL WORKS

<u>DRAWING NO.</u>	<u>TITLE</u>
PVM-BDC-05.001	PV MOUNTING PIPE & CLAMP DETAILS
PVM-BDC-05.002	TYPICAL ROOF SIDE POLE MOUNTED PV MODULE & ISOMETRIC VIEW OF PV MOUNTING PIPE





(MIN. DEPTH 500MM) **TYPICAL ROOF SIDE POLE MOUNTED PV MODULE**
 PVM-BDC-05.002 SCALE NTS



ISOMETRIC VIEW OF PV MOUNTING PIPE
 PVM-BDC-05.002 SCALE NTS

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR CAGAYAN AND ISABELA PROVINCES UNDER PV MAINSTREAMING			
LOCATION: CAGAYAN AND ISABELA PROVINCES			
TITLE: TYPICAL ROOF SIDE POLE MOUNTED PV MODULE & ISOMETRIC VIEW OF PV MOUNTING PIPE			
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	PRINCIPAL ENGR. / ARCHT.		RECOMMENDED
CIVIL ARCHT.			RECOMMENDED
ELEC.			APPROVED
MECH.			APPROVED
DWG. NO. PVM-BDC-05.002		SPECS. NO. LuzP22Z1400S.S	
SCALE: AS SHOWN		BID DRAWING	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

SECTION IX

BID DRAWINGS

ELECTRICAL WORKS



**TABLE OF CONTENTS
BID DRAWINGS**

EW – ELECTRICAL WORKS

<u>DRAWING NO.</u>	<u>TITLE</u>
PVM-BDE-05.001	SINGLE LINE DIAGRAM
PVM-BDE-05.002	SYSTEM ARCHITECTURE DESIGN
PVM-BDE-05.003	DETAILS OF DC CONNECTORS
PVM-BDE-05.004	DETAILS OF CABLE INSTALLATION

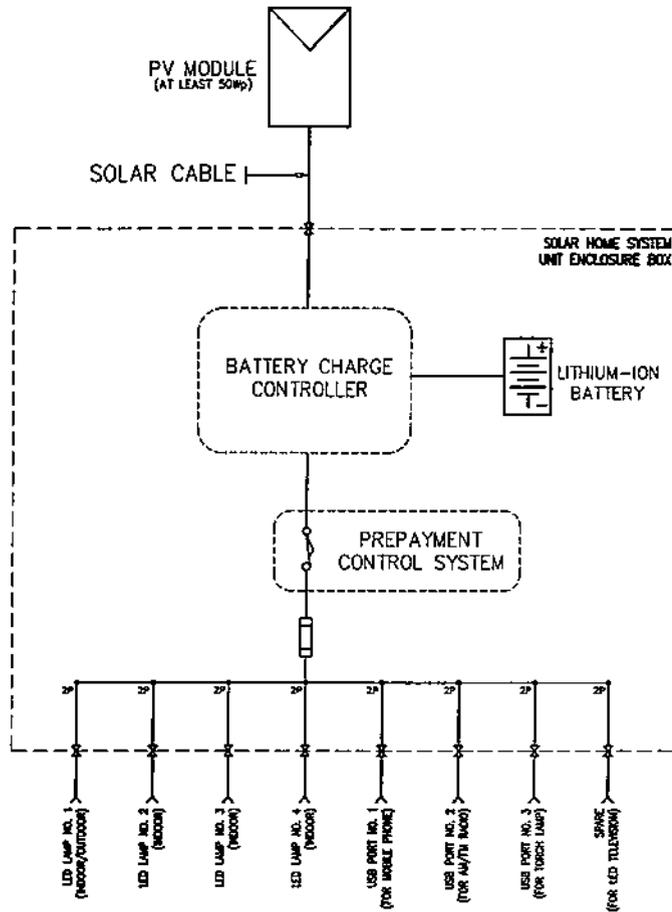


NOTES:

1. ALL ELECTRICAL WORKS SHALL BE DONE IN ACCORDANCE WITH THE LATEST PROVISIONS OF THE PHILIPPINE ELECTRICAL CODE AND SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE LOCAL CODES AND STANDARDS.
2. THIS DRAWING IS CONCEPTUAL AND FOR BIDDING PURPOSES ONLY. THE SUPPLIER SHALL IDENTIFY THE FINAL SINGLE LINE DIAGRAM OF THE SOLAR HOME SYSTEM INCLUDING ITS INTERNAL CIRCUITRY AND PRIMARY COMPONENTS CONNECTION.

LEGEND:

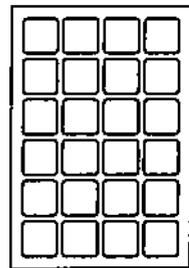
-  — FUSE
-  — LIMIT SWITCH
-  — DC POWER CIRCUIT



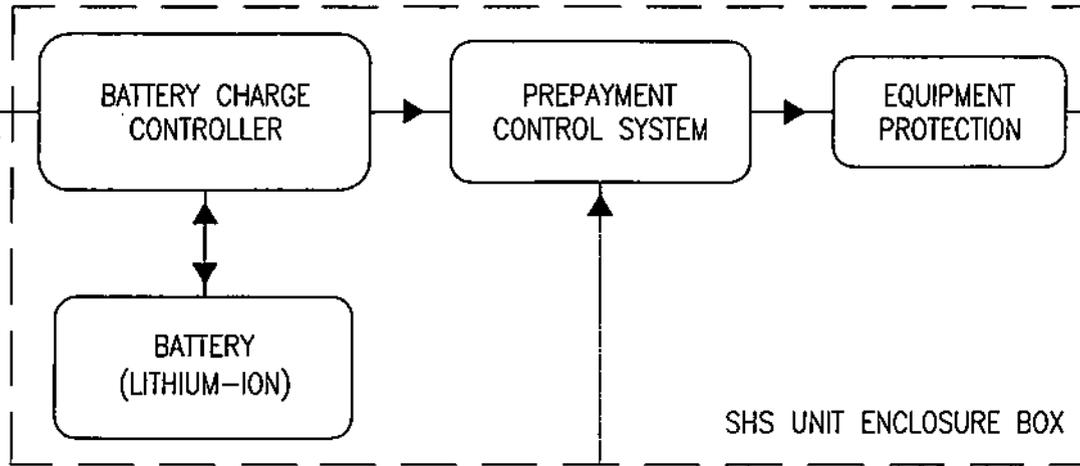
OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR CAGAYAN AND ISABELA PROVINCES UNDER PV MAINSTREAMING			
LOCATION: CAGAYAN AND ISABELA PROVINCES			
TITLE: SINGLE LINE DIAGRAM			
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	PRINCIPAL ENGR./ARCHT.		RECOMMENDED
CIVIL/ARCHT			RECOMMENDED
ELEC.			APPROVED
MECH.			
DWG. NO. PVM-BDE-05.001		SPECS. NO. LuzP22214005s	
SCALE NTS		BID DRAWING	
REV. DATE		NATURE OF REVISION	
BY	CHKD.	RECD.	APPO.
		REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPO.

SOLAR PV MODULE

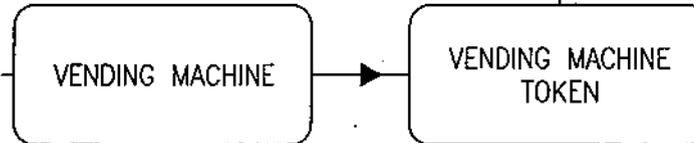


DC CURRENT



DC LOADS
(BUNDLED AND OPTIONAL
APPLIANCES)

SHS UNIT ENCLOSURE BOX



NOTES:

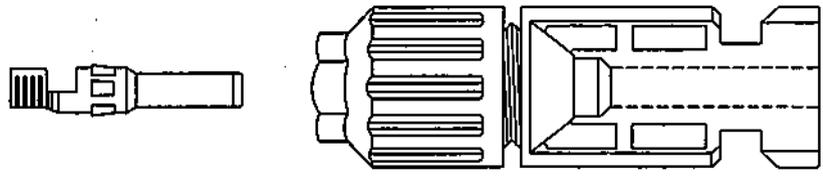
1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY. THE SUPPLIER SHALL IDENTIFY THE ACTUAL SYSTEM ARCHITECTURE INTEGRATED ON EACH SHS UNIT ENCLOSURE BOX. THE COMPONENTS OR THE ENCLOSURE, AS A SINGLE AND COMPLETE SYSTEM, MUST BE COMPLYING ON THE BASIC REQUIREMENTS STATED ON THE TECHNICAL SPECIFICATIONS.
2. THE RATED CAPACITY OF ALL MAJOR COMPONENTS SUCH AS SOLAR PV MODULE, BATTERY AND BATTERY CHARGE CONTROLLER, BUNDLED AND OPTIONAL APPLIANCES SHALL BE REFERRED TO THE TECHNICAL SPECIFICATIONS.
3. THE AMPACITY RATING OF SHS UNIT ENCLOSURE BOX SHALL BE SUFFICIENT TO CARRY THE FULL LOAD CURRENT CONSIDERING THE ADDITIONAL LOAD FOR THE OPTIONAL APPLIANCE.
4. THE VENDING MACHINES PROGRAMMED WITH VENDING MANAGEMENT SYSTEM SERVES AS THE SELLING POINT HARDWARES INTENDED FOR LOADING AND/OR RELOADING THE SOLAR HOME SYSTEM. PROOF OF CREDIT SHALL BE PROVIDED WITH RECEIPT OR SMS, WHICHEVER WILL BE FURNISHED, AFTER EACH TRANSACTIONS.
5. THE SUPPLIER SHALL IDENTIFY THE CREDITING SCHEME OF SHS UNIT ENCLOSURE BOX BEFORE PROJECT IMPLEMENTATIONS.

LEGEND:

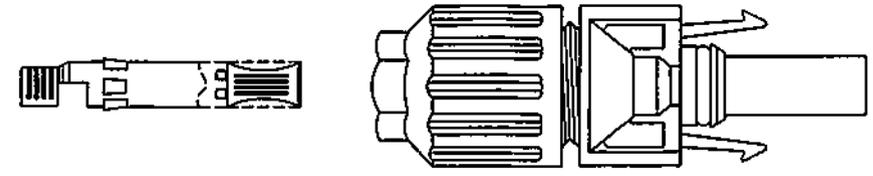
- DC POWER CIRCUIT
- - - WIRELESS CONNECTION
- - - CREDITING FLOW

OWNER:  NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR CAGAYAN AND ISABELA PROVINCES UNDER PV MAINSTREAMING	
LOCATION: CAGAYAN AND ISABELA PROVINCES	
TITLE: SYSTEM ARCHITECTURE DIAGRAM	
DESIGNED	BY: <i>[Signature]</i> CHRD: DATE: SUBMITTED: <i>[Signature]</i> B. M. AGUILA
DRAWN	REVIEWED: PRINCIPAL ENGR. / ARCHT. RECOMMENDED: <i>[Signature]</i> C. S. C. LUYOD JR.
EXAMINER	APPROVED: <i>[Signature]</i> N. S. DOMESTICERRA
ELEC	MECH
DWG NO PVM-BDE-05.002 SPEC NO. LuzP22Z1400Ss	
SCALE: NTS	
BID DRAWING	
REV. 0	

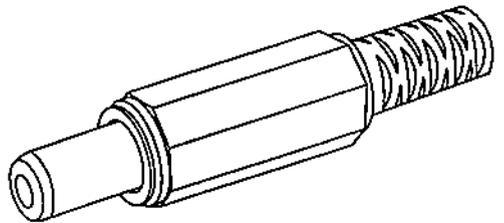
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



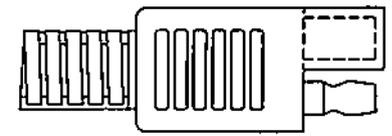

MC4 CONNECTOR (MALE)
 PVM-BDE-05.003 SCALE NTS




MC4 CONNECTOR (FEMALE)
 PVM-BDE-05.003 SCALE NTS




CO-AXIAL CONNECTOR
 PVM-BDE-05.003 SCALE NTS



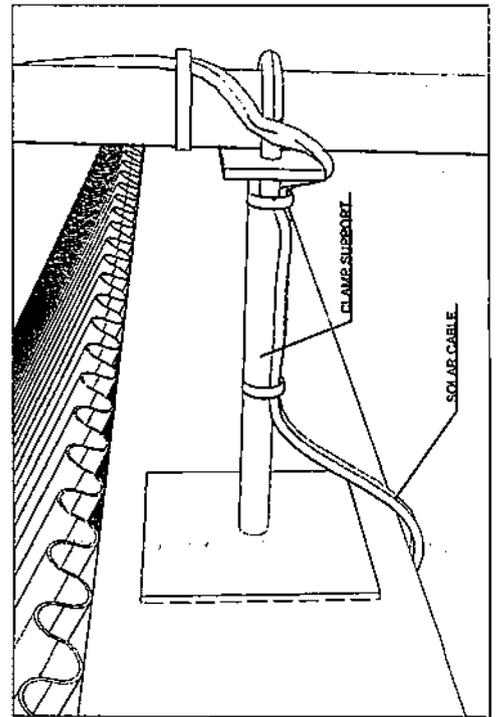
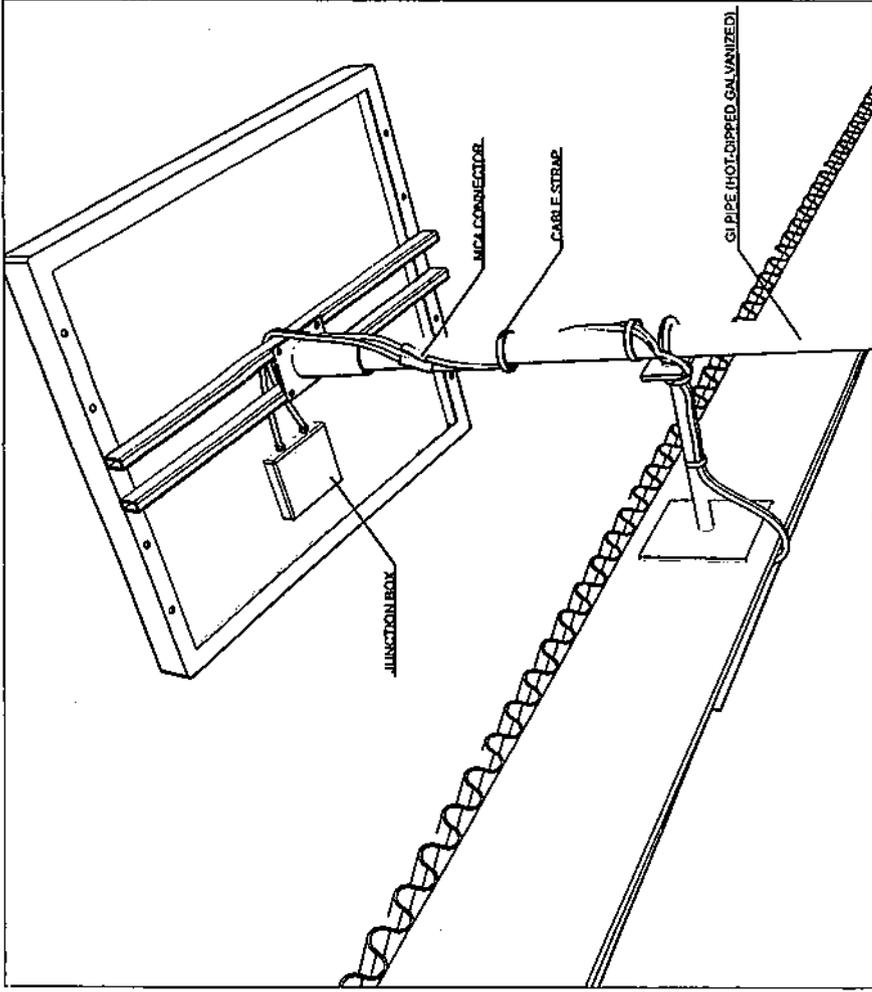
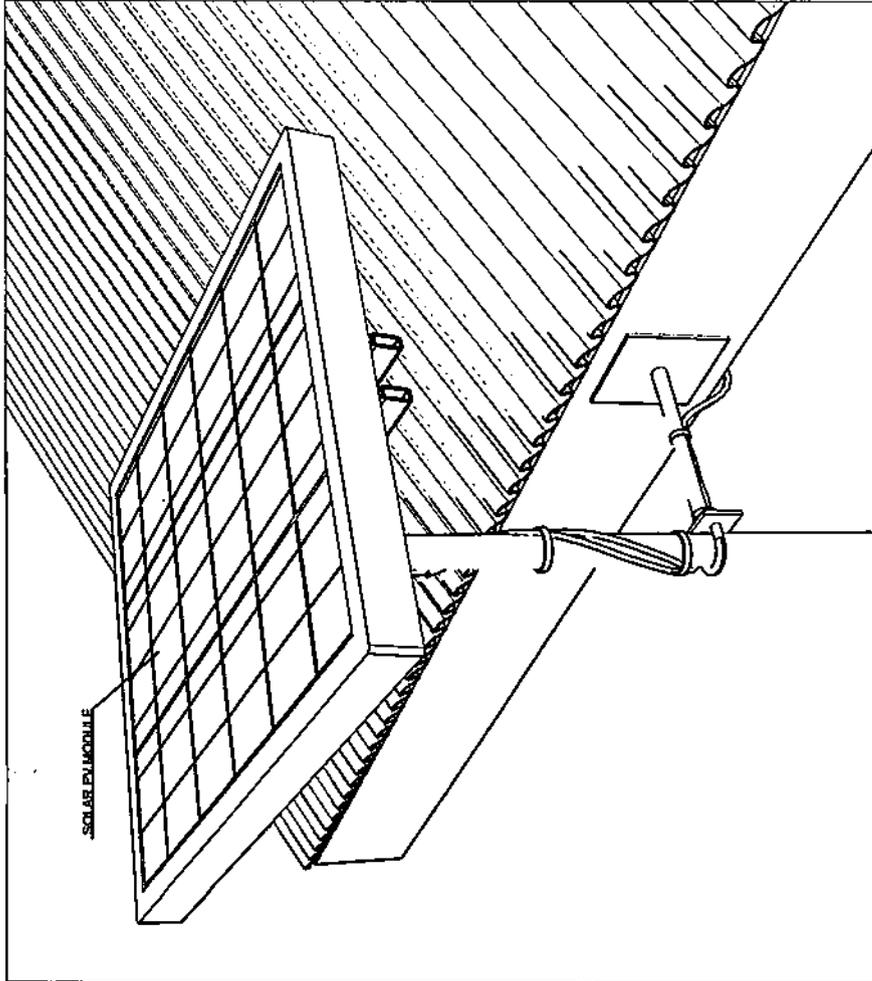

SAE CONNECTOR
 PVM-BDE-05.003 SCALE NTS

NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY. THE SUPPLIER SHALL IDENTIFY THE ACTUAL CONSTRUCTION OF EACH CONNECTOR AND MUST BE COMPLYING WITH THE REQUIREMENTS STATED ON THE TECHNICAL SPECIFICATIONS.
2. THE AMPACITY AND VOLTAGE RATING OF EACH CONNECTOR SHALL BE SUFFICIENT TO CARRY THE MAXIMUM POSSIBLE CURRENT AND VOLTAGE WHICH WILL BE PRESENT ON THEIR RESPECTIVE CIRCUIT.

 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEM FOR CAGAYAN AND ISABELA PROVINCES UNDER PV MAINSTREAMING LOCATION: TAMBOYAWAN, ISABELA PROVINCES	
TITLE: DETAILS OF DC CONNECTORS	
DESIGNED BY: <i>E. M. AGUILA</i> DRAWN BY: <i>[Signature]</i> REVIEWED BY: PRINCIPAL ENGR. / ARCHT. CIVIL/ARCHT. ELEC. MECH.	SUBMITTED BY: <i>E. M. AGUILA</i> RECOMMENDED BY: <i>C. C. LUGOD JR.</i> APPROVED BY: <i>M. G. [Signature]</i> LICENSED ENGR.
DWG. NO. PVM-BDE-05.003	SPECS NO. LuzP22Z1400Ss
SCALE: NTS	BID DRAWING
REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY. DURING INSTALLATION, NECESSARY ADJUSTMENT SHALL BE PERFORMED BY THE SUPPLIER ACCORDING TO THE ACTUAL SITE INSTALLATION REQUIREMENTS.
2. THE DETAILED INSTALLATION DESIGN AND DIMENSION FOR PV MODULES, GI PIPE, WIRE PROTECTION AND SOLAR HOME SYSTEM UNIT ENCLOSURE BOX SHALL BE SUBMITTED TO NPC FOR REVIEW AND APPROVAL.
3. THIS DRAWING SHALL BE WORKED WITH CIVIL BID DRAWINGS.
4. DRIP LOOP SHALL BE INSTALLED ON THE CABLE UPON ENTERING THE RESIDENTIAL ESTABLISHMENT TO AVOID THE PENETRATION OF RAIN WATER OR OTHER LIQUID.
5. APPROPRIATE CABLE SUPPORT AND WIRING PROTECTION SHALL BE FURNISHED AND INSTALLED BY THE SUPPLIER TO AVOID CABLE HANGING AND RAPID DEGRADATION OF CABLES.

OWNER:



NATIONAL POWER CORPORATION
 AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: SUPPLY AND DELIVERY OF 651 UNITS OF PHOTOVOLTAIC SOLAR HOME SYSTEMS FOR CAGAYAN AND ISABELLA PROVINCES UNDER PV MAINSTREAMING
 LOCATION: CAGAYAN AND ISABELLA PROVINCES

TITLE:

DETAILS OF CABLE INSTALLATION

BY	CHKD	DATE
DESIGNED	✓	
DRAWN	✓	
REVIEWED		
CYCLAR/CHT		
ELEC.		
MECH.		
SUBMITTED		
RECOMMENDED		
APPROVED		

PROJECT NO. PVM-BDE-05.004
 SHEET NO. LUP22Z1400SS
 SCALE: NTS
 BID DRAWING
 REV. 0

REV.	DATE	BY	CHKD	RECD	APPD