REPUBLIC OF THE PHILIPPINES

NATIONAL POWER CORPORATION

(Pambansang Korporasyon sa Elektrisidad)

BID DOCUMENTS

Name of Project : DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

Project Location : BRGY. PEÑAFRANCIA, DARAGA, ALBAY

Specification No.: LuzP21Z1349Se

Contents:

Design and Development Department

TDS 180

SECTION I

INVITATION TO BID

National Power Corporation
INVITATION TO BID
PUBLIC BIDDING – BCS 2024-0469

1. The NATIONAL POWER CORPORATION (NPC), through its approved Corporate Budget of CY 2024 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
S3-DIN24-012 / PB240730-JD00341 Lease of 3.0 MW Modular Diesel Gensets for Dinagat DPP	Lease of Modular Diesel Generating Sets or Operation and Maintenance (O & M) of Diesel Generating Sets or Supply, Delivery, Installation, Test and Commissioning of Diesel Generating Set/s	16 July 2024 9:30 A.M.	30 July 2024 9:30 A.M.	₱ 40,398,000.00 / ₱ 25,000.00
HO-TTE24-001 / PB240730-CM00342 Supply, Delivery, Installation and Testing of Household Wiring for Various Areas in Samar (Lunang DPP, Kirikite DPP, Bagongon DPP, Buluan DPP and Cinco Rama DPP) under the Nationwide Intensification of Household Electrification (NIHE) Project	Supply, Delivery, Installation and Testing of Household Connection / Electrification Materials	16 July 2024 9:30 A.M.	30 July 2024 9:30 A.M.	₱ 2,673,000.00 / ₱ 5,000.00
S1-CAT24-009 / PB240730-AM00343 Design, Supply, Delivery, Installation, Testing & Commissioning of 30kW On-Grid Solar PV System with Net Metering Program in Bicol Operations Division Office, Daraga, Albay	Design, Supply, Erection, Test and Commissioning of a Solar PV System with Net Metering Program with Capacity of at least 30kW	16 July 2024 9:30 A.M.	30 July 2024 9:30 A.M.	₱ 3,230,700.00 / ₱ 5,0000.00
Venue: Kañao 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
S3-DIN24-012	Twelve (12) Months – Maximum Six (6) Months - Minimum	Ten (10) Years
HO-TTE24-001	Sixty (60) Calendar Days	Ten (10) Years
S1-CAT24-009	One Hundred Ten (110) 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 in 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. Wearing of Face Masks is recommended but not required in view of Proclamation No. 297 S.2023 lifting the State of Public Health Emergency Throughout the Philippines
   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 in the 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
Gabriel Y. Itchon Building
Senator Miriam P. Defensor-Santiago Ave. (formerly BIR Road)
Cor. Quezon Ave., Diliman, Quezon City, 1100
Tel Nos.: Tel Nos.: 8921-3541 local 5564/5713
Email: bcsd@napocor.gov.ph /

12. You may visit the following websites:

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

ATTY. MELCHOR P. RIDULME
Sr. Vice President & COO and
Chairman, Bids and Awards Committee

SECTION II

INSTRUCTIONS TO BIDDERS

SECTION II – INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

SECTION II – INSTRUCTIONS TO BIDDERS

1. Scope of Bid

The **National Power Corporation (NPC** or **NAPOCOR)** wishes to receive Bids for the **DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY**, with identification number **LuzP21Z1349Se.**

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 2024 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 Two (2) copies of the first and second components of its Bid, marked **Original** and photocopy. Only the original copy will be read and considered for the bid.

Any misplaced document outside of the **Original** copy will not be considered. The photocopy is ONLY FOR REFERENCE.

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 to the given website 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.

Bidders must also comply with the Disclaimer and Data Privacy Notice specified in the **BDS**.

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	For this purpose, similar contracts shall refer to Design, Supply, Erection, Test and Commissioning of a Solar PV System with Net Metering Program with capacity of at least 30kW 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.
7.1	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.
10.1	The prospective bidder shall submit a valid and updated Certificate of PhilGEPs Registration under Platinum Membership (all pages including the Annex A of the said Certificate). **Non-compliance shall be a ground for disqualification.**
10.4	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**: 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 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.
	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:** 1. Certificate of Acceptance; or Certificate of Completion; or Official Receipt (O.R); or Sales Invoice
	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.

10.5	Bidders shall also submit the following requirements in their first envelope, Eligibility and Technical Component of their bid: 1. Drawings and documents to be submitted with the Bid as specified in Clause GW-10.2 of Section VI - Technical Specifications (GW-General Works) Manufacturer's brochures, manuals and other supporting documents of equipment, materials, hardware and tools proposed by the bidders must 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. 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. 2. Complete eligibility documents of the proposed sub-contractor, if any
12	The price of the Goods shall be quoted DDP Project Site or the applicable International Commercial Terms (INCOTERMS) for this Project.
14.1	The bid security shall be in the form of a Bid Securing Declaration, or any of the following forms and amounts: 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.
15.0	All bid submissions and related correspondences are confidential and for viewing only by the intended recipient/s. Any unauthorized access to review, reproduce, or disseminate the information contained therein is strictly prohibited. The National Power Corporation (NAPOCOR) does not guarantee the security of any information electronically transmitted. Bid submissions and related correspondences may contain personal and sensitive personal information, and are subject to the Data Privacy Act of 2012, its implementing rules, regulations and issuances of the National Privacy Commission of the Philippines ("Privacy Laws"). By viewing, using, storing, sharing and disposing (collectively "Processing"), such bids submissions and correspondences, you agree to comply with the Privacy Laws. By responding to correspondence, you consent to the Processing by NAPOCOR of the Personal Data contained in your submission/reply in accordance with NAPOCOR's Personal Data Privacy Policy which you can find at http://www.napocor.gov.ph.

	To report any privacy issue, contact the Data Privacy Officer at dpo@napocor.gov.ph. NAPOCOR is not liable for the proper and complete transmission of the information contained in bid submission/correspondences nor for any delay in its receipt.
19.3	The Goods are grouped together in one (1) lot and will be awarded to one (1) Bidder in one complete contract. 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. The Bidders bid offer must be within the ABC of the lot and ABC. Bid offers that exceed the ABC of the lot or with incomplete price, shall be rejected.
19.5	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.
20.1	Additional documents to be submitted during Post-Qualification: a. Class A – Eligibility Documents listed on the Annex A of Certificate of PhilGEPs Registration under Platinum Membership pursuant to Section 34.3 of the Revised IRR of R.A. 9184 b. 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); c. 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; d. Contract/Purchase Order for the contract stated in the Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid (Form No. NPCSF-GOODS-03) e. Drawings and documents to be submitted during post-qualification process as specified in Section VI – Part II (Technical Data Sheets)
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 CONTRACT

SECTION IV – GENERAL CONDITIONS OF CONTRACT

TABLE OF CONTENTS

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 CONTRACT

SECTION V – SPECIAL CONDITIONS OF CONTRACT

GCC Clause	
1	**Delivery and Documents –** 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. 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: *For Goods supplied from within the Philippines* 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: (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. *For Goods supplied from abroad:* 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:

	(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.

	Intellectual Property Rights – 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.
2.2	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. All progress payments shall first be charged against the advance payment until the latter has been fully exhausted. The terms of payment shall be as follows: **1) For Supply and Delivery 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 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 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 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 SCC provision on Delivery and Documents.

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

	payment and the remaining advance payment will be fully recouped from the succeeding claims. (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 SCC provision on Delivery and Documents
3.2	1. The following must be indicated in the performance bond to be posted by the Supplier: i. Company Name ii. Correct amount of the Bond iii. Contract/Purchase Order Reference Number iv. Purpose of the Bond: "To guarantee the faithful performance of the Principal's obligation to undertake *(Contract/Purchase Order Description)* in accordance with the terms and conditions of *(Contract No. & Schedule/Purchase Order No.)* entered into by the parties." 2. The bond shall remain valid and effective until the duration of the contract *(should be specific date reckoned from the contract effectivity)* 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 SUPPLIER 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 SUPPLIER 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: 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;

	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; 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.
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 15.0 - General Works (GW) and Clause 3.0 - Electrical Works (EW).
	CORRECTION OF PUNCHLIST ITEMS: After to the conduct of Test and Commissioning/Joint Final Inspection or upon the advice by the NPC, the Contractor/Supplier must correct any remaining works and work deficiencies identified in the punchlist issued for the project within one (1) month considering the approved remaining contract time. Failure to comply with this provision shall be grounds for non-issuance of Certificate of Satisfactory Performance which is a requirement for future bidding with the NPC. This, however, shall not preclude NPC's claim for liquidated damages, imposition of any other penalties and/or filing of blacklisting actions in accordance with the blacklisting guidelines issued by the Government Procurement Policy Board (GPPB).
6	Aside from the Liquidated Damages, the PROCURING ENTITY shall also impose a penalty if undue delay is being caused by the Supplier for failing to attend the requested maintenance/repair services within the period specified in the Technical Specifications. The penalty to be imposed to the Supplier shall be in accordance with Section VI - Part I, Technical Specifications, Clauses 15 – General Works (GW).

SECTION VI

TECHNICAL SPECIFICATIONS

SECTION VI

PART I-TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

EW – ELECTRICAL WORKS

SECTION VI

PART I-TECHNICAL SPECIFICATIONS

GENERAL WORKS

TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

TABLE OF CONTENTS

PART I – TECHNICAL SPECIFICATIONS

GW –GENERAL WORKS

GW-1.0 PROJECT DESCRIPTION

This specification covers the general technical and associated requirements for the Design, Supply, Delivery, Installation, Testing and Commissioning of 30 kW On-grid Solar PV System with Net Metering Program. Also included in this document are the specifications for, but not limited to, the legal and administrative requirements for the connection of the on-grid solar PV system comprising of solar PV modules, string inverters and grounding system, structural support, appropriate interconnection lines, metering system and other appurtenances.

Other materials and parts which are not specifically mentioned herein but are necessary for the proper assembly and installation of equipment for the safe and reliable operation of the on-grid Solar PV System shall be furnished including special tools and all required spare parts and consumables during the warranty period.

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 design, installation, 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, installation, 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 equipment 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 PROJECT LOCATIONS

The 30 kW On-grid Solar PV System with Net Metering Program is located at Bicol Operations Division Office, Brgy. Peñafrancia, Daraga, Albay.

Table 1.0 below shows the existing mode of transport from Manila Area to project site, subject to verification by the supplier.

TABLE 1.0

EXISTING MODE OF TRANSPORT FROM MANILA	
PLANT	**1**
Solar PV System with Net Metering Program in Bicol Operations Division Office, Brgy. Peñafrancia, Daraga, Albay	**L** Manila Area to Daraga, Albay Area
NOTES: L – Land Travel; S – Sea Travel; S-S – Special Trip Sea Travel	

GW-3.0 PROJECT DURATION

The contract period shall be **one hundred ten (110) calendar days** reckoned from the receipt of Notice to Proceed inclusive of fifteen (15) unworkable days considered unfavorable for the execution of the works. The equipment shall be delivered, installed, tested and commissioned at the Bicol Operations Division Office. The Supplier shall be responsible for taking reference to its accessibility, means of 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 of the Supplier regarding the existing conditions of the delivery point shall be his responsibility and no additional payment thereof shall be made by NPC.

GW-4.0 SITE INSPECTION

The Supplier shall be required to conduct site inspection to verify the actual condition of site.

Schedule of the site inspection shall be coordinated with ***SPUG*-Bicol Operations Division *Head and/or its duly authorized NPC personnel.*** 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

GW-5.1 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.

The conditions stated below shall be taken into consideration in the design, manufacture and selection of the equipment and materials to be supplied by the Supplier, unless otherwise specifically indicated in the relevant technical specifications.

Elevation above sea level	:	95 to 100m
Ambient temperature	:	20-35°C
Barometric pressure	:	95.52 - 101.01kPa abs
% Relative humidity	:	up to 100%
Design for seismic loads	:	Seismic zone factor 0.4
Max. wind velocity	:	320 km/hr

The prevailing atmospheric condition is generally warm and humid.

Plant and equipment may be subjected to both horizontal and vertical seismic induced accelerations of 0.40g. or more depending on:

a) Natural period and mode of vibration
b) Damping (inherent or specifically provided)
c) Manner of failure (ductile or brittle)
d) Location (at ground level or at a higher level)

The plant and equipment required under this contract shall meet the seismic design requirement for earthquake conditions.

It is evident from the design response spectra that the degree of response varies markedly with the period of vibration. It is essential, therefore, that any equipment, or its supporting structure which has modes of vibration or components with modes of vibration with a natural period longer than 0.1 second be identified.

Provision shall be made for seismic movement by providing seismic movement joints between components which are interconnected and may have different vibratory characteristics. These joints shall be capable of withstanding the sum of the maximum deflection of each component resulting from a design earthquake.

All support and building structures under this contract shall meet the wind velocity requirements specified in the latest edition of NSCP. The recommended wind loading for electrical equipment shall be based on the latest edition of the Philippine Electrical Code and/or other applicable codes and standards.

GW-5.2 Solar PV Mounting Structures and Required Civil Works and Installations

a) The Solar PV panels shall be designed and laid out as roof mounted panels on top of the existing roof structure of Bicol Operations Division Office;

b) Solar PV roof-mounted mounting structure shall be made of metal structure designed to allow easy replacement of any module in line with site requirements;

c) All metal members of mounting structure shall be made of corrosion resistant aluminum alloys;

d) Solar PV panels shall be designed to match the inclination parallel to the roof;

e) Each solar panel shall be supported by three railings running across the longer side of the solar panel;

f) The solar PV roof-mounted mounting structure shall be arranged to have optimum solar power collection. It shall have adequate strength to support the Solar PV modules at a given orientation;

g) In addition, the materials for mounting structure of the PV system shall conform with the requirements of NPC;

h) The solar PV roof-mounted mounting structures shall be designed in consideration of earthquake, wind, dead loading, and other forces that will affect the stability and rigidness of the structures. The structural design shall comply with the requirements stated herein;

i) The support/mounting structure and related installation shall consider and prevent different metal reaction which will cause degradation to the materials. Appropriate protection and standard method shall be conducted to prevent such cause;

j) All nuts and bolts for the PV mounting structure, especially the ones to be used to fasten the solar PV panels to the mounting structures, shall be made of good quality stainless steel 304 conforming to ASTM A240;

k) The solar PV layout shall take into consideration the optimization of the available area. The Supplier shall layout the whole solar PV system inconsideration with the existing roofing structure of the Bicol Operations Division Office as indicated in the bid drawings or otherwise directed by the NPC with consideration to the specified capacities of the solar PV system, civil works/structures and future expansion of the solar PV system;

l) The Supplier, during construction, shall avoid any interruption to the on-going operations or activities of Bicol Operations Division Office. In case of damage to existing properties/structures during construction/installation, the Supplier, at his own expense, shall restore the damaged properties/structures into equivalent or better conditions with NO ADDITIONAL PAYMENT BY NPC.

GW-6.0 SUPPLIER'S SCOPE OF WORKS

General

The scope of works shall cover the Design, Supply, Delivery, Installation, Testing and Commissioning of 30 kW On-grid Solar PV System with Net Metering Program and the integration to the existing electrical power system.

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 works under this Contract shall generally consist of provisions stipulated hereunder.

All works and materials which are not specifically mentioned herein but are deemed necessary for the safe and reliable operation of the solar PV system shall be performed, identified and furnished by the Supplier at no additional cost to NPC.

GW-6.1 On-Grid System

a) Solar PV System

- Design, supply, delivery, installation, testing and commissioning of Solar PV System with a total installed capacity of at least 30kW Solar PV System consisting of solar panels, string inverters, DC boxes/AC combiner box and grounding system, structural support, DC/AC power cables, conduits and its appurtenances, metering system, harmonic & surge filter, if necessary, and all other necessary components and associated auxiliaries;

- Design, supply, delivery, installation and testing of power, control and instrumentation cables including ground conductors, conduit and other appurtenances required to power and interface the supplied equipment which form part the Solar PV System;

- Design, supply, delivery, installation and testing of grounding system for the Solar PV System and other newly installed facility(ies), if any, included in this contract; and

- Supply and delivery of all the required and necessary tools and accessories for the safe and reliable operation and maintenance of the on-grid solar PV system.

b) Net Metering System

- Supply, delivery, installation and testing of service entrance equipment complete with the required protection for the measurement of energy generation and system utilization of the solar PV system as shown in the Bid Drawings; and

- Secure legal, administrative and associated payment requirements for the connection of on-grid solar PV system such as:

    - Net-Metering application to Distribution Utility (DU);

- Local Government Unit (LGU) Building Permit & Electrical Permit
- Distribution Impact Study (as applicable)
- LGU Certificate of Final Inspection;
- Energy Regulation Commission (ERC) Certificate of Compliance (COC);
- DU Connection Agreement; and
- Other permits/regulatory compliances as applicable.

c) Civil and Structural Support

- Supply, delivery, installation of railings and supports complete with clips, clamps, screws and other necessary accessories;

- Supply, delivery, manufacture and installation electrical equipment shed made of structural steel for string inverters, DC and AC combiner box and etc. as shown on the bid drawings and/or as directed by the NPC; and

- Supply, delivery and installation of Ethylene Propylene Diene Monomer (EPDM) for the connection between kliplock hook and roof sheet to prevent water insertion.

Table 2.0

SUMMARY OF MAIN EQUIPMENT TO BE SUPPLIED/INSTALLED BY SUPPLIER			
Capacity of Solar PV System (kW)	**Net Metering System with Service Entrance Equipment (Lot)**	**General and Equipment Grounding System (Lot)**	**Power, Control & Instrumentation Cables (Lot)**
30	1	1	1

GW-6.2 Operation and Maintenance

a) The Supplier shall submit three (3) sets of hard copy of approved Operation and Maintenance Manual including one (1) sets of electronic copies in DVDs to be submitted ten (10) calendar days after the testing and commissioning. Operation and Maintenance Manuals shall include Parts List and Preventive Maintenance Schedule of all components/equipment during the operating life of the Solar PV power system.

GW-6.3 Other Allied Services

a) Conduct actual inspection of the project site and make assessment on its physical condition, and determine the extent of the scope of works required for the solar PV power system;

b) Inspection, testing and commissioning of all major equipment and their auxiliaries for the verification of their compliance to the set minimum functions, features, capabilities, limitations in accordance to technical specifications, contract provisions and guarantees;

c) Construction of temporary storage facilities for electrical and construction materials and other civil works, including demobilization, removal of temporary facilities and clean-up work;

d) Provide a comprehensive operation and maintenance training at site to NPC plant personnel who will be assigned to operate and maintain the solar PV system. The training program shall be supported with a training manual related to design application, operation and maintenance calibration, including trouble shooting of the Supplier's supplied equipment and system, as well as the integration of future PV modules and other relevant equipment necessary for the expansion of solar PV system as specified in these documents;

e) On-call service support system and equipment breakdown during the warranty period as specified in GW-15.0 Guarantee. The Supplier shall have an established service center with experienced personnel that will promptly and efficiently cater the repair and maintenance requirements of the supplied equipment during the warranty period. Supplier shall provide contact details & response/resolution time for service/parts replacement requests;

f) Supply and delivery of Special Tools and Equipment as specified in the Specifications and as recommended by the manufacturer including toolbox required for start-up, test and commissioning, operation and normal maintenance of solar PV system with net metering system;

g) Supply and delivery of all the required spare parts, special tools and appliances including labor and all associated expenses necessary for any repair works in the solar PV system and net metering system during the warranty period;

h) Supply and delivery of complete and ready for operation Portable Type Fire Extinguisher and auxiliaries with appropriate cabinet for outdoor used.

i) Erection/detail drawings not shown in the bid drawings shall be submitted by the Supplier to NPC for approval; and

j) The contract shall also include the inventory of trees to be cut, if any.

GW-7.0 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. TheSupplier shall include the tools that are specified below.

a) One (1) lot of manufacturer's standard and special tools and instruments required for start-up, test and commissioning, operation, maintenance of the equipment and auxiliaries furnished by the Supplier.

b) Any special tools or appliances required solely for erection 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 and stamped on a metal tab to be attached on the box.

If the weight of any box, or its size, is such that it cannot be conveniently carried, it shall be supported on steerable rubber tired wheels. All large tools and wrenches shall be mounted on a suitable shadow board arranged for wall mounting.

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.

All brochures/catalogues shall be written in English. If 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.

Tools for Solar PV System

Tools for Solar PV System shall be suppliedfor each area by the Supplier which shall consist of the following:

1. One (1) unit – PVC hose, flexible and robust 3/4 inch diameter, at least 20m length with reel (hose size and length will be verified on actual site condition)

2. One (1) unit – Extendable/telescopic panel cleaning pole with detachable squeegee and sponge, at least 5m length with hose attachment (3/4 inch diameter hose)

3. One (1) set – MC4 tool kit, with pairs of MC4 connectors (at least 50% of the number strings), 1 pc of MC4 crimping tool, MC4 connect and disconnect tool.

4. One (1) unit – Fiberglass Extension step ladder 14/25ft length

GW-8.0 DESIGN AND INSTALLATION REQUIREMENTS

GW-8.1 Design Requirements

a) The Supplier is responsible for the design as well as 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 PV System;
1.3 Technical Data Sheet for Solar Panel;
1.4 Technical Data Sheet for String Inverter;
1.5 Technical Data Sheet for DC Box/AC Combiner Box;
1.6 Technical Data Sheet for Cables; and
1.7 Technical Data Sheet for Digital Energy Meter.

b) The Solar PV System must be designed in accordance to the latest edition of IEC 62548 with minimum service life of twenty (20) years;

c) The Supplier shall provide all the necessary protection for the Solar PV System required by Philippine Electrical Code (PEC) and other applicable regulatory agencies;

d) The Supplier shall design the structural support of the solar PV system based on the latest National Structural Code of the Philippines (NSCP);

e) Design of underground installation for solar PV system output circuit shall be in compliance with the minimum requirement specified in Philippine Electrical Code (PEC) and/or other applicable standards or local codes;

f) Design standards shall be in accordance with appropriate standards and accepted detailed design practice as required by existing laws and regulations;

g) Design standards for structures shall consider, among other things, the optimum safety of structures to minimize possible damages from tropical typhoons, cyclones and wind gustiness prevailing in the area;

h) All proposed designs and methodology of installation provided by the Supplier shall be reviewed and approved prior to its implementation and installation. The Supplier shall provide the said design within seven (7) calendar days after the kick-off meeting and prior installation works;

i) The Supplier shall submit drawings and documents for NPC's approval of major materials and equipment such as schematics and wiring diagrams, dimensioned drawings, SPV layout, underground route, interconnecting diagrams identifying by terminal numbers, among others;

j) The Supplier shall submit system configuration of the Solar Plant for approval of NPC (e.g. number of solar panels in series/parallel, number of solar panels per string/MPPT/array);

k) Output and Performance Ratio calculation shall be calculated using the latest version of PVSyst software reckoned from the bid opening date; and

l) Equipment to be supplied including spares, during warranty period, of the same class shall bear the same manufacturer's name and model.

GW-8.2 Installation Requirements

Prior to installation of the Solar PV System and associated electrical equipment, the Supplier shall submit construction drawings for all the supplied equipment for NPC's review and approval. The Supplier shall ensure that all relative materials to be used shall be tested in accordance with the requirements specified herein.

The installation of the PV arrays, inverters and other components shall be in accordance to IEC 62548, IEC 61140 and IEC 62109-1 & 2 standards.

All electro-mechanical equipment and associated structures shall be installed, tested and commissioned in accordance with the manufacturer's drawings, instruction manuals, and drawings provided thereto. In the event of conflict within these documents, the Supplier shall inform NPC of the conflict in writing for written resolution prior to the execution of the Work.

Materials and equipment shall be handled with care at all times to prevent damage and defects during handling, hauling, packing/crating, loading, transportation, unloading, assembly, erection and any such damage and defects shall be repaired, replaced or otherwise make good by the Supplier to the satisfaction of and at no cost to NPC.

Assembly, erection and installation of all materials, equipment and its associated structures shall be carried out by skilled and qualified personnel with special training and experience in the appropriate trade.

During installation, the Supplier shall provide adequate lifting gears and other protective devices that may be required to prevent damage of the equipment during and after installation. The Supplier shall be responsible for the correct positioning and leveling of the equipment and auxiliaries, and any checking made by NPC during the course of the work shall not relieve the Supplier from his responsibility. The equipment shall be carefully lifted or glided on their respective supports by using only approved methods and devices on a manner that will prevent damage during erection/installation. They shall be positioned on locations as shown on the drawings.

The equipment shall be set level and checked true to grade and alignment. Adequate quantity of mounting bolts, clamps and clips shall be supplied and installed by the Supplier. The cost of which shall be included in the cost for the installation of solar PV equipment.

Welding works for structural steels shall be by an electric arc process. The procedure, testing and inspection shall conform generally with the relevant approved standards and to the approval of NPC. Weld joint preparations shall be in accordance with approved standard and to NPC's approval. Approval of the welding procedure, etc. shall not relieve the Supplier of his responsibility for correct welding, electrodes and for minimizing distortion in the finished structure.

The Supplier shall identify the most convenient access and manner of moving the equipment out of a fixed structure/s. The Supplier shall provide temporary shelter/cover (tarpaulin or equivalent type of cover) on the torn down part until it is properly packed and crated. Any part of fixed structures that has to be torn down or damaged shall be brought back to its original form to the satisfaction of NPC.

The access area identified or used during the removal of any affected existing equipment and/or facilities shall be utilized in mounting and installation of the new equipment. Any part of fixed structures that has been torn down and used as temporary access during the removal of the existing facilities/equipment may be left open and provided with temporary tarpaulin or equivalent type of cover until the new equipment have been unloaded and installed. Such temporary access shall be brought back to its original form by the Supplier to the satisfaction of NPC.

GW-9.0 PACKING, SHIPMENT AND STORAGE

GW-9.1 Packing/Crating

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 solar PV modules, string inverters, digital energy meter and other sensitive parts or components.

Equipment shall be completely drained of all water and thoroughly dry prior to shipment. When such draining requires removal of plugs, drain valves, etc., the Supplier shall make sure that these parts are re-inserted or reassembled prior to shipment.

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.

Butt-weld connections shall be protected by wooden disks that cover the entire weld end area, and shall be secured by metal straps and fasteners.

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.

As the shipment may be left in open storage at the designated place, the Supplier shall ensure that the delivered items have appropriate protection from water and other elements. All delicate electrical and mechanical parts susceptible to damage from moisture shall be packed in hermetically sealed container or other approved containers within their packing cases, with all machined surfaces coated with a rust preventive compound. All sealed packages shall include bags of silica or equally moisture absorbing chemical. When electric space heaters or air conditioners are provided for that purpose, these should be wired to the outside of the equipment so that energization immediately upon receipt is possible without disassembly of crates, etc. This also requires that no combustible material be left inside the equipment.

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-9.2 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 by 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 of the plant auxiliary equipment, string inverters, meters and solar PV modules 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 carriers of Philippine registry. However, goods may be shipped by a carrier which is not of Philippine registry provided that 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-9.3 Storage

If the equipment and materials to be supplied by the Supplier will not be immediately required for installation at the specified site, the materials and equipment shall be carefully stored and maintained at such place and in such a manner as NPC may direct until such time as they are ready for installation/erection. If the Supplier desires to use any storage area other than those designated by NPC, he may do so at his own expense and subject to the approval of NPC.

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

GW-10.0 DOCUMENTS/DRAWINGS AND INSTRUCTION MANUALS

GW-10.1 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. Bid drawings particularly plant layout, equipment layout and wiring layout, which require changes or adjustments to suit with actual site conditions or which may be modified in design/details to conform with the configuration of the supplied equipment shall be prepared/submitted by the Supplier for NPC's review and approval. 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-10.2 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-10.3 Supplier's/Manufacturer's Drawings

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-10.3.1 General and Detailed Drawings and Specifications for Electrical Equipment

Before proceeding with the manufacture/procurement 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, site training program, test and commissioning 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 systems under this Contract subject to NPC's approval.

GW-10.3.2 General and Detailed Drawings and Specifications 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, raceways for cables and pipes, supports and any other data used in the design of Civil Works, as applicable.

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

GW-10.3.3 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.

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.

GW-10.4 As-Built Drawings

The Supplier shall provide and keep up to date "As-Built" drawings of all equipment and accessories erected, installed, or modified during the works. These drawings shall show all changes or revisions from original location, sizes and kinds of equipment and accessories, miscellaneous metal works, embedded piping and electrical systems, and other concealed items of work.

Within thirty (30) calendar days after completion of works, the Supplier shall furnish NPC the complete and duly checked and approved "As- Built" drawings in five (5) prints, one (1) reproducible copy of approved quality and one (1) electronic copy in a write-once recordable CD. Such CDs shall be suitable for CD ROM/WRITE drive of computer system.

All drawings shall be clearly marked "As-Built".

All "As-Built" drawings shall be signed and dry-sealed by the Supplier's Professional Mechanical, Electrical or Civil Engineer as applicable.

GW-10.5 Instruction Manuals

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 test and commissioning for NPC review and approval. Upon approval, the supplier shall submit three (3) final hard copies and one (1) electronic copy of the Operation and Maintenance Manuals.

The distribution of approved manuals are as follows:

	AREAS FOR DISTRIBUTION	QTY
1	Bicol Operations Division Office	1
2	Workshop Maintenance Technical Services Division - LOD	1
3	Luzon Operations Department Office	1

The Manuals shall include Parts List, and Preventive Maintenance Schedule/ Procedure and Troubleshooting during the life span of the Solar PV System and its components.

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.

Detailed Instruction Manuals shall contain data relevant to the device or system design and its installation, start-up, operation, preventive maintenance, troubleshooting, testing and repair. The descriptions shall not be general or applicable to any type and size of Supplier's equipment but shall be specific with (whenever possible) references to drawings submitted by the Supplier.

The following requirements shall be included but not limited to:

a) List of all equipment 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 of integral devices and other relevant drawings;

c) Electrical Parts lists itemizing type, number, rating, performance limits, and services required including electric power;

d) Instrument lists (including switches and probes) itemizing function, set points, type, catalogue number, and range;

e) Lists of trips and alarms complete with set points;

f) Operating procedures and instructions on when and how to operate the equipment, including precautions, limitations and set points. Procedures listed in step-by-step sequence shall include start-up, shutdown, normal operation and load variation. 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 supply frequency drop shall be addressed;

g) Preventive Maintenance Schedule for all equipment with servicing procedures including instructions for dismantling and/or replacing components, routine electrical and communication interface checking procedures, performance check and tests, checks for cleaning, lubricating and otherwise caring for equipment. These procedures shall include instrument calibration and maintenance of interlocks and other safety features;

h) Maintenance instructions with step-by-step procedures for all anticipated equipment repairs including control system troubleshooting, alignment and calibration, assembly and disassembly. Dimension record with clearances and tolerances and torque values for all bolts shall be provided for reference;

i) Special and standard tools list stating the item's purpose and operating manual as well as other procedures/instructions needed for the care and maintenance of the tool/equipment such as calibration and lubrication;

j) Parts list including ASTM designation (if applicable). The parts list shall be in the form of a report that provides sufficient data necessary for computerized information processing. The set of data for a particular piece of equipment shall include, but not limited to the following:

1. Equipment identification number or SPIN
2. Description of part
3. Manufacturer/Supplier part number
4. Manufacturer's drawing number
5. Self-life
6. Ordering lead time
7. Unit cost
8. Weight
9. Quantity required
10. Outline sketch diagram

GW-10.6 Working Plan

The Working Plan to be submitted shall include the organization, working system, temporary yard installation, construction method, overall construction schedule, a list of Construction Equipment/Temporary Facilities to be used, etc.

GW-10.7 Bar Chart

A Bar Chart must be submitted by the Supplier/Contractor within fifteen (15) calendar days from the effectivity of the Contract for NPC review and approval indicating the schedule of various activities for the project such as design, engineering, approval (brochures/drawings), manufacturing, testing, delivery, erection, site test and commissioning.

The "Agreed Bar Chart" shall not be revised or modified without the prior approval/confirmation of NPC or except where extension of the contract period is approved in accordance with relevant provisions of the specification.

If the Works is not being adequately or properly performed in any respect, NPC shall require the Supplier to submit a new "Agreed Bar Chart" providing for the proper and timely completion of the Works covered by this Contract.

The Supplier shall see to it that the "Agreed Bar Chart" is followed as much as possible. The percentage which will be the basis for judgment of the progress of the Works shall be computed in percent of progress in each different item of work and integrated on the "Agreed Bar Chart". The actual value or quantity of work done divided by the value or quantity of the total work, respectively, and multiplied by 100 shall be the Contractor's percentage of accomplishment.

The percentage of accomplishment subtracted from anticipated percentage on the "Agreed Bar Chart" is the percentage the Supplier is behind or ahead in his work.

GW-10.8 Progress Report

The Supplier shall submit to NPC on the seventh (7th) day of every month or as agreed prior to project implementation, written detailed progress report, in an approved form, indicating the stage reached and anticipated completion dates for the design, ordering, procurement, manufacture, delivery and erection of the components. The report should be forwarded promptly so that on receipt by NPC the information is not unduly out of date.

From the commencement of manufacturing works, the Supplier shall provide color photographs of the Works which will be attached to the monthly progress reports. Each photographic print shall bear a printed description, a serial number and the date when taken. Inscriptions shall be in English. Each photograph shall record or illustrate specific events.

GW-10.9 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-11.0 INSPECTION AND TESTS

GW-11.1 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.

All the items that are expected to be consumed or replaced during the test and commissioning stage shall be supplied and replaced by the Supplier at no additional expense to NPC.

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 either replace or make any alterations necessary to meet the requirements of the Specifications at no costs to NPC.

During the site test and commissioning period, the Supplier may request NPC to provide operations and maintenance personnel to assist in the performance of the required tests under the direct supervision and coordination of the Supplier.

Consumables required during site test and commissioning shall be borne by the Supplier.

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

GW-11.2 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-11.3 Pre-Commissioning/Commissioning Test

GW-11.3.1 General

After installation of the equipment and its associated auxiliaries, the Supplier shall notify NPC of the date when the plant is ready for pre-

commissioning/commissioning test at site. The timing and duration of the test shall be as mutually agreed by NPC and Supplier and shall be satisfactorily completed as required under the Contract.

The Supplier shall submit Personal Data Sheet of the proposed Commissioning Engineer/s for NPC's evaluation and approval at least one (1) month prior to testing. All tests shall be carried out in accordance with the approved procedures submitted by the Supplier or as directed by NPC.

During the test and commissioning period, the Supplier may request NPC to provide operations and maintenance personnel who shall assist in the performance of the commissioning test under the direct supervision of the Supplier/Commissioning Engineer.

The Supplier shall be responsible in compiling, recording and submitting the test reports to NPC.

Measuring and testing instruments, tools, and devices shall also be furnished by the Supplier. The cost of all tests shall be borne by the Supplier.

GW-11.3.2 Pre-Commissioning Test for Supplied Equipment

The typical Pre-Commissioning Test shall include but not limited to the following:

a) Alignment of equipment;
b) Wiring continuity test;
c) Megger testing of equipment and power cables;
d) Checking of settings for switches;
e) Calibration of measuring instruments;
f) Functional test of all supplied equipment; and
g) Setting/calibration of AC SPDs and other protective devices

GW-11.3.3 Commissioning Test

The Commissioning Test shall be carried-out after the Pre-Commissioning Test has been conducted to ascertain its fitness for operation and shall include the following:

a) Trial run of individual auxiliary equipment;
b) System sequential operation;
c) Unit tripping device test;
d) Test of control systems safety and operating functions;
e) Grid synchronization; and
f) Anti-Islanding test of each inverter.

GW-11.4 Performance Tests

The performance test shall be carried out during the period of commissioning test of the plant to verify the guaranteed or specified values of the supplied equipment in accordance with the requirements of the Specifications which include the guaranteed power output and others as required or specified in the relevant clauses of the Technical Specifications.

All instruments, materials, and devices necessary to perform the required testing as well as to measure and analyze data shall be furnished by the Supplier. The Supplier shall provide key test personnel who will supervise the tests and collaborate closely with NPC's representatives who are duly designated to participate in the conduct/performance of the test and commissioning.

All tests shall be coordinated with NPC and shall be timed to conform to the grid requirements. Correction factors for variations of test conditions from the specified design conditions shall be stated in the Test Procedure to be submitted by the Supplier for NPC's review and approval.

Performance Test Procedures to be submitted by the Supplier shall include the following:

a) Introduction;
b) Purpose of Test;
c) Procedure for the Test;
d) Simplified diagrams indicating test envelope, test points and measuring equipment;
e) Test data and parameters to be measured;
f) Step by step calculations indicating how the test data are used to arrive at the final results;
g) Forms to be used; and
h) Correction curves and other curves or tables to be used in the test (correction curves shall be submitted with the Bid).

Acceptance of the equipment shall be on the basis of the satisfactory results of the performance tests meeting the guaranteed values.

GW-11.4.1 Solar PV Power System

Performance test of the Solar PV Power System shall be carried-out in accordance with the manufacturer's instructions and specified codes and standards.

The test shall be performed and lead by a qualified PV System installer who is knowledgeable regarding PV system and its associated electrical equipment to ensure safety during the conduct of test.

Testing

Testing of PV 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. IEC 62446 requires that the AC circuits be tested first, then the following six DC circuit tests 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 [V_{OC}] for each PV source circuit;
d) Test short-circuit current [I_{SC}] for each PV source circuit;
e) Test functionality of major system components; and
f) DC conductor Insulation resistance test.

GW-11.5 Tests Failures

If any equipment or component fails to pass any test, NPC may, direct the Supplier to make any necessary corrections or alterations for defects or order equipment/component replacement, as maybe deemed appropriate. 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.

If the results of the performance test at site show that the equipment failed to meet the technical specifications and or guarantees, the Supplier shall be given two (2) weeks maximum from the completion date of the performance test to make any necessary corrections or alterations of defects before conducting the retest. The Supplier may request time extension for any corrections subject to NPC's evaluation/approval of corresponding justification for such extension. One (1) retest only is allowed 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 site for the solar PV and associated equipment failed to meet the guaranteed data.

GW-11.6 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-12.0 TRAINING OF NPC PERSONNEL

GW-12.1 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 Plant.

The cost of training of all involved NPC personnel at Plant Site shall be borne by the Supplier and shall be included in the bid price.

GW-12.2 Operation and Maintenance Training at Site

The Supplier shall conduct training at Plant Site of NPC's personnel who will be assigned to operate and maintain the facility. At least eight (8) NPC Personnel shall participate in the training program. The Supplier shall provide a comprehensive training program related to design application, operation and maintenance, including trouble shooting of the Supplier's supplied system and equipment starting from Start of Pre-Commissioning/Commissioning and thereafter up to the issuance of Certificate of Acceptance.

The contents of the training program shall include but not limited to:

a) Plant principles in management and practices for operators, technicians and in maintenance personnel; and

b) Operation and Maintenance training program covering electrical and instrumentation and control, as applicable.

The Supplier shall provide training material in the form of drawings, instructions and/or audio visuals. The training material shall include but not limited to the following topics:

a) Handling and Storage;
b) Application;
c) Installation, Operation and Maintenance;
d) Environmental Performance;
e) Electrical Performance; and
f) Basic Troubleshooting.

The following subject shall be discussed thoroughly with the NPC Personnel:

a) Basic features and operation;
b) Field and remote control operation;
c) Interrogation for access of event data, status, fault records and metering data;
d) Fault finding;
e) Application of protection and control settings/reconfigurations;
f) Integration of additional equipment for the expansion of the system.

Said training program 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 to participate in the pre-commissioning and commissioning tests of the Plant.

During pre-commissioning, commissioning, and performance test period, the Supplier may request NPC to provide operations and maintenance personnel to assist the Supplier in the operation and maintenance of his supplied equipment under the direction of the Supplier for the purpose of on-the-job training.

NPC shall have the right to send to the Site its personnel intended to operate and maintain the equipment supplied under this Contract. The Supplier shall use his staff to instruct these personnel relative to the operation and maintenance of the equipment.

GW-12.3 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-13.0 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-14.0 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. The warranty period for the completed works shall commence on the date of issuance of the Certificate of Completion. If defects had developed, said defects should have been corrected to be the satisfaction of NPC and have undergone another warranty period reckoned after correction.

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-15.0 as certified by Manager of Bicol Operations Division), 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-15.0 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**. However, the manufacturer's warranty against defect in design, workmanship and materials for solar panels array and rapid shutdown equipment shall be ten (10) years while the Inverters shall have a minimum warranty of five (5) years.

The Supplier shall provide on-call support for issues beyond the technical capability of NPC personnel 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 plant site their appropriate staff within ten (10) calendar days after NPC's notification.

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, facility maintenance personnel 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/security bond is without prejudice to the terms provided by GW-15.0and shall be done after the warranty period plus downtime attributable to Supplier, if any as certified by the concerned end-user.

In the event that undue delay is being caused by the Supplier for failing to attend the requested maintenance/repair services within ten (10) calendar days, a penalty shall be charged to the Supplier as follows:

Penalty = Prevailing electricity rate in pesos per kW-hour x Produced Energy based on the approved Annex E.4[1] in kWh/day x number of shutdown days counted from 11th day of supplier's receipt to NPC's request without action.

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.

[1] *Approved Annex E.4 "Computation of Performance Ratio and Annual Yield using **PVsyst Software**"*

SECTION VI

PART I-TECHNICAL SPECIFICATIONS

ELECTRICAL WORKS

PART I – TECHNICAL SPECIFICATIONS

EW – ELECTRICAL WORKS

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

EW – ELECTRICAL WORKS

EW-1.0 SOLAR PV SYSTEM

This section provides the definition, functional/performance requirements, technical specifications and standards for the Solar PV modules, Mounting Structures, String Inverters, AC protections, enclosures and etc.

EW-1.1 Solar PV Modules

a) Solar PV System shall have a power rating of at least 30 kW and shall be based on the AC power output of the String inverters.

b) The modules to be supplied shall have the same manufacturer and model for all installations required in this document.

c) The Solar PV modules shall be 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 21%.

d) 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
IEC	61730-1	PV module safety qualification – Requirements for construction
IEC	61730-2	PV module safety qualification – Requirements for testing
IEC	61701	Salt mist corrosion testing of photovoltaic (PV) modules

The following qualification/certification listed above shall be indicated on the brochure/document to be submitted during project implementation or on the equipment itself. Use of other standards shall be subject to the approval of the National Power Corporation

e) The Solar PV modules shall be mounted on the roof as shown in the bid drawings.

f) In accordance with EN 50380 - Datasheet and nameplate information for photovoltaic modules, each module shall carry 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 (Vmax) at STC
8. Current at maximum power point (Imax) at STC

g) Protective devices against surges at the PV module shall be provided. By-pass diodes shall be provided in the PV modules.

h) Module Junction box shall be designed for long life outdoor operation and compliant to IP65 protection or approved equivalent.

i) The manufacturer of the Solar PV module shall be **ISO 9001 and ISO 14001 certified**. The proof of compliance/certification shall be indicated on the brochure/document to be submitted with the proposal or on the equipment itself.

j) The SPV modules shall have one make / model. The outputs shall be within the tolerance of +/- 3% in each string to avoid array mismatch losses.

EW-1.2 String Inverters

a) Each string inverter shall have at least 1 Maximum Power Point Tracker (MPPT). The MPPTs shall automatically operate the Solar PV system. It shall be microprocessor/microcontroller-based to minimize power losses and maximize energy utilization.

b) The inverter shall match the solar PV plant capacity while achieving optimum system efficiency. The total harmonic distortion shall not be more than 5%.

c) The string inverters shall have an output of single (1) phase system and a nominal voltage of 230V.

d) The efficiency of the inverter shall not be less than **95% at rated capacity.**

e) Inverter shall be transformerless and IP65 degree of protection and shall comply with IEC 60529/UL50E. Climatic category shall comply with IEC 60721-3-4 or IEC 60068.

f) The string inverters shall be grid-interactive. It shall have protection against overvoltage and unintentional islanding which detects islanding conditions and automatically disconnects the system from the grid. The solar PV system shall be automatically reconnected to the grid when the power has been restored.

g) The inverter shall be equipped with an arc fault and ground fault circuit protection. Manual/automatic DC disconnect functionality shall also be integrated with the string inverter.

h) The string inverters shall conform with, but not limited to, the latest issue of the following codes and standards:

IEC	62109-1	Safety of power converters for use in photovoltaic power systems – General Requirements
IEC	62109-2	Safety of power converters for use in photovoltaic power systems – Particular Requirements for inverters
IEC	62116	Utility-interconnected photovoltaic inverter – Test procedure of islanding prevention measures

The following qualification/certification listed above shall be indicated on the brochure/document to be submitted during project implementation or on the equipment itself. Use of other standards shall be subject to the approval of the National Power Corporation

i) The inverter shall be rated for outdoor operation. It shall be placed away from direct sunlight and shall be provided with necessary cover or protection, if necessary, to ensure its maximum service life.

j) The inverter shall be able to provide logged data on power generated per period (configurable). The inverter shall have a minimum display parameters of AC output power, AC output voltage, AC output current, frequency, Power Factor, PV Array voltage, PV Array current, AC energy yield and Events/Errors.

k) The inverter load ratio shall be within 0.9 – 1.1 otherwise within the limits recommended by the manufacturer of the string inverter to avoid under and over sizing of the inverter.

l) Inverters shall be set/configure to produce its highest possible output to maximize the PV array generation. Output curtailment feature of the string inverters, if any, shall be disabled.

m) The manufacturer of the String Inverter shall be **ISO 9001 certified**. The proof of compliance/certification shall be indicated on the brochure/document to be submitted with the proposal or on the equipment itself.

EW-1.3 DC Boxes

a) The DC Boxes shall be dust proof, vermin and waterproof and sturdy and shall have at least IP65 Protection. It shall be mounted in the location indicated in the bid drawings.

b) The DC Boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Proper markings shall be provided on the cable entries for easy identification.

c) The DC Boxes shall have suitable arrangement for the following:

1. Incoming DC cables from the solar array
2. DC isolation switch/circuit breaker per String
3. At least type II DC surge protection device (SPD)
4. Outgoing DC cables to the string inverter
5. Provision for earthing

d) The DC Boxes shall be permanently marked and labeled. It shall have swinging doors or covers and shall be accessed by a lock or approve equivalent means.

e) If the string inverters have a built-in DC protection/disconnect switch and DC SPDs (at least type II) per string, the Supplier may opt to supply a separate DC combiner box, DC SPDs and disconnects.

f) The DC circuit breakers shall be Compact with Thermal Magnetic Trip Unit Type, Miniature Circuit Breaker (MCB). Rating of the circuit breakers shall be appropriate for the proposed design of the supplier. The rating of the breaker shall be verified by NPC for approval.

g) All electrical equipment inside the DC box shall be listed for use in PV systems.

EW-1.4 AC Combiner Box

a) The AC combiner box shall be surface-mounted and to be located in the electrical equipment bay/shed as shown in the bid drawings. In the case where the AC combiner box is impractical to be installed as stated, necessary alteration or modification on installation is permitted but subject for approval of NPC. The AC combiner box shall be properly marked with electrical caution.

b) The AC Combiner box shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Proper markings shall be provided on the bus bar for easy identification. Cable ferrules shall be fitted at the cable termination points. The bus bars shall be made of copper of appropriate capacity with adequate safety factor.

c) The AC combiner box shall have suitable arrangement for the following:

1. Incoming cables from each string inverter
2. AC circuit breakers of each string inverter
3. Main AC circuit breaker
4. At least type II AC surge protection devices (SPD)
5. Digital Energy Meter

6. Outgoing cables to service entrance
7. Provision for earthing

d) The AC combiner box shall be permanently marked and labeled. It shall have swinging doors or covers and shall be accessed by a lock or approve equivalent means.

e) The AC combiner box shall be provided with digital metering system with display window capable to measure single phase electrical parameters through respective control switches. Digital meter to be used shall meet the minimum specifications requirement stated in EW-1.6 Digital Energy Meter.

f) The supplier shall provide adequate surge protection devices. If the string inverters have a built-in AC SPDs (at least type II), the Supplier may opt to supply a separate AC SPD for the main circuit breaker in the AC combiner box.

g) The AC circuit breakers shall be compact with thermal magnetic trip unit type, Molded Case Circuit Breaker (MCCB). Rating of the circuit breakers shall be appropriate for the proposed design of the supplier. The rating of the breaker shall be verified by NPC for approval.

EW-1.5 AC and DC Switches

a) **DC Side**

1. Each string of the Solar PV shall be provided with a circuit breaker for isolation and maintenance purposes. Circuit breakers shall be listed for use in solar PV system and shall have the appropriate voltage, current and interrupting capacity ratings.

2. DC Circuit breakers shall be sized to carry not less than 125 percent of the total rated short circuit current of the string/array.

b) **AC Side**

1. Main Circuit Breaker of appropriate rating shall be provided for connection and disconnection of Solar PV plant and the grid.

2. Each inverter shall be provided with circuit breakers. The rating of the circuit breakers shall be based on the output rating of the inverter.

EW-1.6 Digital Energy Meter

This specification covers the technical and associated requirements for the digital energy meter including instrument transformer and accessories required for the solar PV system.

EW-1.6.1 Technical Characteristics and Requirements

The digital energy meter shall be furnished and installed by the Supplier as shown on the bid drawings. It shall be panel-mounted and complete

associated metering instruments transformers (current transformers) of appropriate burden and accuracy and other accessories for indoor metering purposes. It shall be capable to measure the power generated by the solar PV system. It shall be designed to operate continuously for the normal life of the meter. The digital energy meter shall meet the following minimum requirements:

ITEM	DESCRIPTION	REQUIREMENTS
1	Number of Wires	2
2	Voltage, V	220-240
3	Current Range	1-6
4	Frequency, Hz	60
5	Register Type	LCD
6	Communication Port for Kilowatt-hour meter	To be Provided
7	Metering Current Transformer	
	a. Application (Indoor/Outdoor)	Indoor
	b. Insulation type	Full cast epoxy resin
	c. Primary rated current, A	25
	d. Secondary rated current for all windings, A	5
	e. No. of cores	One (1) core Secondary CT
	f. CT ratio	25:5 A
	g. Accuracy class	0.3 or better
	h. Burden, VA	2.5
	i. BIL, kV	10

The digital energy meter shall have but not limited to the following features:

1. Can withstand the temperature of -20°C to +70°C and Humidity of up to 95% non-condensing
2. With back light display
3. With built-in battery for LCD display and back-up battery
4. Measure display (Energy, RMS voltage & current, Reactive & Apparent Power, Power factor and Frequency)

The digital energy meter with the required metering instruments shall be enclosed/mounted on the AC combiner box or, if needed, by a separate enclosure for proper protection and safety against water droplets, dust, exposure of energized conducting material and the like without additional cost to NPC.

EW-1.7 PV Rapid Shutdown System

This specification covers the technical and associated requirements for the rapid shutdown requirement for the solar PV system to be installed on or attached on a building. Use of other technology or system to comply with the rapid shutdown requirement shall be subject to the approval of the National Power Corporation.

EW-1.7.1 Rapid Shutdown Device

a) The rapid shutdown device shall be able to receive or monitor triggering signal from the rapid shutdown initiation device or approve equivalent equipment through signal cables (DC signaling) or other approve industry used technology such as PLC signaling.

b) The rapid shutdown device shall be rated of at least IP 65 degree of protection in accordance with IEC 60529.

c) A single rapid shutdown device shall be able to control at least one (1) solar PV module output. Two (2) or more solar PV modules are permitted to be connected in series for a single rapid shutdown device.

d) The output power rating of the rapid shutdown device shall be greater than the maximum power output of the connected solar PV module. Likewise, its rated operating voltage and current shall be greater than the rated open-circuit voltage and short-circuit current of the module respectively.

e) The rapid shutdown device shall be designed to operate at the maximum expected ambient temperature considering the amplification of ambient temperature on rooftop installation.

f) The rapid shutdown device shall conform with, but not limited to, the latest issue of the following codes and standards:

UL	1741	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources – PV Rapid Shutdown Equipment

The following qualification/certification listed above shall be indicated on the brochure/document to be submitted during project implementation or on the equipment itself. Use of other standards shall be subject to the approval of the National Power Corporation

g) Rapid shutdown device shall be placed away from direct sunlight and high risk of water accumulation during rainy season to ensure its maximum service life.

EW-1.7.2 Rapid Shutdown Initiation Device

a) The rapid shutdown initiation device shall have an input of single (1) phase, 230VAC, 60 Hz. The output DC voltage able to transmit signal to at least sixty (60) units of solar PV modules.

b) Rapid shutdown initiation device shall be permitted to be installed 120m (circuit meter) away from the rapid shutdown device/s.

c) It shall have provision for key slot to avoid unintentional initiation and/or to limit authorization for PV system power back on control.

d) The rapid shutdown initiation device shall have an operation indicator light to identify the status of the system and shall be properly marked with emergency button/stop.

e) Rapid shutdown initiation device shall be wall-mounted and located at the electrical equipment bay/shed beside the AC combiner box as shown in the bid drawings.

f) It shall have provision for cable glands or approve equivalent for cable inlet/outlet. Signal conductor shall be covered with at least 2-hour fire rated cable insulation and shall be terminated with an approved weather resistant male/female communication connector appropriate adaptor for the rapid shutdown device.

EW-1.8 Power Cables and Accessories

a) Power cables of adequate current and voltage insulation rating shall be required of interconnection of:

- Modules/panels within the PV array
- PV array and DC Box
- DC Box and String Inverter
- String Inverter and AC combiner box
- AC combiner box and digital energy meter

b) DC power cable shall be classified as class 5 stranded plain or tin annealed copper conductor in accordance with IEC 60228. It shall be covered with weather/UV resistant, flame retardant, halogen free crosslinked type insulation and outer sheath suitable for outdoor installation. This cable shall be rated to carry the short circuit current of the connected PV source circuit.

c) DC power cables shall be terminated with tinned copper end-ferrules to prevent fraying and breaking of individual wire strands. A marking near the terminals to indicate the destination of each cable shall be provided for future maintenance. It shall be designed for heavy duty operation, 1.5kVDC grade, insulated and stranded copper conductor. MC4 connectors shall conform with EN 50521 and Philippine Electrical Code.

d) AC conductor shall be either of Class 1 or Class 2 of plain annealed copper conductor in accordance with IEC 60228. It shall have flame retardant and lead-free polyvinyl chloride insulation and covered with tough protective sheath of nylon complying to UL standard or any equivalent. It shall be THHN/THWN-2 type with sizes intended for its use.

e) Size of all cables shall be selected to keep the voltage drop and losses to the acceptable minimum level. The permissible voltage drop on the DC side shall be ≤1% at full power.

f) The ampacity of the conductors shall be equal to or greater than the rating of the overcurrent protection device.

g) All cable installations shall be provided with suitable protective raceway. Proper cable management shall be observed to ensure maximum service life of the cables. Such raceways and equipment shall be provided with adequate supports and hangers designed so as not to exceed allowable loading of structures.

h) All raceways which will pass through any masonry structures, concrete walls and elsewhere as required shall be provided with conduit sleeves and fire stopping material for the ease of repair and maintenance and avoidance of fire spreading. Proper cable management shall be observed to ensure maximum service life of the cables.

EW-1.8 Power Cables, Conduits, electrical boxes and Accessories

EW-1.8.1 Power Cables

Power cables of adequate current and voltage insulation rating shall be required of interconnection of:

- Modules/panels within the PV array
- PV array and DC Box
- DC Box and String Inverter
- String Inverter and AC combiner box
- AC combiner box and digital energy meter

The ampacity of the conductors shall be equal to or greater than the rating of the overcurrent protection device.

Size of all cables shall be selected to keep the voltage drop and losses to the acceptable minimum level. The permissible voltage drop on the DC side shall be ≤1% at full power.

The Supplier shall submit catalogues and/or brochures showing details of cable insulation and ampacity ratings of all types of cables to be supplied for approval of NPC.

DC Cables

DC power cable shall be classified as class 5 stranded plain or tin annealed copper conductor in accordance with IEC 60228. It shall be covered with weather/UV resistant, flame retardant, halogen free crosslinked type insulation and outer sheath suitable for outdoor installation. This cable shall be rated to carry the short circuit current of the connected PV source circuit.

DC power cables shall be terminated with tinned copper end-ferrules to prevent fraying and breaking of individual wire strands. A marking near the terminals to indicate the destination of each cable shall be provided for future maintenance.

It shall be designed for heavy duty operation, 1.5kVDC grade, insulated and stranded copper conductor. MC4 connectors shall conform with EN 50521 and Philippine Electrical Code.

AC Conductors

AC conductor shall be either of Class 1 or Class 2 of plain annealed copper conductor in accordance with IEC 60228 suitable for continuous temperature of 90˚C when used in wet or dry location and 90˚C when exposed to oil or coolant.

It shall have flame retardant and lead-free polyvinyl chloride insulation and covered with chemical and abrasion resistant nylon sheath complying to PEC requirements, UL 83 and PNS 35 standard or any other equivalent. It shall be THHN/THWN-2 type with sizes intended for its use.

Cable Installation

All cable installations shall be provided with suitable protective raceway.

Cables pulled through conduits shall be supported in an approved manner to avoid damaged to the insulation. Grease or oily substances shall not be used to facilitate the passage of the conductor in conduits.

The pull shall be applied to cables only by means of approved grips. The end portion of the cable, which has been marked or deformed by the grip, shall be cut-off by the Supplier.

All cable runs shall be continuous and all termination shall be at the terminal boards, equipment, etc. No splices are allowed in conduit or cable tray.

Prior to installation, cables and conduits shall be thoroughly cleaned to prevent damage to cables during installation. After cables have been installed, cables shall be tested for continuity and insulation resistance and shall be tagged with respective cable number.

All raceways which will pass through any masonry structures, concrete walls and elsewhere as required shall be provided with conduit sleeves and fire stopping material for the ease of repair and maintenance and avoidance of fire spreading. Proper cable management shall be observed to ensure maximum service life of the cables.

Proper cable management shall be observed to ensure maximum service life of the cables. Such raceways and equipment shall be provided with adequate supports and hangers designed so as not to exceed allowable loading of structures.

EW-1.8.2 Conduits

All embedded and concealed conduits, boxes and fitting required for the power and control conductors including all necessary hardware and accessories such as screws, bolts, concrete inserts, clamps, locknuts, couplings shall be furnished by the Supplier. The required quantities of various items of conduits and associated materials shall be furnished in accordance with the installation requirements.

During installation, due precaution shall be taken to protect the conduit and threads from mechanical injury. The ends of the conduit shall be sealed in an approved manner. Conduit runs shall be sealed by the use of caps and discs or plugs. The seals shall be maintained, except during inspection and tests, until the conductor is pulled in. Conduit shall be check to be free from obstructions by pulling a wooden mandrel of appropriate size through the conduit.

Conduits running in floors and terminating at equipment mounted on concrete bases shall be brought up to the equipment within the concrete bases, wherever possible.

All joints between lengths of conduits and threaded connection to boxes, fittings and equipment enclosures shall be made watertight.

Conduits installed outdoors running underground shall be buried to a minimum of 0.5m.

Non-Metallic Conduit

Non-metallic conduit shall be made of un-plasticized polyvinyl chloride (uPVC) smooth walled inside and outside, coloured red-orange, schedule 40.

The uPVC conduits shall be non-corrosive and weatherproof, resistant to the attacks of acids and alkalis and must have a self-extinguishing property hence shall not support combustion. It shall resist corrosion, rust and scale.

This shall be applicable for providing cover and appropriate protection to the grounding electrode conductors.

Rigid Metallic Conduit

Rigid metallic conduit shall be hot-dipped galvanized. The inside of the conduit shall have stove enameled coating to prevent erosion and assure smooth wire pulling. Metal fittings and cover shall have the same property and finish as that of the metallic conduits.

This shall be applicable for exposed electrical wirings and underground wire installations which will house DC/AC cables and service entrance conductors.

Liquidtight Flexible Metal Conduit

Flexible metal conduit shall be covered with a rugged moisture, oil and sunlight-resistant polyvinyl chloride (PVC) jacket throughout the length of the conduit. All fittings, connectors and couplings shall be listed for use with LFMC.

Wiring methods shall be performed according to the manufacturer's approved procedures and/or as detailed in the Philippine Electrical Code with sufficient and appropriate supports. Conduit terminations shall be trimmed inside and outside of the conduit to remove rough edges and avoid cable bruises and cuts.

This shall be applicable for providing cover and appropriate protection to DC cables on PV arrays, DC boxes and other suitable locations which requires flexibility of fittings and appropriate environmental protection rating.

Metal Wireways

Metal wireways shall be made of high-grade metal sheet coated all surfaces, both interior and exterior, with corrosion protection. It shall be fabricated with sufficient size to contain DC cables, AC conductors, control conductor, equipment grounding conductors and other necessary circuit conductors.

All dead ends shall be enclosed with the same material and shall be integrated with an acceptable drain valve/hole, as applicable, for the inevitable insertion of water or other liquid agent. Curve marks, due wireway deflection, shall be provided with suitable bushings, shields or fittings having smooth and rounded edges.

Appropriate supports, markings and covers shall be in accordance to the provisions stipulated in the Philippine Electrical Code and other prevailing local or industry standard practices.

This shall be applicable for providing cover and appropriate protection to DC and AC cables on PV arrays (as busways), DC/AC combiner boxes, string inverters and on other suitable locations.

EW-1.8.3 Junction/Utility & Pull Boxes

Junction/Utility Boxes

All junction/utility boxes for concealed work shall be of hot dip galvanized steel or un-plasticized polyvinyl Chloride. All wall boxes on exposed work shall be of aluminum blasted cast iron.

Utility boxes shall be firmly anchored in place and where required provided with fixture supports. Suitable expansion screws shall be used for securing boxes to solid masonry and approved type toggles for securing to hallow masonry units.

Pull Boxes

Pull boxes shall be installed at all necessary points, to prevent damage to the insulation or other damage that might result from pulling resistance or for other reasons related to improper installation. All pull boxes shall be made of galvanized sheet steel not less than 2mm or un-plasticized polyvinyl chloride. Where pull boxes are used in connection with exposed conduits, plain covers attached to the pull box with a suitable number of countersunk flathead machine screws may be used.

EW-1.9 Grounding System and Surge Protection

a) The Solar PV system & structures shall be grounded properly using adequate number of earthing kits. All metal casing or shielding, PV module frame and mounting structure of the Solar PV system shall be grounded to ensure safety. Grounding materials/equipment and design shall comply in accordance to governing standards and regulations in grounding system (PEC, NEMA, IEC and IEEE standards).

b) Grounding cables shall be copper conductor of soft drawn in accordance with the latest revision of ASTM B3 and manufactured in accordance with ASTM Specification B8 (class B).

c) The Supplier shall supply exothermic welding materials for cable-to-cable and cable-to-grounding rod connections. These materials shall be Cadweld or approved equal. The Supplier should submit detailed information describing the proposed process.

d) Terminal lugs shall be one hole, socket type, rounded edge lug, cast of high strength corrosion resistant copper alloy. Machine screws, nuts, and washers used with the lugs shall be bronze.

e) The Solar PV system shall be provided with surge protection. The purpose of this protection is to reduce the over voltage to a tolerable value before it reaches the PV or other sub-system components. Surge materials/equipment shall comply in accordance to governing standards and regulations (PEC, NEMA, IEC and IEEE standards).

f) The specification of surge protection shall provide optimum filtering in relation with the specification required by the proposed inverter and PV modules. The surge protection device must be compact and shall comply in accordance to the UL 1449 3rd edition testing, ANSI/IEEE C62 and ANSI/IEEE Std. 1100-1999.

g) Surge protection device shall be marked with a short circuit current rating and shall not be installed at a point on the system where the available fault current shall not exceed that rating.

h) The Solar PV System shall be provided with an automatic ground-fault protection device or system. The ground-fault protection shall be capable of detecting a ground fault, providing an indication of the fault, interrupting the flow of fault current and automatically disconnects the conductors and/or shuts off the inverter for that portion faulted array.

EW-2.0 NET METERING

This section provides the general specifications required for net metering. The Supplier has the option between Full Feed-in and Behind-The-Meter connection scheme as required by the local distribution utility.

EW-2.1 General

The Supplier shall coordinate to local distribution utility, engineering department of the local government unit and other concerned agencies/offices regarding the adaptation of net metering scheme. The Supplier shall secure the following necessary documents and permits but not limited to:

- Net-metering application to Distribution Utility (DU)
- Local Government Unit (LGU) Building Permit & Electrical Permit
- Distribution Impact Study (as applicable)
- LGU Certificate of Final Inspection
- Energy Regulation Commission (ERC) Certificate of Compliance (COC)
- DU Connection Agreement
- Other permits/regulatory compliances as applicable

The Supplier shall be responsible for legal, administrative and associated payment incur upon securing the above listed requirements and all other clearances requisite for the installation and connection of solar PV system. The Supplier shall submit schematic diagram of the proposed design for the approval of NPC.

EW-2.2 Full Feed-in

This specification covers the technical and associated requirements for the full feed-in net metering scheme required for proper and accurate measuring of Solar PV System energy output.

EW-2.2.1 Service Entrance

This section provides the material technical specification and the method of installation of the newly furnish service entrance equipment and accessories.

Service-Entrance Conductor

Service entrance conductor shall have a minimum size and insulation type as specified on the bid drawings. The point of connection between service-entrance and service-drop conductor shall be located below the service head or service entrance cap. Each and individual service-entrance conductor shall form drip loops before entering the service head.

Service Raceway

Metallic raceway, intended for the service-entrance conductor protection, shall be made of corrosion-resistant material. Service raceway shall be securely fastened with sufficient number of approved type of raceway support.

Spool Insulator

Spool insulator shall be the primary point of attachment of messenger wire for delivering the service-drop conductors to the tapping point. This shall be firmly attached on the service entrance pole and shall be installed with a minimum height of three (3) meters above finished grade.

Service Head

The service raceway shall be equipped with a rain-tight service head. Service head shall be made of corrosion-resistant material and rated for wet location installation. This shall be compatible with the trade size of the service raceway. For the protection against moisture and liquid insertion, service head shall have appropriate fittings and have exact number of conductor entries for service-entrance conductors.

Export Kilowatt-Hour Meter

The export kilowatt-hour meter shall be unidirectional digital energy meter used to measure the export energy to the grid. It shall be furnished by the local electric Distribution Utility. This energy meter shall meet all the minimum electrical parameters requirements of the solar PV system output circuit for the safe and reliable operation of the system.

Service Equipment Disconnecting Means

Service Equipment Disconnecting Means shall be a compact with thermal magnetic trip unit type, Molded Case Circuit Breaker (MCCB). The rating of the circuit breaker shall be appropriate for the proposed design of the supplier. It shall be verified by NPC for approval.

The Service Equipment Disconnecting Means shall be protected by a NEMA 3R type enclosure or other approve equivalent type enclosure. It shall be mounted onto flat-faced service entrance pole or wall as shown in the bid drawings.

The enclosure box shall have swinging door or cover with provision for padlock or approve equivalent. It shall be properly marked and labeled with electrical caution.

EW-2.3 Behind-the-Meter

This specification covers the technical and associated requirements for the behind-the-meter net metering scheme required for proper and accurate measuring of Solar PV System energy output.

EW-2.3.1 Bi-directional Kilowatt-Hour Meter

The bi-directional kilowatt-hour meter shall be a bi-directional digital energy meter used to measure the export and import energy to and from the grid. It shall be furnished by the local electric Distribution Utility. This energy meter shall meet all the minimum electrical parameters requirements of the solar PV

system output circuit considering the calculated load consumption of the NPC office and staff house.

EW-2.3.2 Interconnection Box

The specifications and provisions for the construction material, protection rating and installation of the interconnection box shall be in accordance with the following minimum requirements:

a) The Interconnection Box shall be rated of at least NEMA 3R Protection. It shall be located on the service entrance under the service equipment disconnecting means.

b) The Interconnection Box shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Proper markings shall be provided on each phase for easy identification.

c) The Interconnection Box shall have a screw type cover and the body shall be directly connected to the grounding system.

d) The Interconnection Box shall have suitable arrangement for the following:

1. Incoming AC cables from the AC combiner box
2. Incoming AC cables from the feeder of the Main Distribution Panel
3. Tapping point
4. Outgoing AC cables to the Bi-directional Kilowatt-hour Meter
5. Provision for earthing

e) Accepted type of tapping shall be implemented upon connecting the AC combiner box feeder cables, MDP feeder cables and cables between Interconnection Box and bi-directional kilowatt-hour meter.

f) Adequate insulation shall be applied on all the tapping points of the AC cables. The Supplier shall ensure the isolation of the current carrying cables from the interconnection box or from each of them. The insulating tape used to cover the tapping shall be applicable for dry, damp and wet location.

All materials and parts which are not specifically mentioned herein but are necessary for the proper installation and safe operation of net metering shall be identified by the Supplier and shall be furnished at no additional cost to NPC.

EW-3.0 WARRANTY

The Solar PV System and Net Metering including all their components shall have a minimum general warranty of one (1) year. Integral components such as Solar PV Modules shall have a minimum manufacturer warranty of ten (10) years while String Inverters and rapid shutdown equipment shall have a minimum manufacturer warranty of five (5) years. The supplier shall submit its

warranty agreement with the manufacturer/electric cooperative that stipulates the scope and responsibilities of each party. Both parties (bidder and manufacturer) shall be equally and severally liable for failure of either party to perform warranty obligations.

EW-4.0 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

DRAWINGS AND DOCUMENTS TO BE SUBMITTED DURING BID OPENING

DOCUMENTS TO BE SUBMITTED DURING POST QUALIFICATION

DOCUMENTS TO BE SUBMITTED DURING IMPLEMENTATION

SECTION VI

PART II-TECHNICAL DATA SHEETS

ELECTRICAL WORKS

DRAWINGS AND DOCUMENTS TO BE SUBMITTED DURING BID OPENING

PART II – TECHNICAL DATA SHEETS

EW- ELECTRICAL WORKS

Drawings and Documents to be Submitted during Bid Opening

TABLE OF CONTENTS

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.

Name of Firm	Name & Signature of Representative	Designation

ANNEX A - LETTER OF AUTHORIZATION AND GUARANTEE STATEMENT

The following ***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 Equipment:

a. Solar PV (SPV) Module
b. String Inverter
c. Rapid Shutdown Equipment

either from the following:

- Original Equipment Manufacturer (OEM); or
- Licensee of the OEM accompanied by a Certification from OEM as a Licensee or the Licensee Agreement; or
- 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.***

Name of Firm	Name & Signature of Representative	Designation

ANNEX B.1 – SOLAR PV SYSTEM

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
B-1.1	Total Capacity of Solar PV System at AC Side	At least 30 kW	
B-1.2	Total Number of Inverters connected in parallel	By Supplier	

ANNEX B.2 – SOLAR PV MODULES

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
B-2.1	Manufacturer	By Supplier	
B-2.2	Model	By Supplier	
B-2.3	Place of Manufacture	By Supplier	
B-2.4	Cell Type	Crystalline Silicon	
B-2.5	Rated Power (Wp) at STC	By Supplier	
B-2.6	Module Efficiency	At least 21%	

ANNEX B.3 – STRING INVERTER

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
B-3.1	Manufacturer	By Supplier	
B-3.2	Model	By Supplier	
B-3.3	Place of Manufacture	By Supplier	
B-3.4	Rating	By Supplier	
B-3.5	Efficiency	$\geq$95%	
B-3.6	Output Voltage (V_{AC})	230 V (nominal voltage adjustable by ±5% via system set points), Single Phase	

Name of Firm | Name & Signature of Representative | Designation

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
B-3.7	Output Frequency (Hz)	60 Hz, ±0.5%	
B-3.8	Topology	Transformerless	

ANNEX B.4 – RAPID SHUTDOWN DEVICE

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
B-4.1	Manufacturer	By Supplier	
B-4.2	Model	By Supplier	
B-4.3	Place of Manufacture	By Supplier	
B-4.4	No. of Controlled PV Module	At least One (1)	
B-4.5	Ingress Protection Rating	At least IP 65 degree	

ANNEX B.5 – RAPID SHUTDOWN INITIATION DEVICE

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
B-5.1	Manufacturer	By Supplier	
B-5.2	Model	By Supplier	
B-5.3	Place of Manufacture	By Supplier	
B-5.4	No. of Controlled PV Module	At least Sixty (60)	
B-5.5	Output Voltage (V_{DC})	By Supplier	
B-5.6	Input Voltage (V_{AC})	230 V, Single Phase	
B-5.7	Frequency (Hz)	60 Hz	

Name of Firm | Name & Signature of Representative | Designation

SECTION VI

PART II-TECHNICAL DATA SHEETS

ELECTRICAL WORKS

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

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. 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.

3. Non submission of the required documents shall be a ground for disqualification.

ANNEX C – SCHEMATIC DIAGRAM

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

Annex C.1	Schematic Diagram of the Proposed Solar PV System with Net Metering Program showing all equipment/components to be furnished.
Annex C.2	Certificate of Site Inspection duly signed by the authorized personnel as stated in *GW-4.0 Site Inspection.*

Note: Failure to submit drawings and documents listed hereunder Annex C shall be ground for disqualification.

D-1.0 SOLAR PV SYSTEM

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-1.1	Total Number of Modules	By Supplier	
D-1.2	No. of Modules in Series (Array)	By Supplier	
D-1.3	Number of Parallel Combination	By Supplier	
D-1.4	Number of Inverters	By Supplier	

D-2.0 SOLAR PV MODULES

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-2.1	Manufacturer	By Supplier	
D-2.2	Model	By Supplier	
D-2.3	Cell Type	Crystalline Silicon	
D-2.4	Rated Power (Wp) at STC	By Supplier	
D-2.5	Module Efficiency	At least 21%	
D-2.6	Solar PV Module Service Life	At least 25 Years	
D-2.7	Rated Voltage (V) at STC	By Supplier	
D-2.8	Rated Current (A) at STC	By Supplier	
D-2.9	Open Circuit Voltage (Voc) at STC	By Supplier	
D-2.10	Short Circuit Current (Isc) at STC	By Supplier	
D-2.11	Power Tolerance	± 3%	
D-2.12	Dimension (L x W)	By Supplier	
D-2.13	Weight (kg)	By Supplier	
D-2.14	Junction Box IP Rating	IP65	

Name of Firm | Name & Signature of Representative | Designation

D-3.0 STRING INVERTER

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-3.1	Manufacturer	By Supplier	
D-3.2	Model	By Supplier	
D-3.3	Inverter Power Rating (KW)	By Supplier	
D-3.4	Efficiency at Rated Power	≥95%	
D-3.5	Input DC Power (KWp)	By Supplier	
D-3.6	No. of MPPT	At least One (1)	
D-3.7	Input Voltage Range per MPPT (V)	By Supplier	
D-3.8	Maximum Open Circuit Voltage per MPPT (V)	By Supplier	
D-3.9	Maximum Input Current per MPPT (A)	By Supplier	
D-3.10	Maximum Short Circuit Current per MPPT (A)	By Supplier	
D-3.11	Nominal Output Voltage (V)	230 V (adjustable by ±5% via system set points)	
D-3.12	Maximum Output Current (A)	By Supplier	
D-3.13	Number of Phase	Single (1)	
D-3.14	Nominal Output Frequency (Hz)	60 Hz, ±0.5%	
D-3.15	Power Factor at Rated Power Rating	By Supplier	
D-3.16	Total Harmonic Distortion	<5%	
D-3.17	Operating Temperature Range (°C)	By Supplier	
D-3.18	Data Interface	Modbus	
D-3.19	Topology	Transformerless	
D-3.20	Ingress Protection Rating	IP65	
D-3.21	Over current Protection	Required	
D-3.22	Overvoltage Protection	Required	
D-3.23	Anti-Islanding Protection	Required	

Name of Firm | Name & Signature of Representative | Designation

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-3.24	DC Reverse Polarity Protection	Required	
D-3.25	Ground Fault Monitoring	Required	
D-3.26	Grid Monitoring	Required	
D-3.27	PV Array Fault Monitoring	Required	
D-3.28	Residual Current Monitoring	Required	

D-4.0 DIGITAL ENERGY METER

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-4.1	Technical and Functional Requirements as stated in **EW-1.6**	Required	
D-4.2	Manufacturer	By Supplier	
D-4.3	Brand and Model	By Supplier	
D-4.4	Place of Manufacture	By Supplier	

D-5.0 RAPID SHUTDOWN DEVICE

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-5.1	Manufacturer	By Supplier	
D-5.2	Brand and Model	By Supplier	
D-5.3	Maximum Number of Controlled Solar PV Module	At least One (1)	
D-5.4	Maximum Operating Voltage (V)	By Supplier	
D-5.5	Maximum Operating Current (A)	By Supplier	
D-5.6	Nominal Operating Ambient Temperature Range (°C)	By Supplier	
D-5.7	Ingress Protection Rating	IP65	

Name of Firm | Name & Signature of Representative | Designation

D-6.0 RAPID SHUTDOWN INITIATION DEVICE

ITEM	DESCRIPTION	NPC REQUIREMENTS	SUPPLIER'S DATA
D-6.1	Manufacturer	By Supplier	
D-6.2	Brand and Model	By Supplier	
D-6.3	Nominal Number of Controlled Solar PV Module/Rapid Shut-down Device	At least Sixty (60)	
D-6.4	Nominal Input Voltage (V)	230 V, Single Phase	
D-6.5	Frequency (Hz)	60	

D-7.0 STANDARD / SPECIAL TOOLS FOR SOLAR PV SYSTEM[1]

ITEM	DESCRIPTION	QTY.
D-7.1	PVC hose, flexible and robust 3/4 inch diameter, at least 20m length with reel assembly	1 unit
D-7.2	Extendable/telescopic panel cleaning pole with detachable squeegee and sponge, at least 5m length with hose attachment (3/4 inch diameter hose)	1 unit
D-7.3	MC4 tool kit, with pairs of MC4 connectors (at least 50% of the number strings), 1 pc of MC4 crimping tool, MC4 connect and disconnect tool	1 lot
D-7.4	Fiberglass Extension step ladder 14/25ft length	1 unit

D-8.0 SPECIAL TOOLS FOR SOLAR PV SYSTEM AS RECOMMENDED BY MANUFACTURER (Except Otherwise Specified)

ITEM	DESCRIPTION	QTY.	UNIT PRICE	TOTAL PRICE[2]
D-8.1				
D-8.2				
D-8.3				

[1] Refer to GW-7.0

[2] Indicated Price shall be used for reference in future purchase orders

Name of Firm | Name & Signature of Representative | Designation

SECTION VI

PART II-TECHNICAL DATA SHEETS

ELECTRICAL WORKS

DOCUMENTS TO BE SUBMITTED DURING IMPLEMENTATION

PART II – TECHNICAL DATA SHEETS

ANNEX E - ADDITIONAL DRAWINGS AND DOCUMENTS TO BE SUBMITTED DURING IMPLEMENTATION

SOLAR PV SYSTEM

ANNEX	DESCRIPTION
Annex E.1	**Manufacturer's General Data and Illustrated Catalogues and Brochures** stating the following minimum requirements for the equipment offered: 1. Solar PV Modules a. Manufacturer b. Model c. Cell Type d. Rated Power (Wp) at STC e. Module Efficiency f. Solar PV Module Service Life g. Rated Voltage (V) at STC h. Rated Current (A) at STC i. Open Circuit Voltage (V_{OC}) at STC j. Short Circuit Current (I_{SC}) at STC k. Power Tolerance l. Dimension (L X W) m. Weight (Kg) n. Junction Box IP Rating 2. String Inverter a. Manufacturer b. Model c. Rating d. Efficiency e. Input DC Power (W) f. No. of MPPT g. Maximum Input Voltage (V_{DC}) h. Minimum Input Voltage (V_{DC}) i. MPP Voltage Range (V_{DC}) j. Maximum Input per MPPT (A) k. Maximum Short Circuit per MPPT (A) l. Maximum Output Current (A) m. Power Factor at rated power (pf) n. Total Harmonic Distortion o. Connection Phase p. Output Voltage (V_{AC}) q. Output Frequency (Hz) r. Data Interface s. Protection Rating

Name of Firm | Name & Signature of Representative | Designation

t. Operating Temperature Range
u. Topology

3. AC Combiner Box
   - Protection Rating
   - Surge Protection
   - Circuit Breakers

4. Power Cables
   600 V THHN/THWN-2 Cable
   a. Manufacturer
   b. Place of Manufacturer
   c. Maximum operating Temperature, °C
   d. Max. continuous current carrying capacity of conductor at 90°C
   e. Conductor Cross-Section, mm2
   f. Conductor Diameter, mm
   g. Maximum Outside Diameter, mm
   h. Conductor Material
   i. Insulation (Material & Thickness)

   1.5kV DC Cable
   a. Manufacturer
   b. Place of Manufacturer
   c. Conductor Size
   d. Conductor Metal
   e. Conductor Shape
   f. Conductor Material
   g. Type of wire
   h. Type of Insulation
   i. Maximum Operating Temperature

5. Grounding System
   General
   a. Bonding Conductor
      - All major equipment such as string inverter, SPV module, AC combiner Box, etc.
      - For Solar PV Array structural support earthing

6. Digital Energy Meter
   a. Manufacturer
   b. Place of Manufacturer
   c. Accuracy Class
   d. Number of Phase
   e. No. of Wires
   f. Voltage (V)
   g. Current Range (A)
   h. Frequency (Hz)
   i. Register Type
   j. LCD Display

Name of Firm | Name & Signature of Representative | Designation

	7. Rapid Shutdown Device a. Manufacturer b. Place of Manufacturer c. Maximum Operating Voltage d. Maximum Operating Current e. Nominal Operating Ambient Temperature Range f. IP Rating 8. Rapid Shutdown Initiation Device a. Manufacturer b. Place of Manufacturer c. Nominal Input Voltage d. Frequency
Annex E.2	Site Acceptance Test Procedure for the following: a) SPV panels b) String Inverters c) Digital Energy Meter
Annex E.3	Warranty Statement for the following (as stated in GW-15 Guarantee): a) SPV panels and Rapid Shut-down Equipment at least 10-year warranty b) String Inverters at least 5-year warranty
Annex E.4	Computation of Performance Ratio and Annual Yield using **PVsyst Software**
Annex E.5	Manufacturer's General Data and Illustrated Catalogues and Brochures stating the manufacturer of the following equipment is certified by **ISO 9001**: a) Solar PV (SPV) Modules b) String Inverters
Annex E.6	Manufacturer's General Data and Illustrated Catalogues and Brochures stating the manufacturer of the following equipment is certified by **ISO 14001**: a) Solar PV (SPV) Modules
Annex E.7	Manufacturer's General Data and Illustrated Catalogues and Brochures stating that the **SPV Modules** to be supplied are complying with the following standards: a) IEC 61215 – Crystalline Silicon Terrestrial Photovoltaic (PV) Modules- Design Qualification and Type Approval b) IEC 61730-1 – Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction c) IEC 61730-2 – Photovoltaic (PV) module safety qualification- Part 2: Requirements for testing d) IEC 61701 – Salt mist corrosion testing of photovoltaic (PV) modules
Annex E.8	Manufacturer's General Data and Illustrated Catalogues and Brochures stating that the **String Inverters** to be supplied are complying with the following standards: a) IEC 62109-1 – Safety of power converters for use in photovoltaic power systems- Part 1: General requirements b) IEC 62109-2 – Safety of power converters for use in photovoltaic power systems- Part 2: Particular requirements for inverters c) IEC 62116 – Utility-interconnected photovoltaic inverters - Test

Name of Firm | Name & Signature of Representative | Designation

	procedure of islanding prevention measures
Annex E.8	Manufacturer's General Data and Illustrated Catalogues and Brochures stating that the **Rapid Shutdown Devices** to be supplied are complying with the following standard: a) UL 1741 – Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources – PV Rapid Shutdown Equipment

Name of Firm | Name & Signature of Representative | Designation

SECTION VII

SCHEDULE OF REQUIREMENTS

SECTION VII - SCHEDULE OF REQUIREMENTS

BPS.1 - Breakdown of Prices

BRGY. PEÑAFRANCIA, DARAGA, ALBAY

Item No.	Description of Work or Materials	QTY.- UNIT	* CODE	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 from Plant 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.	CIVIL WORKS											
A.1	Solar PV Roof-mounted Mounting Structure											
	Design and Supply of Labor and Materials for the installation of Roof mounted Mounting Structure including railings, mid clamp, end clamp, L clamps/klipiock with EPDM, module tin kit, stainless steel bolts, structural steel for electrical equipment shed and other accessories required in the Technical Specifications and as shown on the Bid Drawings	1 Lot										
	SUB-TOTAL A	(Amount in Words)										
B.	ELECTRICAL WORKS											
B.1	Solar PV System											
B.1.1	Solar Panel, Crystalline Silicon Modules	1 Lot										
B.1.2	String Inverters	1 Lot										
B.1.3	Rapid Shutdown system complete with rapid shutdown device, rapid shutdown initiation device and all other necessary accessories and auxiliaries as described in the Technical Specifications, Technical Data Sheet and as shown on the Bid Drawings including installation works.	1 Lot										
B.1.4	Protection Devices, AC Combiner Box with Digital Metering System, DC Box and all other appurtenances as described in the Technical Specifications, Technical Data Sheet and as shown on the Bid Drawings including installation works, testing and commissioning of all major equipment at the Solar PV System.	1 Lot										
B.2	Net Metering											
B.2.1	Service Entrance complete with kWh meter base socket/enclosure service entrance cap, spool insulator and other accessories as described in the Technical Specifications, Technical Data Sheet and as shown on the Bid Drawings including installation works, testing and commissioning.	1 Lot										
B.3	Power, Control & Instrumentation Cables complete with the required accessories for cabling works to interface the supplied equipment to the existing distribution system as described in the Technical Specifications, Technical Data Sheet and as shown on the Bid Drawings including installation works.	1 Lot										
a.	6.0 mm², DC Cable (PV Wire), UV Resistant, up to 1.5kV$_{DC}$											
b.	4.0 mm², fire rated cable											
c.	80 mm², 600V, Heat Resistance Thermoplastic (THHN), copper conductor											
d.	22 mm², 600V, Heat Resistance Thermoplastic (THHN), copper conductor											
e.	8.0 mm², 600V, Heat Resistance Thermoplastic (THHN), copper conductor											
f.	5.5 mm², 600V, Heat Resistance Thermoplastic (THHN), copper conductor											

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 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

BPS.1 - Breakdown of Prices

BRGY. PEÑAFRANCIA, DARAGA, ALBAY

Item No.	Description of Work or Materials	QTY.- UNIT	* CODE	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 from Plant 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)
B.4	Conduits complete with the required accessories for cabling works as described in the Technical Specifications and Technical Data Sheets as shown on the Bid Drawings including installation works.	1 Lot										
B.5	Grounding System complete with the required electrode grounding conductor, equipment bonding riser, exothermic welding materials, ground rods and other accessories as described in the Technical Specifications and Technical Data Sheets as shown on the Bid Drawings including installation works.	1 Lot										
	SUB-TOTAL B	(Amount in Words)										
C.	**OTHER WORKS/SUPPLY/SERVICES**											
C.1	**Compliance on the legal, administrative and associated payment requirements for the connection of on-grid solar PV system such as:**	1 Lot										
a.	Net-Metering application to Distribution Utility (DU);											
b.	Local Government Unit (LGU) Building Permit & Electrical Permit;											
c.	Distribution Impact Study (as applicable);											
d.	LGU Certificate of Final Inspection;											
e.	Energy Regulation Commission (ERC) Certificate of Compliance (COC); and											
f.	DU Connection Agreement.											
C.2	Standard / Special Tools for Solar PV System including their auxiliaries as described in the Technical Specifications(TS-GW-7.0) and Technical Data Sheet (TDS-EW-PO-D-7.0).	1 Lot										
C.3	Training at Plant Site for at least eight (8) NPC Personnel as described in the Technical Specifications.	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 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

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)

- PhilGEPs Certificate of Registration and Membership under Platinum Category (all pages) in accordance with Section 8.5.2 of the Revised IRR of RA. 9184;

  Note: The failure by the prospective bidder to update its Certificate with the current and updated Class "A" eligibility documents shall result in the automatic suspension of the validity of its Certificate until such time that all of the expired Class "A" eligibility documents has been updated;

- 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. 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.)

- 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-10.2 of Section VI - Technical Specifications (GW-General Works);
- Complete eligibility documents of the proposed subcontractor, if any

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 Two (2) copies of the first and second components of its Bid, marked Original and photocopy. Only the original copy will be read and considered for the bid. Any misplaced document outside of the Original copy will not be considered. The photocopy is ONLY FOR REFERENCE. 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.(i) of the revised IRR of R.A. 9184.*

Standard Form Number: NPCSF-GOODS-02

List of All Ongoing Government and Private Contracts Including Contract Awarded But Not Yet Started

Business Name : _____
Business Address : _____

Name of Contract/ Project Cost	a. Owner's Name b. Address c. Telephone Nos.	Nature of Work	Bidder's Role		a. Date Awarded b. Date Started c. Date of Completion or Contract Duration/ Date of Delivery	Value of Outstanding Works / Undelivered Portion
			Description	%		
Government						
Private						
					Total Cost	

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.

Note : This statement shall be supported with the following documents for all the contract(s) stated above which shall be submitted during Post-qualification:

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.

Submitted by : _____
(Printed Name & Signature)

Designation : _____
Date : _____

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 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.	₱
2.	₱

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 that the difference between the amount of the said Principal's Bid and the amount of the Bid that is accepted by the Employer.

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

DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY, LuzP21Z1349Se

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

I/We[1], 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
Gabriel Y. Itchon Building
Sen. Miriam P. Defensor-Santiago Ave.
(formerly BIR Road) corner Quezon Avenue
Diliman, Quezon City, Philippines 1100

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 **DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY (LuzP21Z1349Se)** 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
Gabriel Y. Itchon Building
Sen. Miriam P. Defensor-Santiago Ave.
(formerly BIR Road) corner Quezon Avenue
Diliman, Quezon City, Philippines 1100

[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

SECTION IX

BID DRAWINGS

CW – CIVIL WORKS

EW – ELECTRICAL WORKS

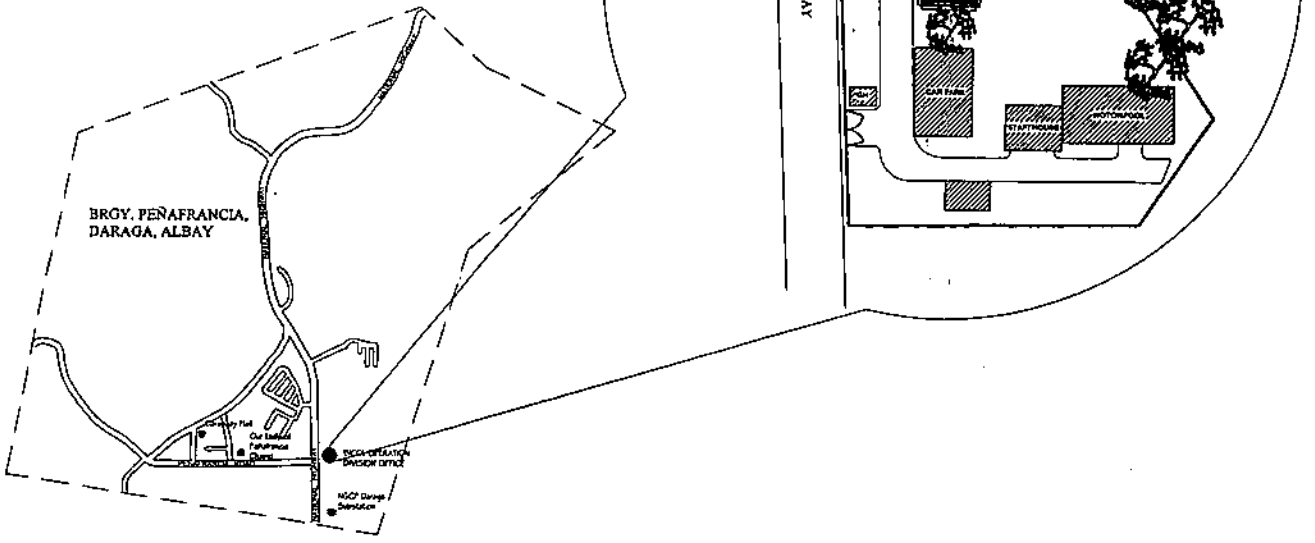
SECTION IX

BID DRAWINGS

CIVIL WORKS

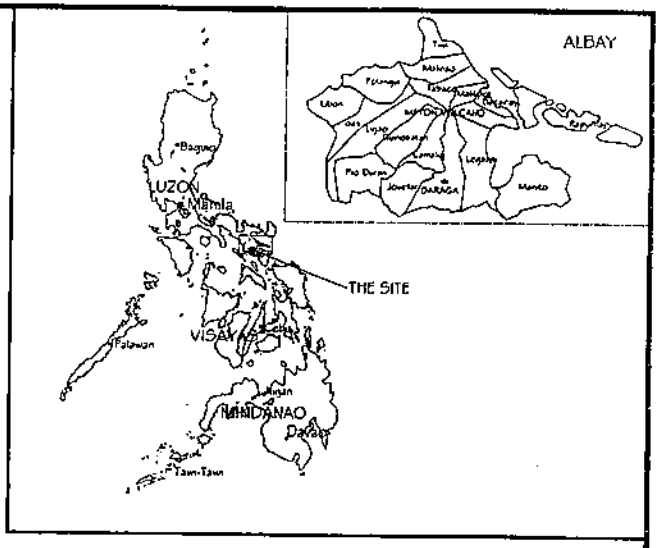
TABLE OF CONTENTS
BID DRAWINGS

CW – CIVIL WORKS



VICINITY MAP

BODSPV-BDC-17.001 SCALE NTS



LOCATION MAP

NOT TO SCALE

LEGENDS:

- EXISTING STRUCTURES
- SOLAR PANELS
- PERIMETER FENCE

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: NATIONAL HIGHWAY, BRGY. PEÑAFRANCIA, DARAGA, ALBAY

TITLE: VICINITY MAP (BICOL OPERATIONS DIVISION OFFICE)

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, PRINCIPAL ENGINEER/HEAD

RECOMMENDED: A/C. ESPIRITU, MANAGER, CEAD

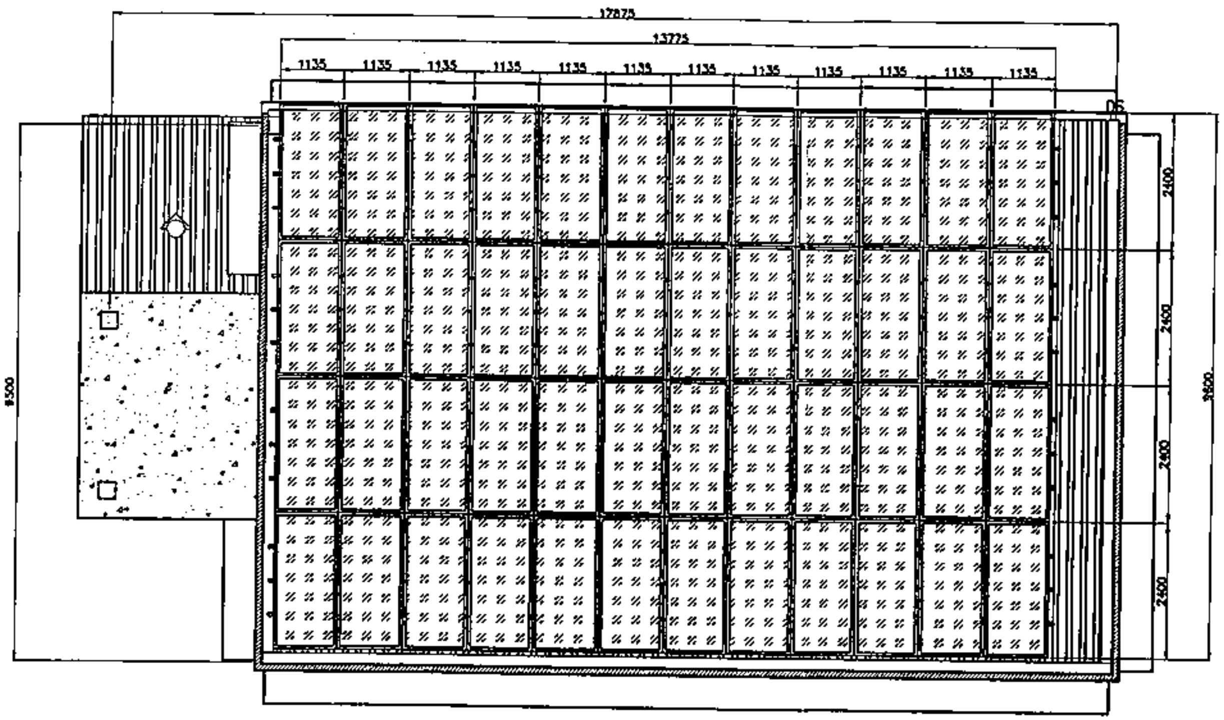
APPROVED: N. G. DONOSIERRA, MANAGER, BOD

DWG. NO. BODSPV-BDC-17.001 SPECS. NO. LuzP2121346Se

SCALE: AS SHOWN BID DRAWING REV. 0

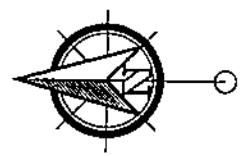
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

[redacted] [redacted] [redacted]



SOLAR PANEL LAYOUT

BODSPV-BDC-17.002 SCALE NTS



NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THIS DRAWING IS FOR BIDDING PURPOSES ONLY. THE SUPPLIER SHALL DESIGN THE ROOF MOUNTED MOUNTING STRUCTURE INCLUDING ITS CONNECTION TO THE EXISTING ROOF STRUCTURE.

LEGEND:

– SOLAR PANEL

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

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: NATIONAL HIGHWAY, BRGY. PEÑAFRANCIA, DARAGA, ALBAY

TITLE: **SOLAR PANEL LAYOUT**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: N. G. SOMOSIERRA, Manager, DDD

DWG. NO. BODSPV-BDC-17.002 SPECS. NO. LuzP21Z1349Se

SCALE: 1:150 **BID DRAWING** REV. 0

SECTION IX

BID DRAWINGS

ELECTRICAL WORKS

TABLE OF CONTENTS
BID DRAWINGS

EW – ELECTRICAL WORKS

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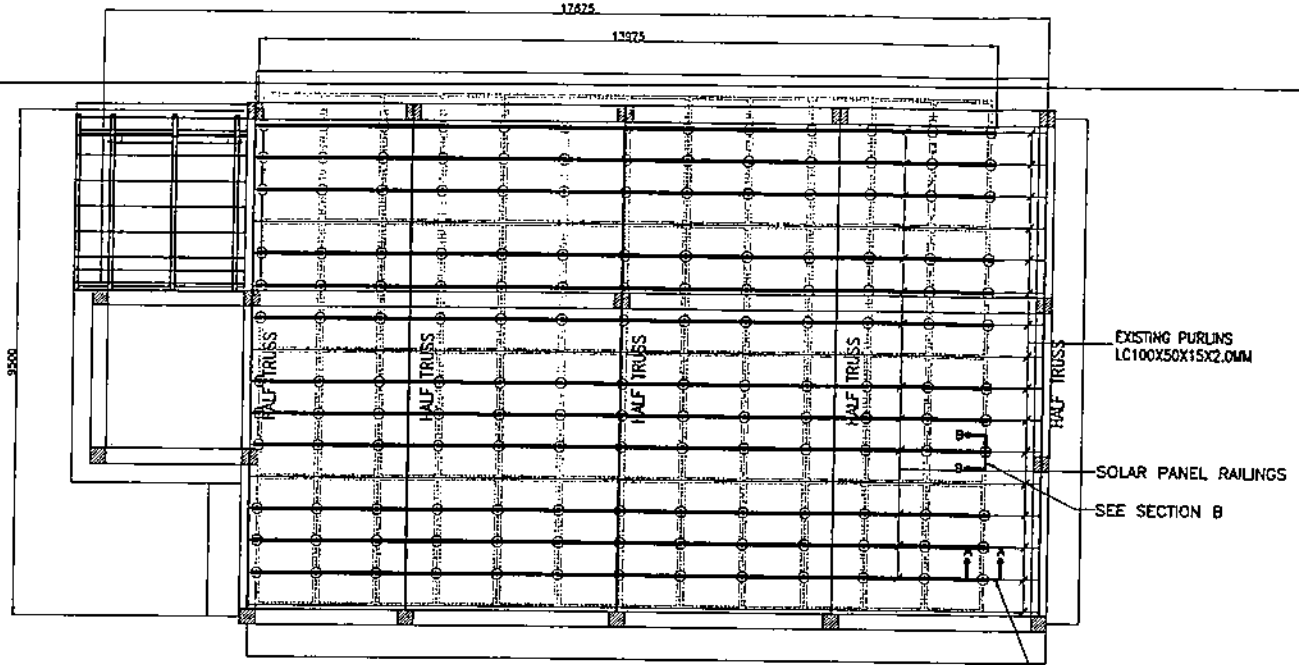
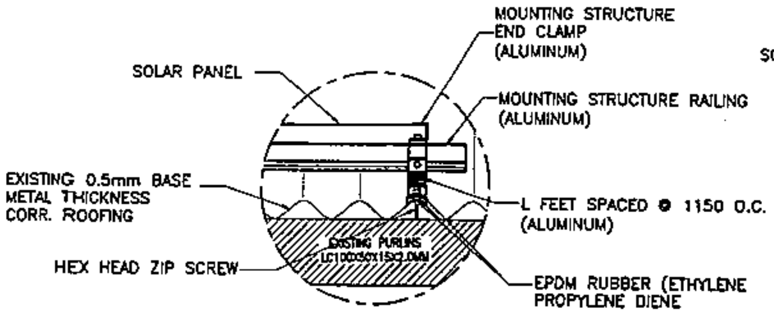
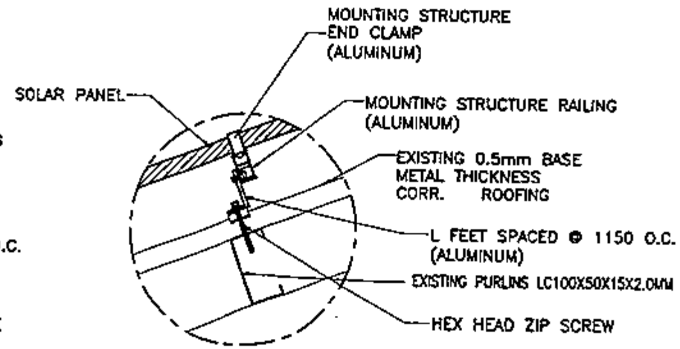


RAILINGS LAYOUT

BODSPV-BDC-17.003 SCALE NTS



SECTION A



SECTION B

DETAILS OF MOUNTING STRUCTURE COMPONENTS & CONNECTIONS

BODSPV-BDC-17.003 SCALE NTS

LEGEND:

- SOLAR PANEL FOOTPRINT
- LOCATION OF SOLAR PANEL & MOUNTING STRUCTURE CONNECTION TO EXISTING PURLINS

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THIS DRAWING IS FOR BIDDING PURPOSES ONLY. THE SUPPLIER SHALL DESIGN THE ROOF MOUNTED MOUNTING STRUCTURE INCLUDING ITS CONNECTION TO THE EXISTING ROOF STRUCTURE.
3. THE DESIGN OF THE ROOF MOUNTED MOUNTING STRUCTURE SHALL RESIST A WIND LOAD OF 300KPH

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

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: NATIONAL HIGHWAY, BRGY. PEÑAFRANCIA, DARAGA, ALBAY

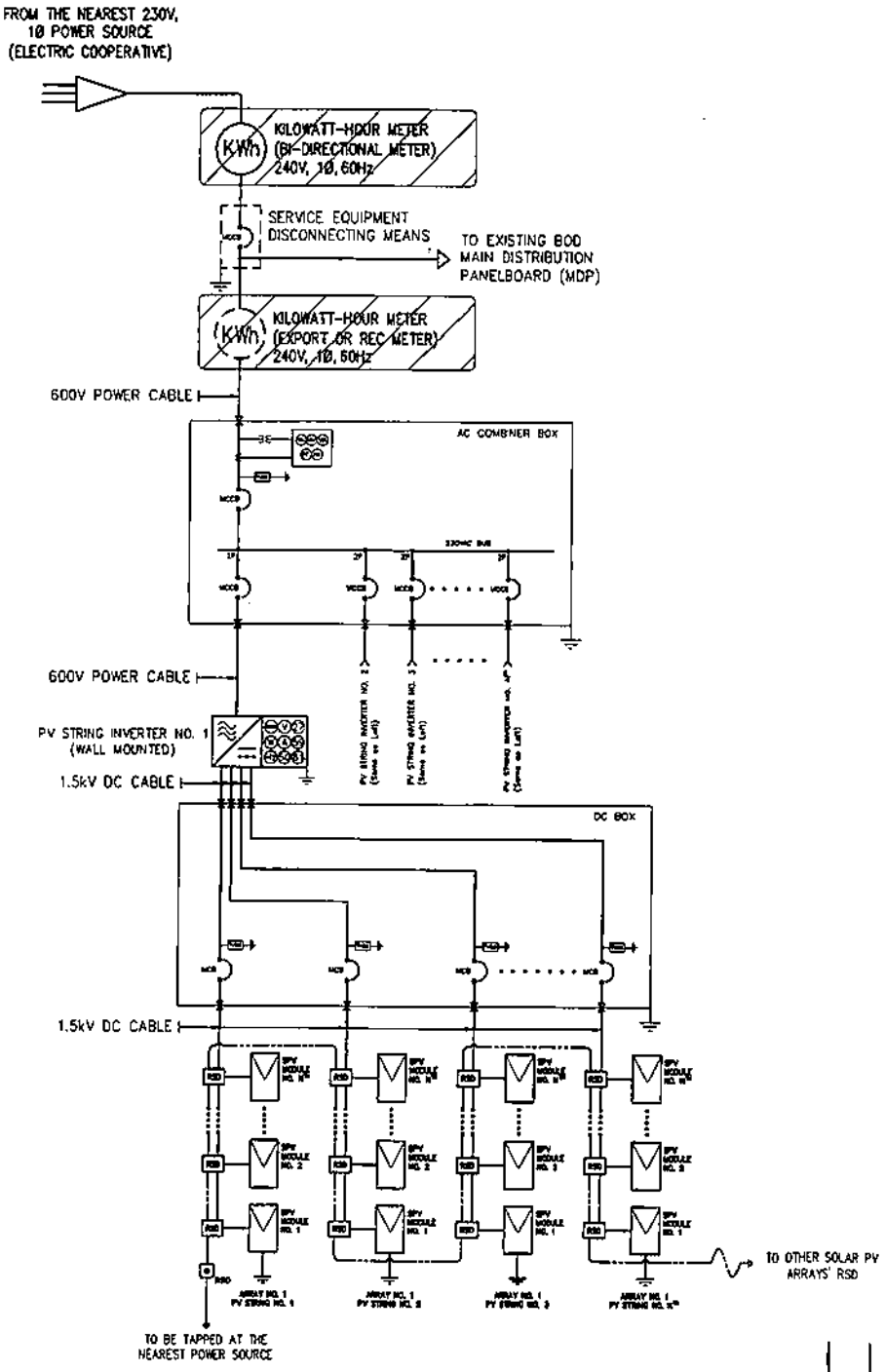
TITLE: RAILINGS LAYOUT AND DETAILS OF MOUNTING STRUCTURE COMPONENTS & CONNECTIONS

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: N. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: N. G. SOMOSIERRA, Manager, DDD

DWG. NO. BODSPV-BDC-17.003 SPECS. NO. LuzP21Z1349Se

SCALE: AS SHOWN BID DRAWING REV. 0



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. ACTUAL QUANTITIES, RATING AND SIZES OF PV-ARRAYS, INVERTERS, CIRCUIT BREAKERS, RAPID SHUTDOWN EQUIPMENT, WIRES INCLUDING ALL NECESSARY MATERIALS AND ACCESSORIES SHALL BE DETERMINED, FURNISHED AND INSTALLED BY THE SUPPLIER.
3. THE DETAILED DESIGN AND NECESSARY CALCULATION FOR THE REQUIRED NUMBER AND SIZES OF PV-ARRAYS, INVERTERS, WIRES, CONDUITS AND CIRCUIT BREAKERS SHALL BE SUBMITTED FOR NPC'S REVIEW AND APPROVAL.
4. THIS DRAWING IS APPLICABLE FOR BEHIND-THE-METER CONNECTION SCHEME AND FOR BIDDING PURPOSES ONLY. IN THE CASE THE SUPPLIER OPT TO USE THE FULL FEED-IN CONNECTION SCHEME, THE SUPPLIER SHALL PROVIDE APPROPRIATE SINGLE LINE DIAGRAM ACCORDING FOR SUCH NET METERING CONNECTION SCHEME.
5. PULL BOXES OF APPROPRIATE SIZE SHALL BE PROVIDED TO ACCOMMODATE THE NUMBER OF SPLICES OF WIRES.
6. EXPOSED NON CURRENT-CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, AND CONDUCTOR ENCLOSURES SHALL BE PROPERLY GROUNDED.
6. EQUIPMENT (KWH METER) SHADED IN ▨ PORTION WILL BE SUPPLIED BY THE LOCAL ELECTRIC COOPERATIVE WHILE EQUIPMENT DRAWN IN ▭ ARE EXISTING. ALL OTHERS ARE INCLUDED IN THE CONTRACT.

LEGEND:

- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- KWH — KILOWATT-HOUR METER
- V — VOLTMETER
- A — AMMETER
- MCB — MINIATURE CIRCUIT BREAKER
- MCCB — MOLDED CASE CIRCUIT BREAKER
- 27 — UNDERVOLTAGE RELAY
- 59 — OVERVOLTAGE RELAY
- 50 — INSTANTANEOUS OVERCURRENT RELAY
- 81 — FREQUENCY RELAY
- — GROUND/EARTH
- — ALTERNATING CURRENT
- — DIRECT CURRENT
- — CONTROL/SIGNAL CONNECTIONS
- RSD — RAPID SHUTDOWN DEVICE
- RSD — RAPID SHUTDOWN INITIATION DEVICE

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., BGY. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: BRGY. PEÑAFRANCIA, DARAGA, ALBAY

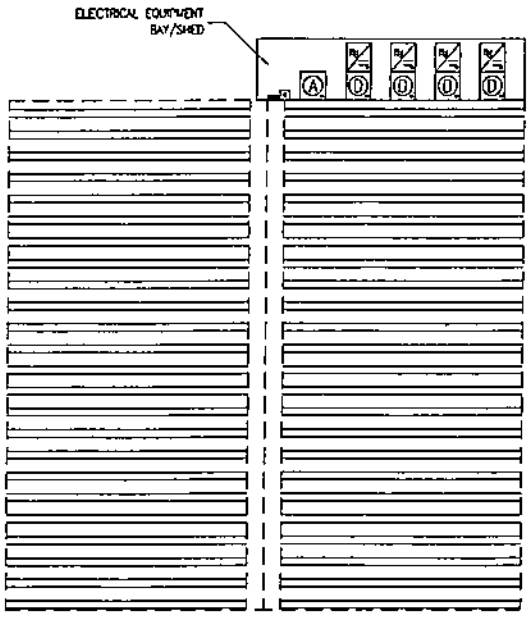
TITLE: **SINGLE LINE DIAGRAM (SOLAR PV SYSTEM)**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R. A. VERAR, Engineer A
RECOMMENDED: A. S. CANDELARIA, III, Manager, EEICO
APPROVED: G. B. MAGPOC, JR., Manager, DOO

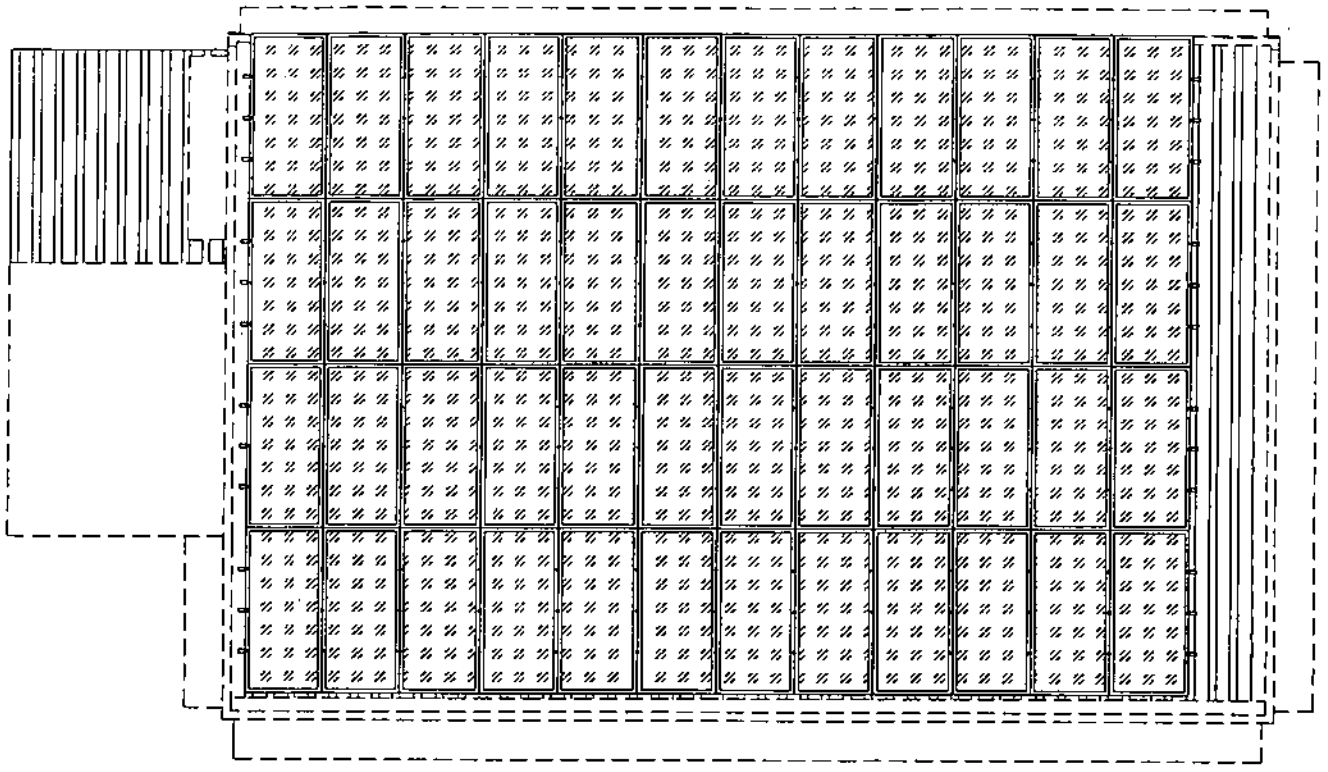
DWG. NO. BODSPV-BDE-17.001 | SPECS. NO. LuzP21Z1349Se

SCALE: NTS | **BID DRAWING** | REV. 1



BOD COMPOUND CANTEEN/CAFETERIA

BODSPV-BDE-17.002 SCALE NTS



BICOL OPERATIONS DIVISION OFFICE

BODSPV-BDE-17.002 SCALE 1:80

NOTES:

1. ALL DRAWING SHADED IN ▭ PORTION ARE EXISTING. ALL OTHERS ARE INCLUDED IN THE CONTRACT.
2. EXPOSED NON CURRENT-CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, CONDUCTOR, AND PROTECTION ENCLOSURES SHALL BE PROPERLY GROUNDED.
3. ALL STRING INVERTERS, DC BOX, AC COMBINER BOX AND PV RAPID SHUTDOWN EQUIPMENT SHALL BE LOCATED AND MOUNTED IN ACCORDANCE TO THE PROVISION IN THE TECHNICAL SPECIFICATIONS. THE SUPPLIER SHALL PROVIDE PROPER AND ADEQUATE PROTECTION SUITABLE ON THE ACTUAL MOUNTING LOCATION OF SUCH EQUIPMENT.
4. FINAL NUMBER OF ELECTRICAL EQUIPMENT AND ACCESSORIES SHALL BE BASED ON THE PROPOSED CONSTRUCTION PLAN BY THE SUPPLIER SUBJECT FOR THE EVALUATION OF NPC.
5. ELECTRICAL EQUIPMENT BAY/SHED SHALL BE PROVIDED TO AVOID RAPID DEGRADATION OF THE MAJOR EQUIPMENT. PROVISION FOR SHED INSTALLATION SHALL BE IN ACCORDANCE TO THE GENERAL WORKS AND CW BID DRAWINGS.

LEGEND:

- — STRING INVERTER
- Ⓐ — AC COMBINER BOX
- Ⓓ — DC BOX
- RSD — RAPID SHUTDOWN DEVICE
- RSD — RAPID SHUTDOWN INITIATION DEVICE

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

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: BRGY. PEÑAFRANCIA, DARAGA, ALBAY

TITLE: **EQUIPMENT LAYOUT (SOLAR PV SYSTEM)**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

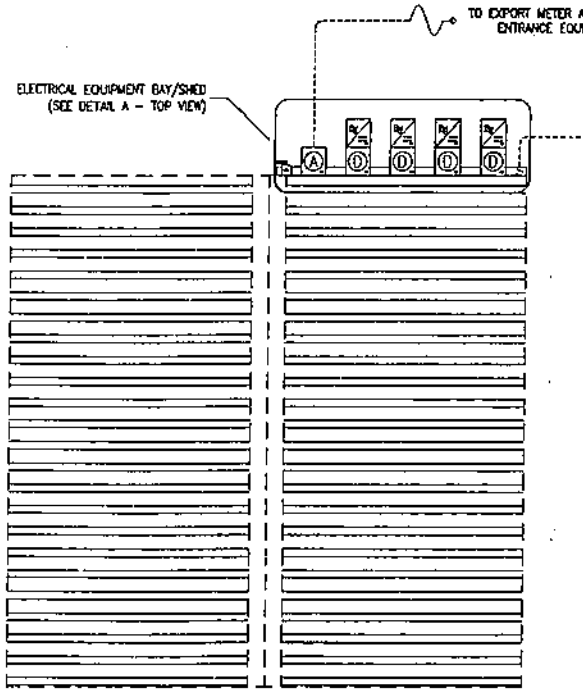
SUBMITTED: B. M. AGUILA
Principal Engineer A

RECOMMENDED: for: C. Z. C. LUGOD JR.
Manager, EEDD

APPROVED: N. G. SOMOSIERRA
Manager, ODD

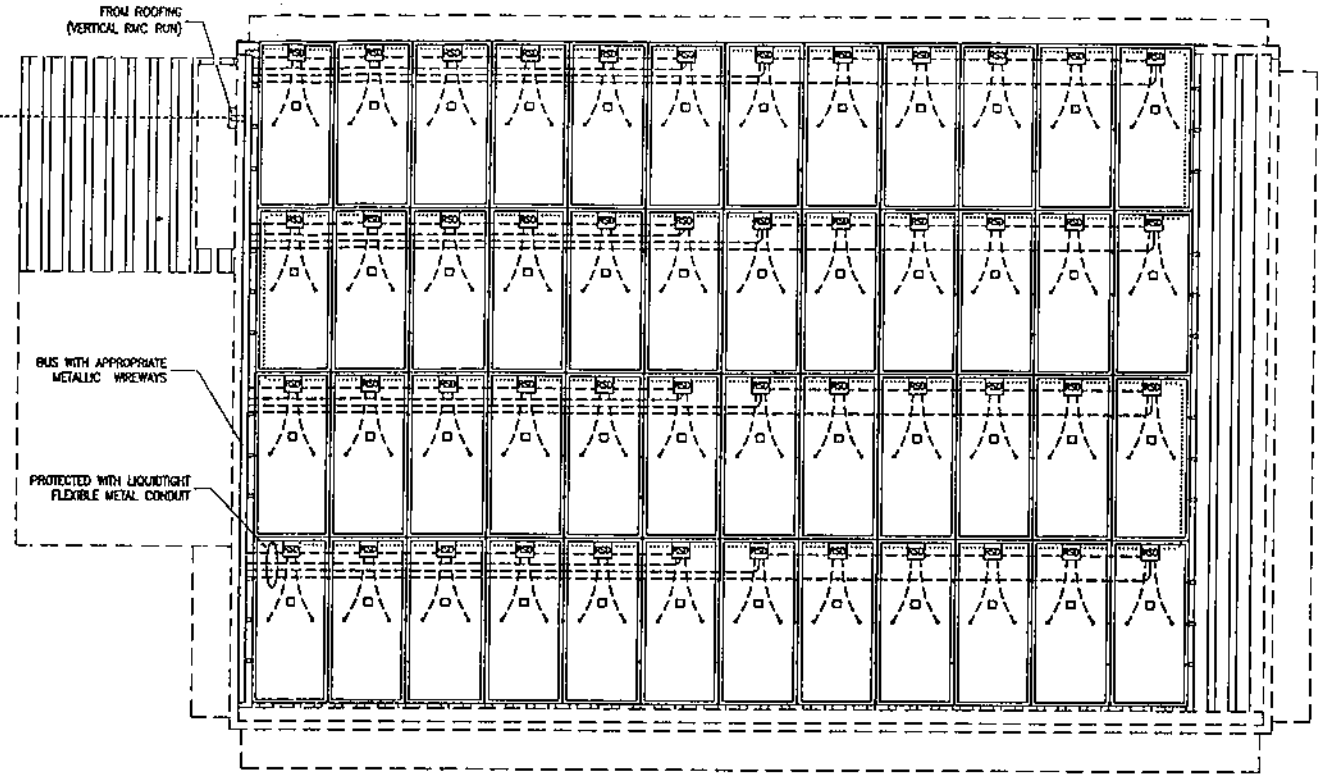
DWG. NO. BODSPV-BDE-17.002 SPECS. NO. LuzP21Z1349Se

SCALE: AS SHOWN BID DRAWING REV. 0



BOD COMPOUND CANTEEN/CAFETERIA

BODSPV-BDE-17.003 SCALE NTS



BICOL OPERATIONS DIVISION OFFICE

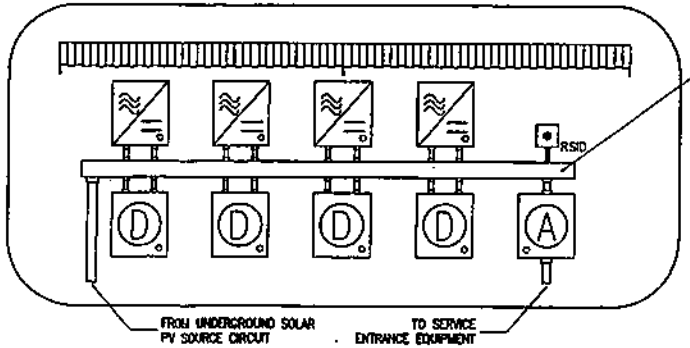
BODSPV-BDE-17.003 SCALE 1:80

NOTES:

1. ALL DRAWING SHADED IN ▭ PORTION ARE EXISTING. ALL OTHERS ARE INCLUDED IN THE CONTRACT.
2. EXPOSED NON CURRENT-CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, CONDUCTOR, AND PROTECTION ENCLOSURES SHALL BE PROPERLY GROUNDED.
3. ALL STRING INVERTERS, DC BOX, AC COMBINER BOX AND PV RAPID SHUTDOWN EQUIPMENT SHALL BE LOCATED AND MOUNTED IN ACCORDANCE TO THE PROVISION IN THE TECHNICAL SPECIFICATIONS. THE SUPPLIER SHALL PROVIDE PROPER AND ADEQUATE PROTECTION SUITABLE ON THE ACTUAL MOUNTING LOCATION OF SUCH EQUIPMENT.
4. FINAL NUMBER OF ELECTRICAL EQUIPMENT AND ACCESSORIES SHALL BE BASED ON THE PROPOSED CONSTRUCTION PLAN BY THE SUPPLIER SUBJECT FOR THE EVALUATION OF NPC.
5. ALL OTHER RACEWAY TYPES RUNNING TOWARDS AND FROM THE METALLIC WIREWAYS SHALL BE PERMITTED FOR ITS USE AND SHALL BE CONNECTED WITH APPROPRIATE ADAPTORS AND COUPLING.
6. THIS DRAWING IS FOR BIDDING PURPOSES ONLY. THE CONTRACTOR SHALL IDENTIFY THE ACTUAL SIZE ADN LOCATION OF THE CABLE RACEWAY AND NECESSARY PULL BOXES.
7. ELECTRICAL EQUIPMENT BAY/SHED SHALL BE PROVIDED TO AVOID RAPID DEGRADATION OF THE MAJOR EQUIPMENT. PROVISION FOR SHED INSTALLATION SHALL BE IN ACCORDANCE TO THE GENERAL WORKS AND CW BID DRAWINGS.

LEGEND:

- STRING INVERTER
- AC COMBINER BOX
- DC BOX
- RAPID SHUTDOWN DEVICE
- RAPID SHUTDOWN INITIATION DEVICE
- CIRCUIT RUNNING UNDERGROUND
- CONTROL CIRCUIT
- EXPOSED WIRING



ELECTRICAL EQUIPMENT BAY/SHED (DETAIL A - FRONT VIEW)

BODSPV-BDE-17.003 SCALE NTS

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

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: BRGY. PEÑAFRANCIA, DARAGA, ALBAY

TITLE: **WIRING LAYOUT**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	MUNICIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

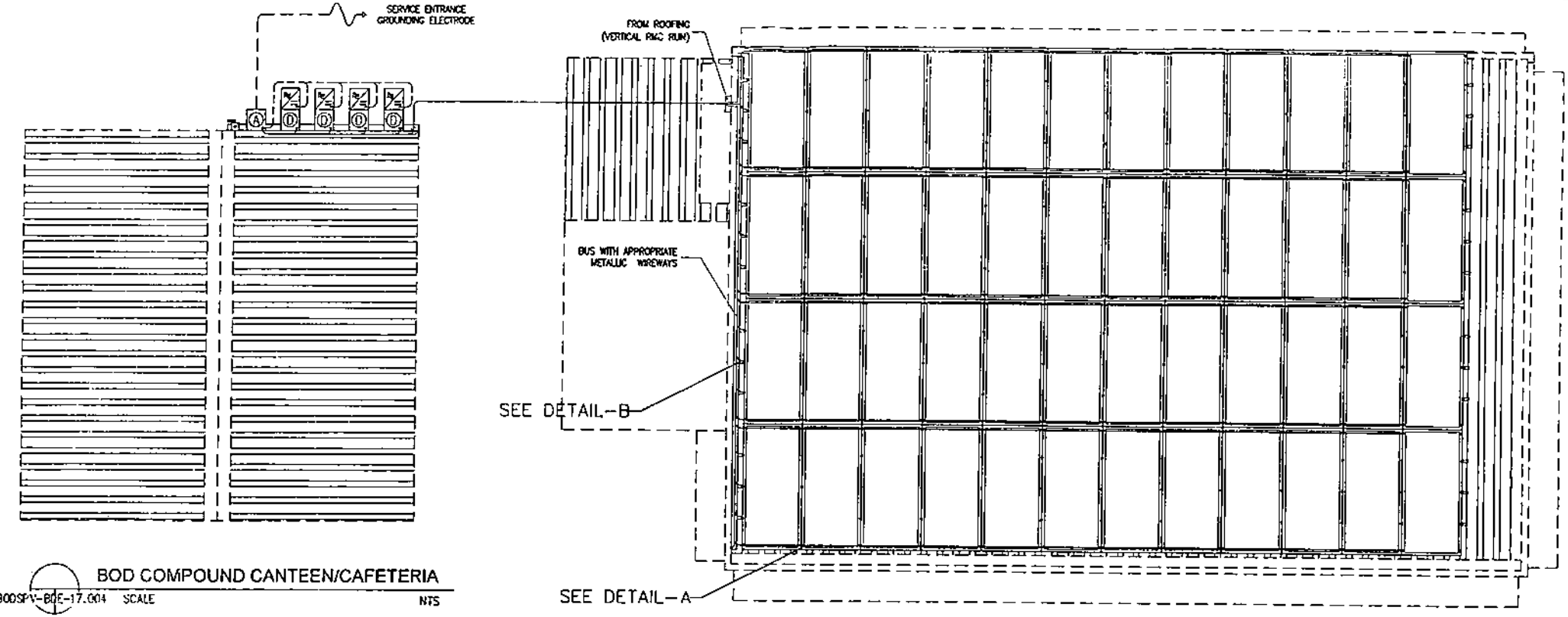
SUBMITTED: B. M. AGUILA 4/30/21
Principal Engineer A

RECOMMENDED: E. Z. C. LOGOD JR.
Manager, DBDD

APPROVED: J. N. G. SOMOSIERRA
Manager, DOD

DWG. NO. BODSPV-BDE-17.003 SPECS. NO. LuzP21Z1349Se

SCALE: AS SHOWN BID DRAWING REV: 0



BOD COMPOUND CANTEEN/CAFETERIA

BODSPV-BDE-17.004 SCALE NTS

BICOL OPERATIONS DIVISION OFFICE

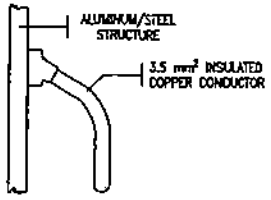
BODSPV-BDE-17.004 SCALE 1:80

NOTES:

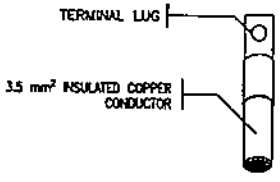
1. ALL DRAWING SHADED IN ▭ PORTION ARE EXISTING. ALL OTHERS ARE INCLUDED IN THE CONTRACT.
2. EXPOSED NON CURRENT-CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, CONDUCTOR, AND PROTECTION ENCLOSURES SHALL BE PROPERLY GROUNDED.
3. IN THE CASE WHERE THE NEAREST EXISTING GROUND ROD HAS PRACTICABLE DISTANCE FROM THE BICOL OPERATIONS DIVISION OFFICE, TAPPING OF GROUNDING CONDUCTOR SHALL BE PERMITTED PROVIDED THAT PROPER AND ALL EQUIPMENT GROUNDING REQUIREMENTS ARE MET.
4. FINAL NUMBER OF ELECTRICAL EQUIPMENT AND ACCESSORIES SHALL BE BASED ON THE PROPOSED CONSTRUCTION PLAN BY THE SUPPLIER SUBJECT FOR THE EVALUATION OF NPC.
5. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

LEGEND:

- — STRING INVERTER
- — AC COMBINER BOX
- — DC BOX
- — RAPID SHUTDOWN DEVICE
- — RAPID SHUTDOWN INITIATION DEVICE
- ——— — 3.5 mm² INSULATED STRANDED ANNEALED COPPER
- - - - - — 5.5 mm² INSULATED STRANDED ANNEALED COPPER
- — — — — 22 mm² INSULATED STRANDED ANNEALED COPPER



DETAIL - A



DETAIL - B

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

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM IN BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: BRGY. PEÑAFRANCIA, DARAGA, ALBAY

TITLE: **SOLAR PV GROUNDING LAYOUT**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: B. M. AGUILA
RECOMMENDED: E. Z. C. LUGOD JR.
APPROVED: N. G. GOMOSIERRA

DWG. NO. BODSPV-BDE-17.004 SPECS. NO. LuzP21Z1349Se

SCALE: AS SHOWN **BID DRAWING** REV. 0

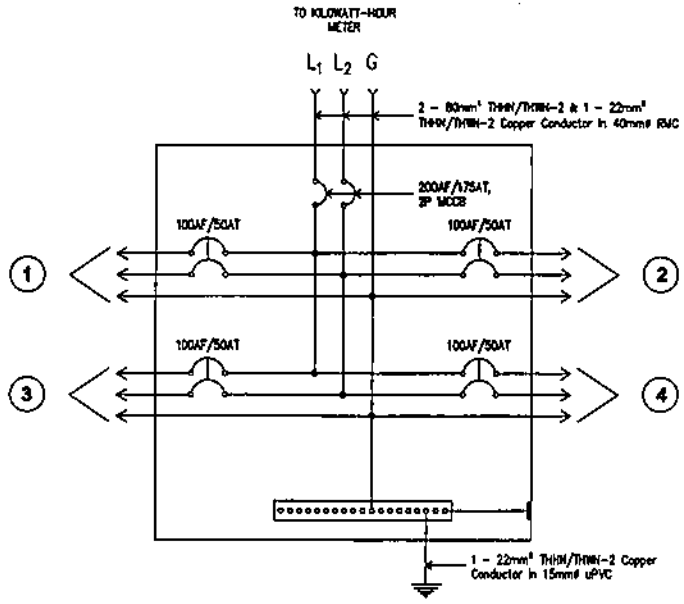
SCHEDULE OF LOADS
(AC COMBINER BOX)

CKT NO.	DESCRIPTION	VA	VOLTAGE (L-L)	AMPERE (1Ø)	SIZE		
					BREAKER	WIRE	CONDUIT
1	7.5 KW STRING INVERTER	7500	230	32.61	100AF/50AT	2 - 8.0mm² THHN/THWN-2 1 - 5.5mm² THHN/THWN-2	20mmØ LFMC
2	7.5 KW STRING INVERTER	7500	230	32.61	100AF/50AT	2 - 8.0mm² THHN/THWN-2 1 - 5.5mm² THHN/THWN-2	20mmØ LFMC
3	7.5 KW STRING INVERTER	7500	230	32.61	100AF/50AT	2 - 8.0mm² THHN/THWN-2 1 - 5.5mm² THHN/THWN-2	20mmØ LFMC
4	7.5 KW STRING INVERTER	7500	230	32.61	100AF/50AT	2 - 8.0mm² THHN/THWN-2 1 - 5.5mm² THHN/THWN-2	20mmØ LFMC
	TOTAL	30000	230	130.43			

PROVIDE: 200AF/175AT, 2P, MCCB
WITH BRANCH CIRCUIT OF:
4 - 100AF/50AT, 2P, MCCB

PROVIDE: 2 - 80mm² THHN/THWN-2 Copper Conductor and
1 - 22mm² THHN/THWN-2 (Grounding) Copper Conductor
in 40mmø RMC

RISER DIAGRAM



GENERAL NOTES:

1. ALL WORKS SHALL BE DONE IN ACCORDANCE WITH THE LATEST PROVISIONS OF THE PHILIPPINE ELECTRICAL CODE, LAWS AND ORDINANCES OF THE LOCAL CODE ENFORCING AUTHORITIES.
2. POWER SUPPLY SHALL BE SINGLE PHASE, 230 VOLTS, 60 HERTZ, TWO (2) WIRE SYSTEM TO BE TAKEN FROM THE NEAREST TAPPING POINT. POWER SUPPLY SHALL BE RUN UNDERGROUND. THE SUPPLIER SHALL SUBMIT THE ACTUAL LAYOUT OF THE POWER SUPPLY ROUTE.
3. METHOD OF WIRING SHALL BE AS INDICATED IN THE BID DRAWINGS WITH PROPER FITTINGS, DEVICES, BOXES AND SUPPORTS, WORK SHALL BE AS PER PLAN AND SPECIFICATIONS AS TO LOCATION, TYPE AND USE.
4. CONDUIT RUNS ARE INDICATIVE ONLY. THE ACTUAL RUNS SHALL BE DETERMINED IN THE FIELD.
5. WIRES, BOXES, ELECTRICAL AS WELL AS NON-ELECTRICAL MATERIALS NOT INCLUDED IN THE PLANS AND SPECIFICATION BUT NECESSARY TO COMPLETE THE JOB SHALL BE FURNISHED AND INSTALLED BY THE SUPPLIER.
6. ALL ELECTRICAL MATERIALS TO BE USED IN THE INSTALLATION SHALL BE NEW, STANDARD AND APPROVED TYPE AS TO LOCATION, TYPES AND PURPOSE.
7. MINIMUM SIZE OF DC CABLE TO BE USED SHALL BE 6.0 mm² IN 20 mmø LIQUIDTIGHT FLEXIBLE METAL CONDUIT UNLESS OTHERWISE SPECIFIED IN THE PLAN.
8. ELECTRICAL WORKS SHALL BE DONE UNDER THE DIRECT SUPERVISION OF A DULY LICENSED ELECTRICAL ENGINEER.

ADDITIONAL NOTES:

1. ACTUAL QUANTITIES, RATING AND SIZES OF CIRCUIT BREAKERS, CONDUCTORS AND CONDUITS SHALL BE DETERMINED BY THE SUPPLIER BASED ON THE ACTUAL SYSTEM REQUIREMENTS.
2. THIS DRAWING IS APPLICABLE FOR BEHIND-THE-METER CONNECTION SCHEME ONLY. IN THE CASE THE SUPPLIER OPT TO USE THE FULL FEED-IN CONNECTION SCHEME, THE SUPPLIER SHALL PERFORM ALL THE NECESSARY ADJUSTMENTS FOR THE PROPER AND SAFE OPERATION OF THE ON-GRID SOLAR PV SYSTEM.
3. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.

OWNER: NATIONAL POWER CORPORATION
GABRIEL Y. ITCHON BLDG., BEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM BY BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: BRGY. PERAFRANCIA, DARAGA, ALBAY

TITLE: SCHEDULE OF LOADS, RISER DIAGRAM AND GENERAL NOTES

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: RAF. VERAR, Electrical Engineer A
RECOMMENDED: A. S. CONDELARIA, III, Engineer, EDCD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. BODSPV-BDE-17.005 SPECS. NO. LuzP21Z1349Se

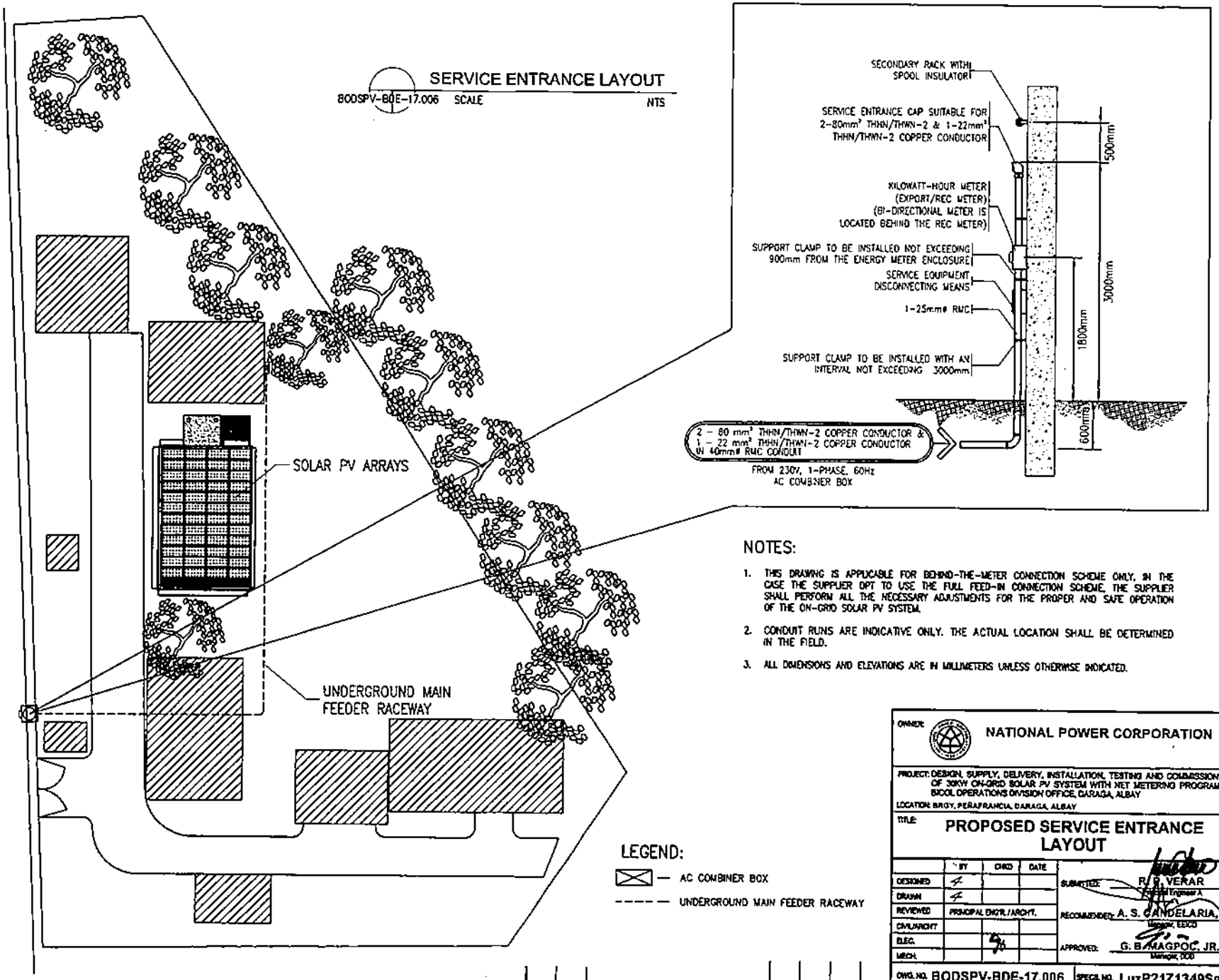
SCALE: NTS BID DRAWING REV. 1

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

NATIONAL HIGHWAY

SERVICE ENTRANCE LAYOUT

BODSPV-BDE-17.006 SCALE NTS



NOTES:

1. THIS DRAWING IS APPLICABLE FOR BEHIND-THE-METER CONNECTION SCHEME ONLY. IN THE CASE THE SUPPLIER OPT TO USE THE FULL FEED-IN CONNECTION SCHEME, THE SUPPLIER SHALL PERFORM ALL THE NECESSARY ADJUSTMENTS FOR THE PROPER AND SAFE OPERATION OF THE ON-GRID SOLAR PV SYSTEM.
2. CONDUIT RUNS ARE INDICATIVE ONLY. THE ACTUAL LOCATION SHALL BE DETERMINED IN THE FIELD.
3. ALL DIMENSIONS AND ELEVATIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

LEGEND:

- AC COMBINER BOX
- UNDERGROUND MAIN FEEDER RACEWAY

OWNER: NATIONAL POWER CORPORATION

PROJECT: DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF 30KW ON-GRID SOLAR PV SYSTEM WITH NET METERING PROGRAM (NM) BICOL OPERATIONS DIVISION OFFICE, DARAGA, ALBAY

LOCATION: BRGY. PERAFRANCIA, DARAGA, ALBAY

TITLE: **PROPOSED SERVICE ENTRANCE LAYOUT**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R. P. VERAR, Electrical Engineer A

RECOMMENDED: A. S. CANDELARIA, III, Manager, EECD

APPROVED: G. B. MAGPOC, JR., Manager, DOD

OWG. NO. BODSPV-BDE-17.006 SPECS. NO. LuzP21Z1349Se

SCALE: NTS **BID DRAWING** REV. 1

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