PHILIPPINE NATIONAL OIL COMPANY
PNOC BLDG. 6, ENERGY CENTER, RIZAL DRIVE
BONIFACIO GLOBAL CITY, TAGUIG CITY

PHILIPPINE BIDDING DOCUMENTS

Project Title : **Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System**

ITB No. : 2025-02-039

Sixth Edition
July 2020

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Glossary of Acronyms, Terms, and Abbreviations

ABC – Approved Budget for the Contract.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender.* (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

CDA - Cooperative Development Authority.

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

CIF – Cost Insurance and Freight.

CIP – Carriage and Insurance Paid.

CPI – Consumer Price Index.

DDP – Refers to the quoted price of the Goods, which means "delivered duty paid."

DTI – Department of Trade and Industry.

EXW – Ex works.

FCA – "Free Carrier" shipping point.

FOB – "Free on Board" shipping point.

Foreign-funded Procurement or Foreign-Assisted Project– Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

Framework Agreement – Refers to a written agreement between a procuring entity and a supplier or service provider that identifies the terms and conditions, under which specific purchases, otherwise known as "Call-Offs," are made for the duration of the agreement. It is in the nature of an option contract between the procuring entity and the bidder(s) granting the procuring entity the option to either place an order for any of the goods or services identified in the Framework Agreement List or not buy at all, within a minimum period of one (1) year to a maximum period of three (3) years. (GPPB Resolution No. 27-2019)

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term "related" or "analogous services" shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

GPPB – Government Procurement Policy Board.

INCOTERMS – International Commercial Terms.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

Supplier – refers to a citizen, or any corporate body or commercial company duly organized and registered under the laws where it is established, habitually established in business and engaged in the manufacture or sale of the merchandise or performance of the general services covered by his bid. (Item 3.8 of GPPB Resolution No. 13-2019, dated 23 May 2019). Supplier as used in these Bidding Documents may likewise refer to a distributor, manufacturer, contractor, or consultant.

UN – United Nations.

Section I. Invitation to Bid

PHILIPPINE NATIONAL OIL COMPANY

PNOC Building 6, Energy Center
Rizal Drive, BGC, Taguig City
Tel No.: 8789-7662
www.pnoc.com.ph, www.philgeps.gov.ph

INVITATION TO BID

Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System

Invitation to Bid No. 2025-02-039

1. Philippine National Oil Company (PNOC), through the *2025 Approved Corporate Operating Budget,* intends to apply the sum of,

Lot No.	Description	Qty/UOM	ABC
Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System			
1	25 kWp Solar PV Rooftop System at Carmona Water District Admin Building	1 lot	1,350,000.00
2	48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)	1 lot	3,000,000.00
3	80 kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR	1 lot	4,600,000.00
		Total	**8,950,000.00**

being the Approve Budget for the Contract (ABC) to payments under the contract for ***Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System*** with identification number **2025-02-039**. Bids received in excess of the ABC shall be automatically rejected at bid opening.

2. The PNOC now invites bids for the above Procurement Project. Delivery of Goods and Services is required within and completion of the project as shown in Section VI. Schedule of Requirements. Bidders should have completed, within five (5) years 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. (Instructions to Bidders).

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) 9184, otherwise known as the "Government Procurement Reform Act".

   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. Interested bidders may obtain further information from the PNOC-Procurement Management Division and inspect the Bidding Documents at the address given below during ***working hours from 8:00 AM to 5:00 PM***.

5. A complete set of Bidding Documents may be acquired by interested Bidders on ***February 13, 2025*** from the given address below and upon payment of a non-refundable fee amounting to,

Lot No.	Description	Qty/UOM	Bidding Documents Fee
Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System			
1	25 kWp Solar PV Rooftop System at Carmona Water District Admin Building	1 lot	1,300.00
2	48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)	1 lot	3,000.00
3	80 kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR	1 lot	4,600.00

The procuring entity shall allow the bidder to present its proof of payment for the fees in person, by facsimile, or through electronic means.

6. The PNOC will hold a Pre-Bid Conference on ***February 20, 2025 (09:00 AM)*** at PNOC Bldg. 6, Energy Center, Rizal Drive, BGC, Taguig City and/or through video conferencing via ***Google Meet*** which shall be open to prospective bidders.

7. Bids must be duly received by the BAC Secretariat through manual submission at the address indicated below on or before ***March 11, 2025 (10:00 AM)***. Late bids shall not be accepted.

8. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB** Clause 14.

9. Bid opening shall be on ***March 11, 2025 (10:30 PM)*** at given address below and/or via ***Google Meet***. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. The PNOC 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 RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:

The Secretariat
Bids and Awards Committee
Philippine National Oil Company
PNOC Bldg. 6, Energy Center
Rizal Drive, BGC, Taguig City
Telephone No. (02) 8789-7757
E-Mail: cfcmelo@pnoc.com.ph / procurement@pnoc.com.ph
Website: www.pnoc.com.ph

12. For downloading of Bidding Documents
www.philgeps.com.ph and http://www.pnoc.com.ph/bids.php

ATTY. JOSEPHINE CASSANDRA J. CUI
BAC Chairperson

Section II. Instructions to Bidders

1. Scope of Bid

The Procuring Entity, PNOC, wishes to receive Bids for the **Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System** , including tools, equipment and materials, with identification number **2025-02-039**.

The Procurement Project, **Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System** for PNOC is composed of **Three (3) Lots**, the details of which are described in Section VII (Technical Specifications).

2. Funding Information

2.1. The GOP through the source of funding as indicated below for 2025 Approved Corporate Operating Budget in the amount of,

Lot No.	Description	Qty/UOM	ABC
Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System			
1	25k Wp Solar PV Rooftop System at Carmona Water District Admin Building	1 lot	1,350,000.00
2	48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)	1 lot	3,000,000.00
3	80 kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR	1 lot	4,600,000.00
		Total	**8,950,000.00**

2.2. The source of funding is the Approved Corporate Operating Budget.

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. *[Select one, delete other/s]*

a. Foreign ownership exceeding those allowed under the rules may participate pursuant to:

i. When a Treaty or International or Executive Agreement as provided in Section 4 of the RA No. 9184 and its 2016 revised IRR allow foreign bidders to participate;

ii. 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;

iii. When the Goods sought to be procured are not available from local suppliers; or

iv. When there is a need to prevent situations that defeat competition or restrain trade.

b. Foreign ownership limited to those allowed under the rules may participate in this Project.

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:

a. For the procurement of Non-expendable Supplies and Services: The Bidder must have completed a single contract that is similar to this Project, 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 Procuring Entity has prescribed that subcontracting is not allowed.

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 (Checklist of Technical and Financial Documents)**.

10.2. The Bidder's SLCC as indicated in **ITB** Clause 5.3 should have been completed within *five (5) 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.

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 (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 e.

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 **Section VII (Technical Specifications).**

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[1] 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 until *[indicate date]*. Any Bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

15. Sealing and Marking of Bids

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

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

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

16. Deadline for Submission of Bids

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

17. Opening and Preliminary Examination of Bids

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

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

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

18. Domestic Preference

[1] In the case of Framework Agreement, the undertaking shall refer to entering into contract with the Procuring Entity and furnishing of the performance security or the performance securing declaration within ten (10) calendar days from receipt of Notice to Execute Framework Agreement.

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 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 15 shall be submitted for each lot or item separately.

19.3. The descriptions of the lots or items shall be indicated in **Section VII (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 as follows:

One Project having several items grouped into several lots, which shall be awarded as separate contracts per lot .

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

20.2. 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

Bid Data Sheet

<table>
<tr><th>ITB Clause</th><th></th></tr>
<tr><td>5.3</td><td>For this purpose, contracts similar to the Project shall be:

Solar PV contract with minimum total installed capacity of 500 kWp within the last five (5) years prior to the deadline for submission and opening of bids.</td></tr>
<tr><td>7.1</td><td>Sub-contracting is not allowed.</td></tr>
<tr><td>12</td><td>No further instructions</td></tr>
<tr><td>14.1</td><td>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 than One Hundred Seventy-Nine Thousand Pesos (PhP179,000.00) or 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 Four Hundred Forty-Seven Thousand Five Hundred Pesos (PhP447,500.00) or five percent (5%) of ABC if bid security is in Surety Bond.</td></tr>
<tr><td>19.3</td><td>Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System

ABC:
<table>
<tr><th>Lot No.</th><th>Description</th><th>Qty/UOM</th><th>ABC</th></tr>
<tr><td colspan="4">Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System</td></tr>
<tr><td>1</td><td>25 kWp Solar PV Rooftop System at Carmona Water District Admin Building</td><td>1 lot</td><td>1,350,000.00</td></tr>
<tr><td>2</td><td>48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)</td><td>1 lot</td><td>3,000,000.00</td></tr>
<tr><td>3</td><td>80 kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR</td><td>1 lot</td><td>4,600,000.00</td></tr>
<tr><td colspan="3">Total</td><td>8,950,000.00</td></tr>
</table></td></tr>
<tr><td>20.2</td><td>No additional requirement</td></tr>
<tr><td>21.2</td><td>No additional requirement</td></tr>
</table>

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

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 prior to 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.

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 IV (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

6.1. 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.

6.2. 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

Special Conditions of Contract

GCC Clause	
1	**Delivery and Documents –** For purposes of the Contract, "EXW," "FOB," "FCA," "CIF," "CIP," "DDP" and other trade terms used to describe the obligations of the parties shall have the meanings assigned to them by the current edition of INCOTERMS published by the International Chamber of Commerce, Paris. The Delivery terms of this Contract shall be as follows: The delivery terms applicable to the Contract are delivered to the Project Site. Risk and title will pass from the Supplier to the Procuring Entity upon receipt and final acceptance of the Goods at their final destination. " The delivery terms applicable to this Contract are delivered to: For Carmona Water District: Carmona Water Distict Admin Building Cityland Subdivision, Brgy. Carmona, Cavite For Angeles City Water District: ACWD Central Reservoir Pumping Station Angeles City, Pampanga For TESDA: TESDA Regional Training Center – NCR TESDA Complex, East Service Road, Taguig City Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in Section VI (Schedule of Requirements). For purposes of this Clause the Procuring Entity's Representative at the Project Site is: **Ms. Alma B. Taganas** OIC - Manager Business Research and Development Department **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.

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:

a. 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

b. 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 (Schedule of Requirements)** and the cost 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 a period of ***one (1) year.***

Spare parts or components shall be supplied as promptly as possible, but in any case, within ***one (1) month*** 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.

<table>
<tr><td></td><td>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.</td></tr>
<tr><td>2.2</td><td>Terms of Payment

Milestone payments will be adopted where the payment shall be released upon reaching the specific project milestone, to ensure that these conform to the requirements set for the purpose.

The payments are subject to the usual government accounting and auditing requirements. Hence, the Contractor is expected to be familiar with the Government Accounting and Auditing Manual (GAAM).

<table>
<tr><th>Project Milestone</th><th>Percentage of Payment</th></tr>
<tr><td>Completion of installation and testing & commissioning</td><td>90%</td></tr>
<tr><td>Handover and completion of training for building operators</td><td>10%</td></tr>
</table>

Retention Money: 10% for every progress billing.</td></tr>
<tr><td>4</td><td>No further instruction</td></tr>
</table>

Section VI. Schedule of Requirements

The delivery schedule expressed as weeks/months stipulates hereafter a delivery date which is the date of delivery to the project site.

Lot No.	Description	Qty/UOM	Activity	Delivery Period
Supply, Delivery, Installation, Testing and Commissioning of Various Solar PV Rooftop System				
1	25 kWp Solar PV Rooftop System at Carmona Water District Admin Building	1 lot	**Engineering, Procurement, Construction, Testing, Commissioning Rooftop Solar System**	Within One Hundred Twenty (120) calendar days upon receipt of Notice to Proceed (NTP)
			Operation and Maintenance of Rooftop Solar System	Within Three Hundred Sixty-Five (365) calendar days from the official start of operation of Rooftop Solar PV System
2	48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)	1 lot	**Engineering, Procurement, Construction, Testing, Commissioning Rooftop Solar System**	Within One Hundred Twenty (120) calendar days upon receipt of Notice to Proceed (NTP)
			Operation and Maintenance of Rooftop Solar System	Within Three Hundred Sixty-Five (365) calendar days from the official start of operation of Rooftop Solar PV System
3	80 kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR	1 lot	**Engineering, Procurement, Construction, Testing, Commissioning Rooftop Solar System**	Within One Hundred Twenty (120) calendar days upon receipt of Notice to Proceed (NTP)

			Operation and Maintenance of Rooftop Solar System	Within Three Hundred Sixty-Five (365) calendar days from the official start of operation of Rooftop Solar PV System

Name of Company: _____

Authorized Representative: _____
(Name and Signature)

Section VII. Technical Specifications

Technical Specifications

Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. **Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection.** A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.

Lot No. : **1**
Description : **25kWp Solar PV Rooftop System at Carmona Water District Admin Building**
Qty/UOM : **1 Lot**

Item No.	Technical Requirements		Statement of Compliance
1	**SOLAR PV MODULES**		
	General		
	Manufacturer	Supplier must specify	
	Model Number	Supplier must specify	
	Rated Capacity in Watt peak	Supplier must specify	
	Cell Type	N-Type Monocrystalline	
	Number of Cells	Supplier must specify	
	Efficiency	17%	
	Guaranteed Output (Minimum)		
	after 1 Year	97%	
	after 5 Years	95%	
	after 10 Years	90%	
	after 25 Years	80%	
	Warranty	10 Years (minimum)	
	Mechanical Characteristics		
	Dimension	Supplier must specify	
	Weight	30.6kg maximum	
	Front Cover Only (if monofacial), or Front and Back Cover (if bifacial	2.0mm to 3.2mm, High transmission, Tempered glass,	
	Frame	Anodized Aluminum Alloy	
	Junction Box Enclosure (minimum)	IP68 Rated	
	Connectors	MC4 or equivalent (1 male and 1 Female per module)	
	Cables Cros-Section Size	1*4.0mm^2 or equivalent	
	Electrical Parameters @ STC		

	Maximum system voltage (V_{max})	Supplier must specify	
1	Nominal Operating Temperature	Supplier must specify	
	Maximum Power Voltage (Vmp)	Supplier must specify	
	Maximum Power Current (Imp)	Supplier must specify	
	Open-circuit Voltage (V_{OC})	Supplier must specify	
	Short-circuit Current (I_{SC})	Supplier must specify	
	Temperature coefficient of Pmax	Supplier must specify	
	Temperature coefficient of Voc	Supplier must specify	
	Temperature coefficients of Isc	Supplier must specify	
	Standards and Certifications		
	Manufacturer Category	Must be Tier1 - CATEGORY LISTED BY Bloomberg New Energy Finance Latest Report	
	Resilient in extreme weather condition	Compliant with IEC 61215 or equiv.	
	Wind load Capacity	2400 Pa	
	Static load Capacity	5400 Pa	
	Salt Mist Corrosion Resistant	Compliant with IEC 61701 or equiv.	
	Ammonia Corrosion Resistant	Compliant with IEC 62716 or equiv.	
	PV Module Electrical and Mechanical Operating Safety Qualification	Compliant with IEC 61730 or equiv.	
	Quality Management System	Compliant with ISO 9001 or equiv.	
	Occupational Health and Safety Management System	Compliant with OHSAS 45001 or equiv.	
	Environment Management System	ISO 14001: 2015 or equivalent	
	With authorized distributor in the Philippines	Must have certified and authorized service center in the Philippines	
2	**INVERTER**		
	Manufacturer	Supplier must specify	
	Model Number	Supplier must specify	
	Rated AC Power	Supplier must specify	
	Maximum AC Active Power	Supplier must specify	
	Type	String Type	
	Nominal Output Voltage	**Three-Phase, 220V to 240V or 400V to 480V**	

2	Maximum Input Voltage	Supplier must specify	
	Operating Voltage/ Start Voltage	Supplier must specify	
	Maximum Input Current per MPPT / Maximum Short Circuit Current per MPPT	Supplier must specify	
	Number of MPPT Trackers/ Maximum Number of Inputs	Supplier must specify	
	Efficiency	98.5%, (minimum)	
	Dimension (W x H x D)	Supplier must specify	
	Weight	Supplier must specify	
	Operating temperature range	–25°C to +60°C (–13°F to +140°F)	
	Topology	Transformer-less	
	Degree of Protection	IP66 (minimum)	
	Protective Devices	Anti-islanding Protection/AC Output Overcurrent/DC Reverse Polarity Protection/Strings Monitoring/DC Surge Protection (Type II)/AC Surge Protection (Type II)	
	Display	Graphic LCD/LED	
	Warranty	5 Years	
	Standards and Certifications		
	Inverter	IEC 62109-1/IEC 62109-2 (Class I, grounded communication Class II, PELV	
		IEC 62116	
		IEC 61727	
3	**INVERTER CONTROLLER**		
	Manufacturer	Supplier must specify (Must be same with Inverter)	
	Model Number	Supplier must specify	
	Max. number of manageable device	20	
	Power Supply	100 to 240 V	
	Interaction	Supplier must specify	
	Operating temperature range	Supplier must specify	
	Communication Protocol	Supplier must specify	
	Mounting	DIN top-hat rails or wall mounting	
	Degree of Protection	IP65 (minimum)	
	MOUNTING STRUCTURE		
	General		
	Manufacturer	Bidder must specify	
	Module Type Compatibility	Framed or frameless	
	Wind Speed	Customizable	
		Anodized structural grade	

4	Material	aluminum alloy (AL6005-T5) and stainless-steel components (SS/SUS 304)	
	Standard	Compliant with AS/NZS1170.2:2011 AMDT 2-2012 or equiv.	
	Major Components		
	L-clamp	Bidder must specify	
	End Clamp (part number)	Bidder must specify	
	Inter/Mid Clamp (part number)	Bidder must specify	
	Railing (part number)	Bidder must specify	
	Rail-Splicer (part number)	Bidder must specify	
	Mounting/L-Clamp (part number)	Bidder must specify	
	Other Components	Shall be determined as per actual site condition	
	OTHER COMPONENTS (refer to Section 21.2 Minimum PV System Components Specifications)		
5	DC Combiner (if needed)		
6	AC Combiner		
7	Transformer (if needed)		
8	Transient Voltage Surge Suppressor with Isolation Switch		
9	PV Generation (Revenue) Meter Including CT/PT and Terminals		
10	ECB Main Disconnect Switch		
11	Cables		
12	Raceways (Cable Trays, Conduits, PVC Pipes and Fittings, Accessories)		
13	Lightning Arrester and Grounding System (if needed)		
14	PV Monitoring and Data Acquisition System		
15	CCTV/IP Surveillance Camera		
16	Communication and Control Cables, Radio Transmission or Fiber Optics or Equivalent		

Terms of Reference

1. Project Description

The Philippine National Oil Company (PNOC), under its Three Arrows Strategy, is revolutionizing sustainable energy solutions by spearheading rooftop solar power projects for various government buildings. This initiative supports the government's strategy to reduce its dependence on international fuel markets and promote renewable energy use.

In line with the Inter-Agency Energy Efficiency and Conservation Committee (IAEECC) Resolution of 07 July 2023, government entities, including government-owned and controlled corporations (GOCCs), state universities and colleges (SUCs), and local government units (LGUs), are mandated to install at least 20% of their electricity requirements from Solar Photovoltaic (PV) systems or equivalent renewable energy technologies within three years.

Additionally, this project aligns with the Government Energy Management Program (GEMP), which encourages a minimum 10% reduction in electricity consumption across all government entities. By ensuring zero export of energy to the distribution grid, this forward-thinking project not only reduces costs but also elevates environmental stewardship, setting a new standard for green energy in the public sector.

PNOC invites submissions from reputable organizations (referred to as "the Contractor") capable of providing a comprehensive turnkey solution encompassing engineering, procurement, construction, commissioning, and testing and commissioning, and one-year operations and maintenance (referred to as "EPCTC") for the Project.

The project shall be named "**Supply, Delivery, Installation, Testing and Commissioning of 25kWp Solar PV Rooftop System at Carmona Water District Admin Building**". The project site is located at Cityland Subdivision, Brgy. Carmona, Cavite.

2. Objectives of the Contract

The intent of the Terms of Reference is to provide the general and technical requirements necessary for the implementation of the project. However, it is the Contractor's obligation to investigate and validate all information herewith as part of their work to be undertaken. Thus, any discrepancies in the TOR in accordance with applicable and generally accepted engineering and construction practices, government rules and regulation and the latest industry codes and standards for solar PV development shall not relieve the Contractor of the accuracy of their work.

a. **Define Project Scope**: Clearly outline the scope of work for the turnkey EPC (Engineering, Procurement, and Construction) contractor, including project preparation, procurement, installation, construction, testing, commissioning, and operation and maintenance (O&M).
b. **Establish Deliverables**: Specify the required deliverables, including documentation, performance guarantees, and O&M plans, to ensure comprehensive project execution and accountability.
c. **Set Performance Standards**: Provide criteria for the performance and quality of the solar PV systems, ensuring they meet industry standards and regulatory requirements.
d. **Detail Compliance Requirements**: Ensure the EPC contractor adheres to all relevant local, national, and international regulations and standards, promoting safety, reliability, and environmental responsibility.
e. **Specify Evaluation Criteria**: Establish the criteria for selecting the EPC contractor, focusing on experience, technical expertise, financial stability, and the quality of the proposed solutions.
f. **Ensure Zero Export Compliance**: Mandate that the solar PV systems operate with zero export to the distribution grid, ensuring on-site energy optimization and compliance with regulatory requirements.
g. **Provide Maintenance Guidelines**: Include a comprehensive one-year O&M plan to ensure the longevity, efficiency, and optimal performance of the installed solar PV systems.
h. **Promote Transparency and Reporting**: Require regular progress reports from the EPC contractor to PNOC, detailing project milestones, challenges, and resolutions, fostering transparency and effective project management.

3. Approved Budget for the Contract (ABC)

PNOC has an approved corporate budget in the amount of One Million Three Hundred Fifty Thousand Pesos (**Php 1,350,000.00**) for the Project.

4. Scope of Works

The scope of work for the Contractor includes:

4.1. Project Preparation

The Contractor shall facilitate all preliminary and general works on time so that any issues or problems encountered can be addressed. If the Contractor fails to timely execute the works, then any delays due to pending issues and problems shall be of the Contractor's account.

- Kick-off Meeting

  The Contractor shall schedule a kick-off meeting no later than ten (10) calendar days starting from the date of commencement as stated in the NTP. The kick-off meeting shall be held at site to discuss mobilization and construction schedules and other details necessary prior project execution. All key personnel must be available during the kick-off meeting.

- Mobilization

  The Contractor shall facilitate the mobilization of manpower and equipment, including operating supplies and tools necessary for the project immediately after the kick-off meeting.

- Temporary Facilities and Storage/Staging Area

  The contractor shall be provided with a temporary headquarters immediately after the kick-off meeting. The location of the headquarters and storage/staging area shall be determined with the consent of the building owner.

- Site Survey and Assessment

  The Contractor shall undertake its own site survey, verification, and assessment, including actual measurements of voltage, current, frequency and power quality for a period of seven (7) calendar days upon mobilization, identification of access, etc., to identify all necessary information about the site conditions and design parameters. Additionally, the Contractor shall perform an energy yield assessment to estimate the potential solar energy generation in the installation site

  The assessment shall also include the condition of roof and existence of roof leaks, and the safety and reliability of the existing electrical system(s) and the whole installation, and maintenance concerns. All findings and necessary engineering intervention shall be incorporated in the detailed project designs and engineering plans and shall be properly addressed during construction.

- Permits and Clearances

The Contractor shall secure the construction permit, safety permit, building permit and other approvals, clearances, and licenses necessary prior to the start of construction and installation.

The Contractor shall also secure necessary permits/documents as required by the Distribution Utility for the installation of the rooftop solar PV system on the installation site.

- Detailed Project Designs and Engineering Plans

The Contractor shall submit Detailed Project Designs and Engineering Plans no later than ten (10) calendar days starting from the date of commencement stated in the NTP. The Detailed Project Designs and Engineering Plans must reflect all additional requirements and information needed based on the reviewed preliminary design drawings.

The Detailed Project Designs and Engineering Plans shall be furnished using engineering standard templates, adequate, readable and must be written in English. The Contractor must use computer-aided design and drafting software (CAD) or equivalent. Likewise, electronic components with built-in programs and software shall be accompanied with their corresponding programs and ladder logic diagrams for submission to PNOC prior to the installation of the systems.
The Detailed Project Designs and Engineering Plans shall be signed and sealed by Professional Engineers (Electrical and/or Civil/Structural Engineer), and PNOC and building owner's authorized representatives. PNOC shall have the right to require the Contractor additional drawings or information as may be necessary.

The minimum number of original copies to be produced by the Contractor shall be 3 sets of A3 size and 2 electronic copies containing CAD and PDF files, as an advance copy. The Contractor must also submit a hard copy as an official document. PNOC reserves the right to reproduce any drawings or documents received from the Contractor as may be necessary.
To avoid revisions, the Contractor may submit first draft drawings or e-file via email before printing the Detailed Project Designs and Engineering Plans.

4.2. Procurement

The Contractor shall be responsible for the procurement of all equipment and construction materials, including consumables, necessary to complete the project.

All delivered equipment and construction materials, including consumables, shall be subject to testing and inspection by PNOC. Testing and inspection includes visual checking, measurement, validation of specifications (in the nameplates) and other applicable testing methods as deemed necessary. PNOC shall release a Materials Inspection Report (MIR) for the findings of the inspected materials. Any damage or deficiency shall be rectified or replaced by the Contractor without additional charges to PNOC.

- Equipment and Construction Materials

The Contractor may source all equipment and construction materials, including consumables locally or abroad provided these shall conform to the required design specifications and standards. In case of changes in the source of supply or brand, the Contractor shall submit a letter of request stating the reasons for the changes for PNOC's review and approval.

- Factory Acceptance Test (FAT)

  The Contractor must provide any proof that the manufacturer's factory or fabricator's shop has passed the FAT for the solar panels and inverters. All related testing expenses shall be of the Contractor's account. Receipt and acceptance of the Certified Test Reports and Inspection & Testing Certificate by PNOC shall in no way relieve the Contractor of its responsibility.

- Handling and Delivery

  The Contractor shall perform proper packing, loading, transportation, hauling and unloading of equipment in accordance with the Manufacturer's standards and recommendations. All duties and taxes including export permits and clearances, insurances and warranties shall be of the Contractor's account. The equipment and construction materials shall be delivered directly to the project site(s).

  The Contractor shall secure handling and delivery manuals from the Manufacturer.

  The Contractor shall notify PNOC for all incoming materials and submit Delivery Receipt upon delivery for inspection and acceptance by PNOC prior to installation.

  All equipment shall be delivered unbroken, not deformed and without cracks and scratches.

  In general, the packaging of the equipment shall be based on generally accepted industry practices or standards. Packaging shall be adequate to prevent damage from any mechanical stresses that may occur and to ensure safety during loading, hauling, unloading, unpacking and storage.

  Boxes shall contain barcode sheet/label showing the following information:

  ✓ Name of the Manufacturer;
  ✓ Model Number;
  ✓ Code No./Serial Number;
  ✓ Product Barcode; and
  ✓ Manufacturing Date.

- On-Site Storage

The Contractor shall perform on-site storage of equipment and construction materials in accordance with the Manufacturer's standards and recommendations. Equipment shall be placed at the designated storage/staging area.

The Contractor shall secure equipment on-site storage manuals from the manufacturer.

4.3. Installation and Construction

The Contractor shall provide all consumables, tools, equipment, and manpower, including PPE, necessary to perform the necessary works.

The Contractor shall only be allowed to work at the designated area agreed upon with PNOC to avoid any interruptions to the on-going operations and activities at the site.

In case of concrete drilling or breaking, the Contractor must ensure that such work shall not compromise the integrity of the existing structures.

In the case of painting, appropriate painting shall be used for the structures to be painted in accordance with applicable standards. The painting shall be done with a primer and topcoat as a minimum.

In the case of earthworks and concreting, it shall be performed in accordance with applicable codes and standards. Concrete foundations must be designed using applicable mixtures and with reinforcing bars as per standards.

The PV system shall be designed for simple mechanical on-site installation with no requirement for welding or complex machinery at the Site. In extreme cases where welding or machinery is necessary, the Contractor shall submit welding methodology. Welding shall be tested as per standards.

The Contractor must also ensure minimal disruption to the daily operations of the installation site.

- Pre-Leak and Post-Leak Test

  The Contractor shall conduct pre-leak test prior to, and after the installation of PV modules and appurtenances, respectively. Schedule of the leak test shall be properly coordinated with PNOC and building owner representatives.

  The Contractor shall submit a leak test procedure for review and approval by PNOC prior to execution.

- Work Permit

  The Contractor shall coordinate with PNOC representative for every work to be performed prior to execution. The work to be performed shall specify the following:

- ✓ Type of Work, such as: Hot works/Cold work/Working at Heights/Confined Space/Concrete Chipping/Excavation works;
- ✓ Target Start and End Dates;
- ✓ Methodology;
- ✓ Hazard associated with the Works;
- ✓ Safety and precautionary measures;
- ✓ Equipment and construction materials with attached approved brochures and/or drawings; and
- ✓ Equipment, Tools, and Personal Protective Equipment (PPE).

- Mounting and Installation of Equipment

  All equipment shall be mounted in accordance with engineering and construction standards and practices and manufacturers' recommendations and standards and safety and health standards. Spacing, orientation, and location shall be based on the approved Detailed Project Designs and Engineering Plans.

- Cabling and Raceway Routing

  DC cables shall be housed in a hot dip galvanized cable tray/ladder with cover. All AC cables shall be housed in rigid steel conduit. Instrumentation and communication cables shall be housed in a separate UV rated conduit.

  For buried cables, it must be housed in a PVC pipe with concrete trench, warning tape or tiles placed above and marking posts at suitable intervals on the surface. The minimum depth of burial is 700mm depending on the location and condition of the ground surface.

  Cables shall occupy less than 66% of the raceway space and properly loop, not too tight to avoid any damages to the wires.

  DC cables shall be installed in a manner which minimizes induction loops between positive and negative cables. For string cables, large loops of excess DC cabling shall be avoided.

  The raceway shall be placed in a manner that it will not create any obstructions or hazards to operations and maintenance.

  The Contractor shall use pull box/junction box on all intersections and sharp curves or bends and provide rubber and bushing on all junctions and endings to avoid cut in the wire insulation. The Contractor shall apply silicone sealant, as applicable, on raceway openings to prevent access of dirt, water, and vermin.

  The Contractor shall comply with the Distribution Utility (DU) Net-Metering requirements for the cable installation and other electrical components.

- Grounding, Termination, and Interconnection

  All equipment shall have adequate grounding. All cables shall be properly dressed/secured/fixed and terminated using terminal lugs, clamps, crimps and

solder. There should be no exposed conductors to avoid short circuits and arc flash.

The Contractor shall request a schedule for shutdown for the interconnection to the existing electrical distribution system.

The Contractor shall conduct a torque test after termination and interconnection.

- Lifting

  Appropriate lifting equipment shall be utilized when performing heavy lifting. Access shall be identified to avoid obstructions. Schedule of lifting shall be properly coordinated with the building owner.

- Foundations and Structural Supports

  Structural supports necessary for the mounting of equipment (e.g., inverters, enclosures, transformers, PV modules, etc.) shall be made of hot dip galvanized structural steel minimum of 2 mm metal thickness and minimum coating thickness of 3 mils as per ASTM A 386 or equivalent. In case the galvanized coating is damaged during installation, the Supplier shall apply the necessary rectification in accordance with ASTM A 780-01 (Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings).

  Reinforced (with deformed bars) concrete blocks/ballast or foundations may be provided to provide stability.

  For penetrated supports, it shall be non-corrosive, and waterproof using flashings, gasket or other approved chemical sealing and coating material. In case of concrete penetration, the anchor bolts (dowel) shall be made also of hot-dipped galvanized or equivalent.

4.4. Testing and Commissioning

The Contractor shall conduct testing and commissioning for a minimum of seven (7) days upon completion of the installation of the PV system, to be witnessed by PNOC and representatives of the building owner. The schedule and duration of the testing and commissioning shall be mutually agreed by the Contractor, PNOC and building owner. However, the testing and commissioning activities shall be satisfactorily completed within the time required under the contract.

Any corrections resulted from the error in the workmanship or design made by the Contractor which were found during the conduct of testing and commissioning or prior to the rooftop solar PV system operation thereon, with the resulting extra expenses due to repair or cost for the replacement for damaged equipment/materials shall be solely charged to the account of the Contractor.

Testing and commissioning shall be performed in a systematic process whereby all systems and equipment are tested and brought into operation and performed interactively according to the design intent and in accordance with the performance criteria set upon. Equipment and accessories shall be inspected to determine the

completeness of the PV system and conformance in accordance with the Specifications. All testing instruments including consumables, temporary structures, and manpower required for the testing and commissioning activities shall be provided and at the account of the Contractor.

The Contractor shall ensure that the rooftop solar PV system operates with zero export to the Distribution Grid by configuring inverters to clip any excess energy generated.

The Contractor shall also arrange the joint inspection with the representatives of Distribution Utility and the Office of Building Official (if applicable) to conduct demonstration of the required features of the rooftop solar PV system. This is for the eventual acceptance of the system by the DU and LGU-OBO by furnishing the necessary certificates.

PNOC shall release a "Certificate of Project Completion" after the Testing and Commissioning provided that all works have been performed and all issues have been addressed.

- Testing and Commissioning Plan

  The Contractor shall submit a TCP/Procedures prior to the conduct of testing and commissioning for PNOC's review and approval.

  The TCP shall include the following information:

  ✓ Itinerary (date) of the testing and commissioning;
  ✓ Detailed methodology and step-by-step procedures;
  ✓ List of tools and equipment, including PPE, to be used;
  ✓ Manpower requirement;
  ✓ Hazards and safety protocol; and
  ✓ Target results or acceptance criteria.

- Testing and Commissioning Works

  The minimum testing and commissioning shall include the following:

  ✓ Inspection and calibration of tools and testing instruments;
  ✓ Visual and physical (quality and quantity) inspection of the installed equipment and appurtenances;
  ✓ Torque test of all terminations and mounting;
  ✓ Continuity test (open circuit and closed circuit) of all breakers, fuses, switches, protection devices and other equipment with circuitry;
  ✓ Insulation test of all DC and AC wires including grounding (line-to-line and line-to-ground);
  ✓ Open circuit voltage/ short circuit current string test;
  ✓ Polarity test;
  ✓ Phase sequence test;
  ✓ AC operating voltage test;

- ✓ Inverter synchronization test;
- ✓ Inverter frequency test;
- ✓ Inverter power generation test;
- ✓ Operating voltage and operating current string test;
- ✓ Thermal scanning;
- ✓ Optimizer Device Functionality;
- ✓ Voltage Harmonic Rise - should not be greater than 5% or inverter specification (whichever is lower);
- ✓ Lighting Arrester Grounding and Counter Tests;
- ✓ Anti-Islanding Test;
- ✓ Cease to Energize Test; and
- ✓ Other necessary tests

The minimum tools and equipment to be used shall include the following:

Torque wrench;
Clamp Meter;
Irradiance meter;
Thermal scanner;
Power Quality Analyzer;
2-way radios;
Insulation Resistance Tester;
Earth Ground Tester; and
Lock-out/tag-out

The Contractor may use a multi-function instrument that is capable of performing the testing and commissioning such as a solar PV installation tester.

Personnel who will conduct the testing and commissioning shall be equipped with the minimum PPE:

- ✓ Safety shoes (Electrical hazard compliant);
- ✓ Safety jacket;
- ✓ Safety pants;
- ✓ Electrical gloves (1kV); and
- ✓ Protective eye glass.

The Contractor shall also provide first-aid kit and fire extinguisher (dry powder).

- Testing and Commissioning Report

  The Contractor shall submit the TCR after the completion of the testing and commissioning. The TCR shall be reviewed and accepted by PNOC and building owner representative(s).

4.5. Operation and Maintenance

The Contractor shall perform a one-year O&M support to PNOC. The Contractor shall provide a comprehensive one-year maintenance plan, which shall include, but not limited to, daily monitoring of system performance, preventive maintenance and repair works, technical support in case of unforeseen decreasing PV system performance, and end-user training.

The training shall include, but not limited to lectures and on-site strategy covering the methods of operation, maintenance, basic troubleshooting, and management of the facility. All costs and expenses for the training, except those incurred by PNOC which include, but not limited to their own transportation and accommodation expenses, shall be borne by the Contractor. A corresponding Certificate of Completion shall be issued to the participants in the training.

During the one-year O&M, the EPCC Contractor shall guarantee the minimum annual production of **30,132.00 kWh** for the rooftop solar PV system.

If ever the minimum annual PV production was not achieved mainly due to uncontrollable factors, then no penalty will be imposed on the Contractor. However, if defects in any of the system components, especially in the inverters, are found to contribute to the performance issues of the PV system, then the Contractor shall pay a corresponding compensation equivalent to the total amount of revenue lost to PNOC from the declared minimum annual production guarantee of **30,132.00 kWh**. Moreover, the cost of any and all rework and/or restoration of damaged properties due to the Contractor's poor workmanship or negligence shall be borne by the Contractor.

5. Deliverables

The Contractor shall ensure that the following deliverables must be provided to PNOC with physical copies as the official submission and electronic copies as advance submissions. Any later correction and changes found necessary by PNOC and all resulting additional costs and/or delays shall be of the Contractor's account. PNOC reserves the right to reproduce any drawings or documents received from the Contractor as may be necessary.

The Contractor shall provide all the necessary deliverables before the start of the Testing and Commissioning, except for the deliverables that need to be submitted at earlier date for review and approval of PNOC (e.g., detailed project plan and timeline, site and energy yield assessment reports, detailed project designs and engineering plans, and procurement records and equipment warranties).

5.1. Documentation

- Detailed project plan and timeline
- Site and energy yield assessment reports
- Detailed project designs and engineering plans
- Procurement records
  - ✓ Bill of materials
  - ✓ Shop/fabrication drawings
- Installation and commissioning reports
- Wiring and termination diagrams

- As-Built Drawings (Power & Control Circuits) and Electronic Programs/Ladder Logic Diagrams
- Equipment and O&M manuals
- List of necessary spare parts, tools, and consumables
- Warranty certificates of the solar panels and Balance of System (BOS) and all other applicable system components and tools

5.2. Performance Guarantees

- Assurance of system performance metrics
- Warranty and maintenance agreements

5.3. Operation and Maintenance (O&M)

- Detailed one-year O&M plan
- Regular maintenance schedule and procedures
- Immediate response and repair protocols
- Performance monitoring and reporting
- List of necessary spare parts, tools, and consumables

6. Commencement Date and Period of Implementation

The commencement date of the Project shall be upon receipt of Notice to Proceed (NTP). There will be two (2) main activities for this entire engagement: the EPCC and O&M support. The duration of the EPCC and O&M support shall be **one hundred twenty (120) days maximum from the receipt date of the Notice to Proceed** and **365 days from the official start of operation of the 25 kWp rooftop solar PV system**, respectively.

7. Payment Terms

Milestone payments will be adopted where the payment shall be released upon reaching the specific project milestone, to ensure that these conform to the requirements set for the purpose.

The payments are subject to the usual government accounting and auditing requirements. Hence, the Contractor is expected to be familiar with the Government Accounting and Auditing Manual (GAAM).

Project Milestone*	Percentage of Payment
Completion of installation and testing & commissioning	90%
Handover and completion of training for building operators	10%

**Retention Money: 10% for every progress billing.*

8. Evaluation Criteria

Bids exceeding the identified Approved Budget for the Contract (ABC) will automatically be disqualified. The selection of the Contractor will be based on:

8.1. Experience and track record in similar projects

- Bidders must have completed solar PV contracts with a minimum total aggregate installed capacity of 1 MWp, where at least two (2) contracts must be fully operational for the last two (2) years from the date of bid submission.

8.2. Technical expertise and key personnel

The Contractor shall employ and certify to their competency the minimum key personnel dedicated for the project.

PERSONNEL	QTY	QUALIFICATIONS	EXPERIENCE
Project Manager	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) solar PV projects, one (1) of which with at least 50% of the project capacity (kWp) ● Minimum of three (3) years' experience in Solar Project Management
Electrical Design Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) solar PV projects, one (1) of which with at least 50% of the project capacity (kWp) ● Minimum of three (3) years' experience in design of Solar Project
Project Site Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) years of experience in project supervision of solar PV projects, one (1) of which with at least 50% of the project capacity (kWp);
Safety Officer	1	With bachelor's degree and either BOSH or COSH certification	● Minimum of three (3) years of experience in Construction.
QA/QC Engineer	1	Shall be Licensed Electrical Engineer	● Minimum of three (3) years of experience in Construction of Solar PV Projects.
Testing and Commissioning Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three ● (3) years' experience in testing and commissioning of solar PV projects, one (1) of which with at least 50% of the project capacity (kWp); Must have adequate knowledge in inverter programming configuration and programmable logic controllers.

The Contractor may nominate the personnel in dual positions, except for the Project Manager, for as long as they are qualified and capable of doing multiple tasks and with the assurance that it can deliver the work on time without compromising the quality.

In case bidder has existing contract for Rooftop Solar PV System with PNOC, the bidder must propose different set of key personnel.

8.2.1. Roles of the Key Personnel

- Project Manager - Shall be the single point of contact with PNOC for all matters pertaining to the Project. The Project Manager shall always be available during weekly meetings and in cases where his/her presence is needed.
- Electrical Design Engineer - Shall be responsible for the engineering design of the PV system. The Design Team shall always be available during meetings pertaining to the design and specifications.
- Project Site Engineer - Shall be in-charge of the overall supervision of the project execution. The Project Engineer shall always be available at the site during the EPCC. During the three-year O&M period, he/she shall conduct all required O&M activities for the Project.
- Safety Officer – Shall ensure the safety and health of all personnel involved in the construction by monitoring and assessing possible hazards in the area.
- QA/QC Engineer – Shall ensure that all delivered materials and works performed are within standards and specifications.
- Testing and Commissioning Engineer – Shall lead the proper testing and commissioning of the PV system.

9. Project Schedule

As part of bid submission, the Contractor shall provide the project schedule, which should include key milestones such as:

9.1. Completion of site and energy yield assessments.
9.2. Procurement and delivery of equipment.
9.3. Completion of installation and commissioning.
9.4. Handover and training for building operators.
9.5. One-year O&M period.

The Contractor shall use applicable software or computer programs in presenting the project schedule.

10. Preliminary Design Drawings

The preliminary design shall be provided for the rooftop solar PV system to give an overview of the project to be developed, as part of the bid submission of the Contractor. This must be adequate and sufficient to understand the concept and orientation of the PV system being proposed. Design drawings shall be submitted in A3 size, including, but not limited to the following:

Sheet	Content
Cover Page	Project Title
G / 1	List of Drawings, Legend and General Notes
G / 2	Project Location Map, Site Development Plan, Project Site Conditions and Technical Features
E / 1	Tapping Point

E / 2	Single Line/Riser Diagram
E / 3	DC and AC Load Schedule Calculation
E / 4	Control and Monitoring System Topology
E / 5	Solar PV Array Stringing Plan
E / 6	DC, AC and Communication Cable Routing Details
E / 7	Proposed Grounding System Location and Wiring
E / 8	CT and Metering Installation
E / 9	Lightning Arrester and Grounding
S / 1	Solar PV Array Mounting & Framing Details
S / 2	Inverters Station and Tapping Point Station Details
S / 3	Access Ladders/railings for maintenance
S / 4	Concrete roof deck foundation and calculation (as needed)

11. Compliance with Industry Standards and Codes

Without limiting the Contractor's obligations, all engineering and construction/installation works performed, all equipment furnished, and all tests carried out under this Engagement shall be undertaken in accordance with latest industry standards and regulation, including, but not limited to the following:

- Grid Code or Distribution Code
- Distribution Services and Open Access Rules (DSOAR)
- Philippine Electrical Code (PEC)
- National Building Code of the Philippines (NBCP)
- National Fire Protection Association Standards (NFPA)
- National Structural Code of the Philippines (NSCP)
- Revised Fire Code of the Philippines of 2008
- International Electrotechnical Commission (IEC) Standards
- Underwriter's Laboratories Inc. (UL) and/or Factory Manual (FM) or equivalent Standards

12. Weekly Construction Meetings and Progress Reports

The Contractor shall conduct weekly construction meetings to be held either on site or online and provide progress reports. Progress reports must be submitted to PNOC also at a weekly basis, which shall include Program of Work, Materials Delivery Status and Accomplishment and Target Report. For urgent matters, PNOC may advise emergency meetings.

- Program of Work – Shall include PERT/CPM, S-Curve, Bar Chart, Manpower, and Equipment Utilization Schedule. The Contractor shall utilize applicable software or computer programs in presenting the Program of Work.
- Materials Delivery Status – Shall reflect the status of all materials being procured including the descriptions, quantity, name of suppliers, purchased order number, ETA site, etc.
- Accomplishment and Target Report – Shall be presented in MS PowerPoint or equivalent. It should include the percentage of weekly accomplishment, safety reports and targets. In case of delays or slippage, the Contractor shall provide a detailed "catch-up" plan.

13. Workmanship

The Contractor shall accept full responsibility for its work in the design, specifications, procurement, fabrication, manufacture, construction, erection, installation, calibration and testing, quality control, documentation, testing and commissioning and performance testing.

The Contractor shall be responsible for the safety and security of its personnel within the project site(s) and provide proper personal protective equipment (PPE).

The Contractor shall also be responsible for all compliance with the Distribution Utility (DU) and Energy Regulatory Commission (ERC) requirements to attain smooth synchronization and commercial operation.

The Contractor shall be deemed solely liable for all its suppliers and subcontractors and shall compensate PNOC against all third-party claims or infringement of patent, trademark, or industrial design rights arising from use of the supplied equipment or any part thereof.

14. Certificate of Acceptance

Certificate of Acceptance for accomplished works shall be issued to the Contractor by PNOC to certify its successful execution and performance.

- A Certificate of Partial Project Completion shall be issued after the 90% completion of the scope of work; and

- A Certificate of Final Acceptance shall be issued by PNOC after the completion of the defects and liability period and the submission of warranty certificates and security.

15. Project Turnover

The project shall be turned over to PNOC upon completion of the scope of work. The Contractor shall issue an endorsement letter for proper turnover.

16. Warranty Certificates

The Contractor shall turnover the warranty certificates for the following structures and equipment to PNOC prior to issuance of Certificate of Final Acceptance:

- A twenty-five (25)-year linear power warranty from the Manufacturer on the solar PV modules with at least eighty percent (80%) power output guaranteed at twenty-five (25) years. The solar PV module manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the modules were installed according to its requirements and specifications for installation.
- A fifteen (15)-year warranty on the permanent structures which include mounting and racking systems used in the rooftop solar PV system.
- A ten (10)-year warranty from the Manufacturer on the solar PV modules. The PV module-manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the PV modules were installed according to its requirements and specifications for installation.

- A five (5)-year warranty from the Manufacturer on the inverters. The inverter manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the inverters were installed according to its requirements and specifications for installation.
- A one (1)-year warranty for safety and protection devices, cables, instrumentation, and control/ communication devices including software, IP cameras and Web portal and all other accessories used in the solar PV system.

17. Defects and Liability Period

Defects and liability period shall include servicing of defective goods and services under the warranty obligations and conditions stipulated in the Contract.

Repairs, troubleshooting, and other after-sales support to commence within seven (7) calendar days upon receipt of notification from PNOC.

Replacement for locally available components shall not exceed fifteen (15) calendar days upon receipt of notification from PNOC.

Replacement for imported components shall not exceed sixty (60) calendar days upon receipt of notification from PNOC.

18. Spare Parts, Tools, and Consumables

The Contractor shall supply the necessary spare parts, tools, and consumables for the installation, testing and commissioning, as well as the operation and maintenance of the project. These items will be turned over to PNOC upon completion of testing and commissioning. Moreover, the bidder shall maintain a warehouse for the storage and immediate dispatch of solar panels (as spare parts) as needed.

Particulars	Qty	Unit
Solar panels (same with the minimum technical specifications stipulated in Section 21.3)	at least 1% of the total number of solar panels required for the Project	unit
DC Cables (same with the minimum technical specifications stipulated in Section 21.3)	as needed	meter
AC circuit breaker (same with the minimum technical specifications stipulated in Section 21.3)	1	set
Portable washer with pump, 7.5Mpa pressure, 5 liter/minute	1	unit
Dry Chemical Fire Extinguisher (10 pounds)	5	unit
RJ 45 connector (100pcs per pack)	3	pack
Electrical tape (0.16mm x 19mm x 8meters; black)	10	roll
Cable tie (UV resistant; 12"; 100pcs per pack)	3	pack
Rubber tape (18mm x 8meters; black)	3	length

Others (please specify, as needed)

Allied Services

18.1. Markings and Labeling

The Contractor shall provide markings and labelling on all electrical equipment (including wires) in accordance with applicable codes and standards or as otherwise agreed upon with the building owner. Markings shall be clearly visible, located visibly on the equipment, constructed and installed to remain eligible for the whole of the design's life of 25 years. The marking and labeling shall be compliant with the following codes:

- PEC article 6.90 and article 1.10
- UL 696

18.2. Safety Signages and Fire Extinguishers

The Contractor shall provide safety signages as per standards including warnings for high voltage, cable burial, etc.

The Contractor shall likewise provide a fire extinguisher to be mounted near each of the identified solar array stations, inverter station and tapping point station as per design drawings.

18.3. Power Supply

The Contractor shall provide power supply, complete with protection devices (e.g., circuit breakers, AVR, etc.) for equipment that will require power such as POE hub, inverter controller, router, etc. The Contractor shall identify the location of the tapping source and request permission to the building owner.

18.4. Water Source

The Contractor shall coordinate with the building owner for the location of the water source to be used during maintenance (e.g., PV module cleaning).

18.5. Canopy

In case an inverter station or any equipment is placed outdoors, a canopy shall be provided as per Manufacturer's standards and recommendation.

18.6. Access Platforms, Stairs and Safety Handrails

The Contractor shall provide access such as sufficient portable access ladder along the PV facility for safety and protection during construction and PNOC's operations and maintenance.

The Contractor shall provide anchors at strategic locations for safety harnesses.

18.7. Relocation or Modification of Existing Structures

The PV system shall be designed with no requirement for relocation or modification of the existing structures. In extreme cases when relocation or modification of existing structures is necessary, the Contractor shall submit modification or relocation plan to ensure that the structures shall be maintained, restored or upgraded.

19. Available Data and Schedule of Site Inspection

Potential bidders can access the relevant site data (e.g., electric consumption information, plans, and drawings) via the following link:

- **https://bit.ly/Carmona-Water-District**

The site inspection is scheduled for February __ and __, 2025, from 9:00 AM to 12:00 PM (can be subject to change). Bidders must inform PNOC representatives in advance using the contact details provided below:

- **Louie Aaron L. Razon**: +639564761790
- **Richard Miguel D. Allauigan Jr.**: +639178460403
- **Patrick Jose IV V. Andaya**: +639369318841

20. Technical Specifications and Standards

20.1. Design Calculations

The design of the PV system shall be for a minimum service life of twenty-five (25) years. Design shall consider service conditions that will affect the performance of the solar PV system such as irradiation, UV radiation, temperature variations, rainfall intensity, humidity, pollution etc. Design shall be able to protect and harness the equipment from natural calamities such as earthquake, tropical typhoons, cyclones and wind gustiness prevailing in the Philippines.

20.1.1. Electrical Design

Maximum DC voltage per string shall not exceed 1500 Volts at a temperature of 15 degrees Celsius.

Minimum DC voltage per string shall be more than the “minimum input voltage” of the inverter at a temperature of 50 degrees Celsius.

Minimum DC voltage per string after 20 years shall be more than the “minimum input voltage” of the inverter at a temperature of 50 degrees Celsius.

Maximum DC power per array (combination of strings) shall be less than the maximum allowable generator power of inverter.

Maximum voltage drop between equipment to equipment shall not exceed 1% on DC system and 5% on AC system.

20.1.2. Structural Design

Seismic loading shall be selected to ensure the Performance Criteria set out below are achieved:

- All system's components which are critical to the generation of electricity shall remain undamaged and operational following a moderate earthquake;

- In case of a massive earthquake, the damage to structures and equipment shall be limited to that which can be repaired sufficiently quickly for the generation of electricity to resume safely within thirty (30) days, unless otherwise the main building has collapsed; and

- Potential costs of repair or replacement and the duration of inability to generate electricity after a large seismic event shall be minimized.

The wind resistant design required for the facility shall be at minimum of 270 kph. In case the basis for wind resistant design in the latest National Structural Code of the Philippines (NSCP) is higher, then NSCP shall govern.

20.2. Minimum PV System Components Specifications

20.2.1. Solar PV Modules

The modules must follow the IEC 61215 standards (i.e., Crystalline Silicon Terrestrial Photovoltaic modules; Design Qualification and Type). These shall be made of monocrystalline material solar cells, tested in extreme weather conditions, and equipped with safety protection mechanisms. These shall also have a minimum efficiency of 17% at Standard Testing Conditions (STC). The solar PV panels supplied must include a performance warranty guaranteeing no more than 2% efficiency degradation in the first year and no more than 0.5% annual degradation thereafter. At the end of 25 years, the panels must still produce at least 85% of their original rated power output. The solar PV modules supplied must be manufactured by a Tier 1 manufacturer as defined by industry-recognized standards such as Bloomberg New Energy Finance (BNEF) or equivalent.

20.2.2. PV Mounting System

The PV mounting system shall be suited to the environment and atmospheric conditions (e.g., corrosion, salt). Structures shall be fixed, metallic and have appropriate design and adequate strength which can withstand the load of the modules, cyclonic and high wind velocities as applicable to the site condition. The material shall be robust and non-corrosive, made from anodized structural grade aluminum 6005 T5 and/or stainless steel components or equivalent. Use of different metals shall be avoided where practically possible to prevent galvanic corrosion. The structure shall prevent water accumulation. The mounting system must be compliant to AS/NZS1170.2:2011AMDT 2-2012 standard or equivalent.

20.2.3. Inverter

The inverter to be used shall be string type, weatherproof and equipped with a safety protection mechanism. The inverter shall be compatible with the existing electrical system. The inverter and its appurtenances shall be state-of-the-art with energy management and communication system and maximum power point trackers (MPPT) for optimum performance. The inverter shall have efficiency of not less than 98.5%, with a 10-year guaranteed service life. It also must have the following minimum communication specifications: WLAN/Ethernet, Wi-Fi, and 4G/3G/2G.

The inverter shall provide Application Programming Interface (API) access, allowing other applications or systems to communicate with it and retrieve data. This capability will facilitate the integration of inverter data into a unified monitoring system, supporting PNOC in implementing the Rooftop Solar PV System for Government Buildings (RGB) initiative.

The mounting shall be robust and non-corrosive, made from hot-dipped galvanized structural steel or equivalent. The foundation shall be fixed and secured. The inverter shall have adequate spacing, free from obstructions and well ventilated.

20.2.4. Inverter Controller

The inverter controller shall be the central communication unit for system monitoring, recording data and controlling. It shall be capable of interconnection of other measuring devices such as solarimeter, weather-meter, etc.

20.2.5. DC Combiner

In cases where design requires the need for a DC combiner, the DC combiner shall be made of glass-fiber reinforced polyester material or approved equivalent. Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. Mounting may be wall-mounted type or stand-alone support. The dimensions and thickness are as per manufacturer's standard. It shall be rated 1500Vdc minimum.

The DC combiner shall have appropriate cable entry points, with cable glands, fitted for input and output cables and a lockable door.

The DC combiner shall be equipped with auxiliaries such as circuit breakers, surge protection devices and grounding terminals, mounted on DIN rail or equivalent and with adequate spacing for easy termination and testing. Auxiliaries shall conform to IEC standards or equivalent.

All circuit breakers and fuses shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The voltage rating shall be a minimum of 1000VDC. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.2.6. AC Combiner

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. Mounting may be wall-mounted type or

stand-alone support. The dimensions and thickness are as per manufacturer's standard. It shall be rated 0.6/1kV minimum.

The AC collector shall have appropriate cable entry points, with cable glands, fitted for input and output cables and lockable doors.

The AC collector shall be equipped with auxiliaries such as circuit breakers (mounted on busbar with adequate spacer) and neutral and grounding terminal mounted on DIN rail or equivalent and with adequate spacing for easy termination and testing. Auxiliaries shall conform to IEC standards or equivalent.

All circuit breakers shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The minimum voltage rating shall be equivalent to inverter output voltage. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.2.7. Transformer

In cases where design requires the need for a transformer, the transformer configuration shall be based on the system configuration or topology between the inverter i.e., TN-S, TN-C, TN-C-S, TT and IT and grounding configuration and voltage.

Depending on the location, the transformer shall either be outdoor type or indoor type in compliance with NEMA or IP standards. The compartment shall be metal-enclosed and non-corrosive. The transformer shall be dry-type, self-cooled and floor mounted. The foundation shall be equipped with an anti-vibration pad or equivalent. The transformer shall be UL/IEC listed or equivalent.

20.2.8. Transient Voltage Surge Suppressor with Isolation Switch

The TVSS shall be capable of bi-directional filtering of harmonics and surges that may be created from the PV system and from the grid.

The surge protection devices shall be compatible with the existing electrical system. The ampere-interrupting capacity (AIC) rating of the devices shall be equal to or greater than the available fault current to which they might be subjected.

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. It shall be rated 0.6/1kV minimum.

20.2.9. PV Generation (Revenue) Meter Including CT/PT and Terminals

The PV generation (revenue) meter shall be digital multi-function power meters complete with CTs and potential fuses. The meter shall conform to the following minimum requirements:

- IEC or ANSI revenue metering standards (i.e., Class 0.3 accuracy); and
- Capable of providing outputs and terminal strips for remote monitoring and data acquisition using RS485 or equivalent.

The meter shall be boxed in a standard enclosure with a viewing window made of fiberglass or equivalent.

20.2.10. ECB Main Disconnect Switch

The enclosed circuit breaker shall act as the main fault current protection device and disconnect switch to isolate the solar PV system from the existing electrical system. Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. The dimensions and thickness as per manufacturer's standard. It shall be rated 0.6/1kV minimum.

The circuit breaker shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The minimum voltage rating shall be equivalent to system voltage. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.2.11. Cables

PV cables shall be copper type. It shall be UV-rated, sunlight-resistant, water-proof protection and manufactured under UL standard. It shall be designed and manufactured in accordance with:

- IEC 60811: Insulation and Fire Protection
- IEC 60227 and IEC 60502: Design
- IEC 60228: Conductors
- UL 1581 (Xeno-Test), ISO 4892-2 (Method A) or HD 506/A1-2.4.20: DC solar cables

All power cables shall be of XLPE insulated with PVC sheathed, 0.6/1kV single or multicore, stranded copper conductor. The conductor shall be made from electrical purity copper for power cables and annealed high conductivity copper for control cables. Conductors shall be stranded for copper power cables and solid for copper control cables.

All cables shall be designed to withstand the mechanical, electrical, and thermal stresses under the steady state and transient/ fault conditions. All cables shall be suitable for high ambient temperature, high humidity and tropical climatic conditions. All cables shall be color coded as per IEC 60364 and should be provided with tag/marking.

All cable ties should be UV protected and can withstand high heat stress without damaging the cables. Cable ties shall conform to EN 50146 and IEC 62275 standards.

Cables to be supplied are categorized as follows:

Particular	Description	Requirement
PV String Cables	Cables from PV strings to DC Enclosures	Must be 2 x 6mm^2
DC Enclosure Cables	Cables from DC Enclosures to Inverters	As per PEC Standards
Inverter Cables	Cables from Inverters to AC Collector	As per PEC Standards

AC Collector Cables	Cables from AC Collector to Transformer	As per PEC Standards
Transformer Cables	Cables from Transformer to ECB for Disconnect Switch	As per PEC Standards
Tapping Point Cables	Cables from ECB for Disconnect Switch to tapping point	As per PEC Standards
Grounding Cables	Cables for grounding	As per PEC Standards
Neutral Cables	Cables for Neutral	As per PEC Standards
Communication Cables	Cables for Controls and Monitoring	UTP, Ethernet, CAT5/CAT6
Power Supply Cables	Cables for 220-240V power supply	As per PEC Standards

20.2.12. Raceways (Cable Trays, Conduits, PVC Pipes and Fittings, Accessories)

Cable trays and fittings shall be hot-dipped galvanized with a minimum of 2mm thickness in accordance with IEC standards or equivalent. Conduit shall be rigid steel in accordance with IEC standards or equivalent.

PVC systems that are to be buried underground shall conform to IEC 61386 Part 24 standards or equivalent.

Raceways shall be color coded as per standards or as per existing color coding of the building.

20.2.13. Lightning Arrester and Grounding System

In cases where design requires the need for a lightning arrester and grounding system, the lightning protection shall be made of conventional lightning protection or the Early Streamers Emission (ESE) type. It shall be equipped with a lightning strike counter. The protection radius shall cover the whole solar PV facility.

The grounding system shall have a maximum resistivity of 5 ohms. The size and diameter of bare copper and grounding rod shall be as per standard.

The safety protection devices shall provide optimum filtering in relation to the specification of inverter and PV panels. The surge protection device shall be compact and shall comply in accordance with the UL 1449 3rd edition testing, ANSI/IEEE C62 and ANSI/IEEE Std. 1100-1999

The surge protection devices shall be compatible with the existing electrical system. The ampere-interrupting capacity (AIC) rating of the devices shall be equal to or greater than the available fault current to which they might be subjected.

The grounding wires shall be placed in a standard UV-rated PVC or equivalent.

20.2.14. PV Monitoring and Data Acquisition System (Internet Connection)

The PV monitoring and data acquisition system shall be capable of both remote and onsite access and monitoring via a subscription-free online platform. The system shall be able to provide the following minimum data:

- energy generation (kWh);
- power (kW);
- power factor;
- voltage;
- current;
- irradiance;
- weather; and
- temperature

The system shall be capable of detecting failures and fault conditions.

Data transmission shall be real-time and shall be equipped with safety and high-security protocol. The data shall be displayed in graphical trends and in figures. Historical data shall be available for a minimum of one (1) year.

20.2.15. CCTV/IP Surveillance Camera

The CCTV/IP surveillance camera shall be capable of onsite monitoring, continuous recording, and remote access and monitoring via a subscription-free online platform. Viewing shall be real-time and can operate 24/7. Video recording shall be capable for a minimum of one (1) month. The camera shall be robust, weatherproof and with high-resolution.

Type	Fixed Bullet
Video Camera	2 units
Resolution	1080HD
Enclosure	Weatherproof, outdoor IP65 or equivalent, minimum
Hard Disk Drive	2TB SATA 6.0Gb/s Cache 64MB Surveillance Type
NVR	Minimum 8 Channel IP Camera, Resolution minimum of 1920x1080
POE Hub/Switch	8 ports
CPE/Router/Modem	1 × USB 2.0 Port for Connecting 4G/3G Modem as WAN Backup; 4 × Gigabit WAN/LAN Ports; Non-WIFI router

20.2.16. Communication and Control Cables, Radio Transmission or Fiber Optics or Equivalent

If long-distance controls are needed, a radio transmission or fiber optics or any equivalent communication protocol may be used. In the case of wireless communication, it shall be equipped with reliable communication equipment such that it will not create unacceptable delays and interference that would compromise the operability of the whole system.

Name of Company: _____

Authorized Representative: _____
(Name & Signature)

Lot No. : **2**
Description : **48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)**
Qty/UOM : **1 Lot**

Item No.	Technical Requirements		Statement of Compliance
1	**SOLAR PV MODULES**		
	General		
	Manufacturer	Supplier must specify	
	Model Number	Supplier must specify	
	Rated Capacity in Watt peak	Supplier must specify	
	Cell Type	N-Type Monocrystalline	
	Number of Cells	Supplier must specify	
	Efficiency	17%	
	Guaranteed Output (Minimum)		
	after 1 Year	97%	
	after 5 Years	95%	
	after 10 Years	90%	
	after 25 Years	80%	
	Warranty	10 Years (minimum)	
	Mechanical Characteristics		
	Dimension	Supplier must specify	
	Weight	30.6kg maximum	
	Front Cover Only (if monofacial), or Front and Back Cover (if bifacial	2.0mm to 3.2mm, High transmission, Tempered glass,	
	Frame	Anodized Aluminum Alloy	
	Junction Box Enclosure (minimum)	IP68 Rated	
	Connectors	MC4 or equivalent (1 male and 1 Female per module)	
	Cables Cross-Section Size	1*4.0mm^2 or equivalent	
	Electrical Parameters @ STC		
	Maximum system voltage (Vm_{ax})	Supplier must specify	
	Nominal Operating Temperature	Supplier must specify	
	Maximum Power Voltage (Vmp)	Supplier must specify	
	Maximum Power Current (Imp)	Supplier must specify	
	Open-circuit Voltage (V_{OC})	Supplier must specify	
	Short-circuit Current (I_{SC})	Supplier must specify	
	Temperature coefficient of Pmax	Supplier must specify	
	Temperature coefficient of Voc	Supplier must specify	
	Temperature coefficients of Isc	Supplier must specify	

1	**Standards and Certifications**		
	Manufacturer Category	Must be Tier1 - CATEGORY LISTED BY Bloomberg New Energy Finance Latest Report	
	Resilient in extreme weather condition	Compliant with IEC 61215 or equiv.	
	Wind load Capacity	2400 Pa	
	Static load Capacity	5400 Pa	
	Salt Mist Corrosion Resistant	Compliant with IEC 61701 or equiv.	
	Ammonia Corrosion Resistant	Compliant with IEC 62716 or equiv.	
	PV Module Electrical and Mechanical Operating Safety Qualification	Compliant with IEC 61730 or equiv.	
	Quality Management System	Compliant with ISO 9001 or equiv.	
	Occupational Health and Safety Management System	Compliant with OHSAS 45001 or equiv.	
	Environment Management System	ISO 14001: 2015 or equivalent	
	With authorized distributor in the Philippines	Must have certified and authorized service center in the Philippines	
2	**INVERTER**		
	Manufacturer	Supplier must specify	
	Model Number	Supplier must specify	
	Rated AC Power	Supplier must specify	
	Maximum AC Active Power	Supplier must specify	
	Type	String Type	
	Nominal Output Voltage	**Three-Phase, 220V to 240V or 400V to 480V**	
	Maximum Input Voltage	Supplier must specify	
	Operating Voltage/ Start Voltage	Supplier must specify	
	Maximum Input Current per MPPT / Maximum Short Circuit Current per MPPT	Supplier must specify	
	Number of MPPT Trackers/ Maximum Number of Inputs	Supplier must specify	
	Efficiency	98.5%, (minimum)	
	Dimension (W x H x D)	Supplier must specify	
	Weight	Supplier must specify	
	Operating temperature range	–25°C to +60°C (–13°F to +140°F)	
	Topology	Transformer-less	
	Degree of Protection	IP66 (minimum)	
		Anti-islanding Protection/AC	

2	Protective Devices	Output Overcurrent/DC Reverse Polarity Protection/Strings Monitoring/DC Surge Protection (Type II)/AC Surge Protection (Type II)	
	Display	Graphic LCD/LED	
	Warranty	5 Years	
	Standards and Certifications		
	Inverter	IEC 62109-1/IEC 62109-2 (Class I, grounded communication Class II, PELV	
		IEC 62116	
		IEC 61727	
3	**INVERTER CONTROLLER**		
	Manufacturer	Supplier must specify (Must be same with Inverter)	
	Model Number	Supplier must specify	
	Max. number of manageable device	20	
	Power Supply	100 to 240 V	
	Interaction	Supplier must specify	
	Operating temperature range	Supplier must specify	
	Communication Protocol	Supplier must specify	
	Mounting	DIN top-hat rails or wall mounting	
	Degree of Protection	IP65 (minimum)	
4	**MOUNTING STRUCTURE**		
	General		
	Manufacturer	Bidder must specify	
	Module Type Compatibility	Framed or frameless	
	Wind Speed	Customizable	
	Material	Anodized structural grade aluminum alloy (AL6005-T5) and stainless-steel components (SS/SUS 304)	
	Standard	Compliant with AS/NZS1170.2:2011 AMDT 2-2012 or equiv.	
	Major Components		
	L-clamp	Bidder must specify	
	End Clamp (part number)	Bidder must specify	
	Inter/Mid Clamp (part number)	Bidder must specify	
	Railing (part number)	Bidder must specify	
	Rail-Splicer (part number)	Bidder must specify	
	Mounting/L-Clamp (part number)	Bidder must specify	

	Other Components (as needed) Shall be determined as per actual site condition	
	OTHER COMPONENTS (refer to Section 21.2 Minimum PV System Components Specifications)	
5	DC Combiner (if needed)	
6	AC Combiner	
7	Transformer (if needed)	
8	Transient Voltage Surge Suppressor with Isolation Switch	
9	PV Generation (Revenue) Meter Including CT/PT and Terminals	
10	ECB Main Disconnect Switch	
11	Cables	
12	Raceways (Cable Trays, Conduits, PVC Pipes and Fittings, Accessories)	
13	Lightning Arrester and Grounding System (if needed)	
14	PV Monitoring and Data Acquisition System	
15	CCTV/IP Surveillance Camera	
16	Communication and Control Cables, Radio Transmission or Fiber Optics or Equivalent	

Terms of Reference

1. Project Description

The Philippine National Oil Company (PNOC), under its Three Arrows Strategy, is revolutionizing sustainable energy solutions by spearheading rooftop solar power projects for various government buildings. This initiative supports the government's strategy to reduce its dependence on international fuel markets and promote renewable energy use.

In line with the Inter-Agency Energy Efficiency and Conservation Committee (IAEECC) Resolution of 07 July 2023, government entities, including government-owned and controlled corporations (GOCCs), state universities and colleges (SUCs), and local government units (LGUs), are mandated to install at least 20% of their electricity requirements from Solar Photovoltaic (PV) systems or equivalent renewable energy technologies within three years.

Additionally, this project aligns with the Government Energy Management Program (GEMP), which encourages a minimum 10% reduction in electricity consumption across all government entities. By ensuring zero export of energy to the distribution grid, this forward-thinking project not only reduces costs but also elevates environmental stewardship, setting a new standard for green energy in the public sector.

PNOC invites submissions from reputable organizations (referred to as "the Contractor") capable of providing a comprehensive turnkey solution encompassing engineering, procurement, construction, commissioning, and testing and commissioning, and one-year operations and maintenance (referred to as "EPCTC") for the Project.

The project shall be named "**Supply, Delivery, Installation, Testing and Commissioning of 48 kWp Solar PV Rooftop System at ACWD Central Reservoir Pumping Station (Phase II)**". The project site is located at ACWD Central Reservoir Pumping Station, Angeles City, Pampanga.

2. Objectives of the Contract

The intent of the Terms of Reference is to provide the general and technical requirements necessary for the implementation of the project. However, it is the Contractor's obligation to investigate and validate all information herewith as part of their work to be undertaken. Thus, any discrepancies in the TOR in accordance with applicable and generally accepted engineering and construction practices, government rules and regulation and the latest industry codes and standards for solar PV development shall not relieve the Contractor of the accuracy of their work.

a. **Define Project Scope**: Clearly outline the scope of work for the turnkey EPC (Engineering, Procurement, and Construction) contractor, including project preparation, procurement, installation, construction, testing, commissioning, and operation and maintenance (O&M).
b. **Establish Deliverables**: Specify the required deliverables, including documentation, performance guarantees, and O&M plans, to ensure comprehensive project execution and accountability.
c. **Set Performance Standards**: Provide criteria for the performance and quality of the solar PV systems, ensuring they meet industry standards and regulatory requirements.
d. **Detail Compliance Requirements**: Ensure the EPC contractor adheres to all relevant local, national, and international regulations and standards, promoting safety, reliability, and environmental responsibility.
e. **Specify Evaluation Criteria**: Establish the criteria for selecting the EPC contractor, focusing on experience, technical expertise, financial stability, and the quality of the proposed solutions.
f. **Ensure Zero Export Compliance**: Mandate that the solar PV systems operate with zero export to the distribution grid, ensuring on-site energy optimization and compliance with regulatory requirements.
g. **Provide Maintenance Guidelines**: Include a comprehensive one-year O&M plan to ensure the longevity, efficiency, and optimal performance of the installed solar PV systems.
h. **Promote Transparency and Reporting**: Require regular progress reports from the EPC contractor to PNOC, detailing project milestones, challenges, and resolutions, fostering transparency and effective project management.

3. Approved Budget for the Contract (ABC)

PNOC has an approved corporate budget in the amount of Three Million Pesos (**Php 3,000,000.00**) for the Project.

4. Scope of Works

The scope of work for the Contractor includes:

4.1. Project Preparation

The Contractor shall facilitate all preliminary and general works on time so that any issues or problems encountered can be addressed. If the Contractor fails to timely execute the works, then any delays due to pending issues and problems shall be of the Contractor's account.

- Kick-off Meeting

  The Contractor shall schedule a kick-off meeting no later than ten (10) calendar days starting from the date of commencement as stated in the NTP. The kick-off meeting shall be held at site to discuss mobilization and construction schedules and other details necessary prior project execution. All key personnel must be available during the kick-off meeting.

- Mobilization

  The Contractor shall facilitate the mobilization of manpower and equipment, including operating supplies and tools necessary for the project immediately after the kick-off meeting.

- Temporary Facilities and Storage/Staging Area

  The contractor shall be provided with a temporary headquarters immediately after the kick-off meeting. The location of the headquarters and storage/staging area shall be determined with the consent of the building owner.

- Site Survey and Assessment

  The Contractor shall undertake its own site survey, verification, and assessment, including actual measurements of voltage, current, frequency and power quality for a period of seven (7) calendar days upon mobilization, identification of access, etc., to identify all necessary information about the site conditions and design parameters. Additionally, the Contractor shall perform an energy yield assessment to estimate the potential solar energy generation in the installation site

  The assessment shall also include the condition of roof and existence of roof leaks, and the safety and reliability of the existing electrical system(s) and the whole installation, and maintenance concerns. All findings and necessary engineering intervention shall be incorporated in the detailed project designs and engineering plans and shall be properly addressed during construction.

- Permits and Clearances

  The Contractor shall secure the construction permit, safety permit, building permit and other approvals, clearances, and licenses necessary prior to the start of construction and installation.

  The Contractor shall also secure necessary permits/documents as required by the Distribution Utility for the installation of the rooftop solar PV system on the installation site.

- Detailed Project Designs and Engineering Plans

  The Contractor shall submit Detailed Project Designs and Engineering Plans no later than ten (10) calendar days starting from the date of commencement stated in the NTP. The Detailed Project Designs and Engineering Plans must reflect all

additional requirements and information needed based on the reviewed preliminary design drawings.

The Detailed Project Designs and Engineering Plans shall be furnished using engineering standard templates, adequate, readable and must be written in English. The Contractor must use computer-aided design and drafting software (CAD) or equivalent. Likewise, electronic components with built-in programs and software shall be accompanied with their corresponding programs and ladder logic diagrams for submission to PNOC prior to the installation of the systems.
The Detailed Project Designs and Engineering Plans shall be signed and sealed by Professional Engineers (Electrical and/or Civil/Structural Engineer), and PNOC and building owner's authorized representatives. PNOC shall have the right to require the Contractor additional drawings or information as may be necessary.

The minimum number of original copies to be produced by the Contractor shall be 3 sets of A3 size and 2 electronic copies containing CAD and PDF files, as an advance copy. The Contractor must also submit a hard copy as an official document. PNOC reserves the right to reproduce any drawings or documents received from the Contractor as may be necessary.
To avoid revisions, the Contractor may submit first draft drawings or e-file via email before printing the Detailed Project Designs and Engineering Plans.

4.2. Procurement

The Contractor shall be responsible for the procurement of all equipment and construction materials, including consumables, necessary to complete the project.

All delivered equipment and construction materials, including consumables, shall be subject to testing and inspection by PNOC. Testing and inspection includes visual checking, measurement, validation of specifications (in the nameplates) and other applicable testing methods as deemed necessary. PNOC shall release a Materials Inspection Report (MIR) for the findings of the inspected materials. Any damage or deficiency shall be rectified or replaced by the Contractor without additional charges to PNOC.

- Equipment and Construction Materials

  The Contractor may source all equipment and construction materials, including consumables locally or abroad provided these shall conform to the required design specifications and standards. In case of changes in the source of supply or brand, the Contractor shall submit a letter of request stating the reasons for the changes for PNOC's review and approval.

- Factory Acceptance Test (FAT)

  The Contractor must provide any proof that the manufacturer's factory or fabricator's shop has passed the FAT for the solar panels and inverters. All related testing expenses shall be of the Contractor's account. Receipt and acceptance of the Certified Test Reports and Inspection & Testing Certificate by PNOC shall in no way relieve the Contractor of its responsibility.

- Handling and Delivery

  The Contractor shall perform proper packing, loading, transportation, hauling and unloading of equipment in accordance with the Manufacturer's standards and recommendations. All duties and taxes including export permits and clearances, insurances and warranties shall be of the Contractor’s account. The equipment and construction materials shall be delivered directly to the project site(s).

  The Contractor shall secure handling and delivery manuals from the Manufacturer.

  The Contractor shall notify PNOC for all incoming materials and submit Delivery Receipt upon delivery for inspection and acceptance by PNOC prior to installation.

  All equipment shall be delivered unbroken, not deformed and without cracks and scratches.

  In general, the packaging of the equipment shall be based on generally accepted industry practices or standards. Packaging shall be adequate to prevent damage from any mechanical stresses that may occur and to ensure safety during loading, hauling, unloading, unpacking and storage.

  Boxes shall contain barcode sheet/label showing the following information:

  ✓ Name of the Manufacturer;
  ✓ Model Number;
  ✓ Code No./Serial Number;
  ✓ Product Barcode; and
  ✓ Manufacturing Date.

- On-Site Storage

  The Contractor shall perform on-site storage of equipment and construction materials in accordance with the Manufacturer's standards and recommendations. Equipment shall be placed at the designated storage/staging area.

  The Contractor shall secure equipment on-site storage manuals from the manufacturer.

4.3. Installation and Construction

The Contractor shall provide all consumables, tools, equipment, and manpower, including PPE, necessary to perform the necessary works.

The Contractor shall only be allowed to work at the designated area agreed upon with PNOC to avoid any interruptions to the on-going operations and activities at the site.

In case of concrete drilling or breaking, the Contractor must ensure that such work shall not compromise the integrity of the existing structures.

In the case of painting, appropriate painting shall be used for the structures to be painted in accordance with applicable standards. The painting shall be done with a primer and topcoat as a minimum.

In the case of earthworks and concreting, it shall be performed in accordance with applicable codes and standards. Concrete foundations must be designed using applicable mixtures and with reinforcing bars as per standards.

The PV system shall be designed for simple mechanical on-site installation with no requirement for welding or complex machinery at the Site. In extreme cases where welding or machinery is necessary, the Contractor shall submit welding methodology. Welding shall be tested as per standards.

The Contractor must also ensure minimal disruption to the daily operations of the installation site.

- Pre-Leak and Post-Leak Test

  The Contractor shall conduct pre-leak test prior to, and after the installation of PV modules and appurtenances, respectively. Schedule of the leak test shall be properly coordinated with PNOC and building owner representatives.

  The Contractor shall submit a leak test procedure for review and approval by PNOC prior to execution.

- Work Permit

  The Contractor shall coordinate with PNOC representative for every work to be performed prior to execution. The work to be performed shall specify the following:

  - ✓ Type of Work, such as: Hot works/Cold work/Working at Heights/Confined Space/Concrete Chipping/Excavation works;
  - ✓ Target Start and End Dates;
  - ✓ Methodology;
  - ✓ Hazard associated with the Works;
  - ✓ Safety and precautionary measures;
  - ✓ Equipment and construction materials with attached approved brochures and/or drawings; and
  - ✓ Equipment, Tools, and Personal Protective Equipment (PPE).

- Mounting and Installation of Equipment

  All equipment shall be mounted in accordance with engineering and construction standards and practices and manufacturers' recommendations and standards and safety and health standards. Spacing, orientation, and location shall be based on the approved Detailed Project Designs and Engineering Plans.

- Cabling and Raceway Routing

DC cables shall be housed in a hot dip galvanized cable tray/ladder with cover. All AC cables shall be housed in rigid steel conduit. Instrumentation and communication cables shall be housed in a separate UV rated conduit.

For buried cables, it must be housed in a PVC pipe with concrete trench, warning tape or tiles placed above and marking posts at suitable intervals on the surface. The minimum depth of burial is 700mm depending on the location and condition of the ground surface.

Cables shall occupy less than 66% of the raceway space and properly loop, not too tight to avoid any damages to the wires.

DC cables shall be installed in a manner which minimizes induction loops between positive and negative cables. For string cables, large loops of excess DC cabling shall be avoided.

The raceway shall be placed in a manner that it will not create any obstructions or hazards to operations and maintenance.

The Contractor shall use pull box/junction box on all intersections and sharp curves or bends and provide rubber and bushing on all junctions and endings to avoid cut in the wire insulation. The Contractor shall apply silicone sealant, as applicable, on raceway openings to prevent access of dirt, water, and vermin.

The Contractor shall comply with the Distribution Utility (DU) Net-Metering requirements for the cable installation and other electrical components.

- Grounding, Termination, and Interconnection

  All equipment shall have adequate grounding. All cables shall be properly dressed/secured/fixed and terminated using terminal lugs, clamps, crimps and solder. There should be no exposed conductors to avoid short circuits and arc flash.

  The Contractor shall request a schedule for shutdown for the interconnection to the existing electrical distribution system.

  The Contractor shall conduct a torque test after termination and interconnection.

- Lifting

  Appropriate lifting equipment shall be utilized when performing heavy lifting. Access shall be identified to avoid obstructions. Schedule of lifting shall be properly coordinated with the building owner.

- Foundations and Structural Supports

  Structural supports necessary for the mounting of equipment (e.g., inverters, enclosures, transformers, PV modules, etc.) shall be made of hot dip galvanized structural steel minimum of 2 mm metal thickness and minimum coating thickness of 3 mils as per ASTM A 386 or equivalent. In case the galvanized

coating is damaged during installation, the Supplier shall apply the necessary rectification in accordance with ASTM A 780-01 (Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings).

Reinforced (with deformed bars) concrete blocks/ballast or foundations may be provided to provide stability.

For penetrated supports, it shall be non-corrosive, and waterproof using flashings, gasket or other approved chemical sealing and coating material. In case of concrete penetration, the anchor bolts (dowel) shall be made also of hot-dipped galvanized or equivalent.

4.4. Testing and Commissioning

The Contractor shall conduct testing and commissioning for a minimum of seven (7) days upon completion of the installation of the PV system, to be witnessed by PNOC and representatives of the building owner. The schedule and duration of the testing and commissioning shall be mutually agreed by the Contractor, PNOC and building owner. However, the testing and commissioning activities shall be satisfactorily completed within the time required under the contract.

Any corrections resulted from the error in the workmanship or design made by the Contractor which were found during the conduct of testing and commissioning or prior to the rooftop solar PV system operation thereon, with the resulting extra expenses due to repair or cost for the replacement for damaged equipment/materials shall be solely charged to the account of the Contractor.

Testing and commissioning shall be performed in a systematic process whereby all systems and equipment are tested and brought into operation and performed interactively according to the design intent and in accordance with the performance criteria set upon. Equipment and accessories shall be inspected to determine the completeness of the PV system and conformance in accordance with the Specifications. All testing instruments including consumables, temporary structures, and manpower required for the testing and commissioning activities shall be provided and at the account of the Contractor.

The Contractor shall ensure that the rooftop solar PV system operates with zero export to the Distribution Grid by configuring inverters to clip any excess energy generated.

The Contractor shall also arrange the joint inspection with the representatives of Distribution Utility and the Office of Building Official (if applicable) to conduct demonstration of the required features of the rooftop solar PV system. This is for the eventual acceptance of the system by the DU and LGU-OBO by furnishing the necessary certificates.

PNOC shall release a “Certificate of Project Completion” after the Testing and Commissioning provided that all works have been performed and all issues have been addressed.

- Testing and Commissioning Plan

The Contractor shall submit a TCP/Procedures prior to the conduct of testing and commissioning for PNOC's review and approval.

The TCP shall include the following information:

- ✓ Itinerary (date) of the testing and commissioning;
- ✓ Detailed methodology and step-by-step procedures;
- ✓ List of tools and equipment, including PPE, to be used;
- ✓ Manpower requirement;
- ✓ Hazards and safety protocol; and
- ✓ Target results or acceptance criteria.

- Testing and Commissioning Works

  The minimum testing and commissioning shall include the following:

  - ✓ Inspection and calibration of tools and testing instruments;
  - ✓ Visual and physical (quality and quantity) inspection of the installed equipment and appurtenances;
  - ✓ Torque test of all terminations and mounting;
  - ✓ Continuity test (open circuit and closed circuit) of all breakers, fuses, switches, protection devices and other equipment with circuitry;
  - ✓ Insulation test of all DC and AC wires including grounding (line-to-line and line-to-ground);
  - ✓ Open circuit voltage/ short circuit current string test;
  - ✓ Polarity test;
  - ✓ Phase sequence test;
  - ✓ AC operating voltage test;
  - ✓ Inverter synchronization test;
  - ✓ Inverter frequency test;
  - ✓ Inverter power generation test;
  - ✓ Operating voltage and operating current string test;
  - ✓ Thermal scanning;
  - ✓ Optimizer Device Functionality;
  - ✓ Voltage Harmonic Rise - should not be greater than 5% or inverter specification (whichever is lower);
  - ✓ Lighting Arrester Grounding and Counter Tests;
  - ✓ Anti-Islanding Test;
  - ✓ Cease to Energize Test; and
  - ✓ Other necessary tests

  The minimum tools and equipment to be used shall include the following:

  Torque wrench;
  Clamp Meter;
  Irradiance meter;

Thermal scanner;
Power Quality Analyzer;
2-way radios;
Insulation Resistance Tester;
Earth Ground Tester; and
Lock-out/tag-out

The Contractor may use a multi-function instrument that is capable of performing the testing and commissioning such as a solar PV installation tester.

Personnel who will conduct the testing and commissioning shall be equipped with the minimum PPE:

- ✓ Safety shoes (Electrical hazard compliant);
- ✓ Safety jacket;
- ✓ Safety pants;
- ✓ Electrical gloves (1kV); and
- ✓ Protective eye glass.

The Contractor shall also provide first-aid kit and fire extinguisher (dry powder).

- Testing and Commissioning Report

  The Contractor shall submit the TCR after the completion of the testing and commissioning. The TCR shall be reviewed and accepted by PNOC and building owner representative(s).

4.5. Operation and Maintenance

The Contractor shall perform a one-year O&M support to PNOC. The Contractor shall provide a comprehensive one-year maintenance plan, which shall include, but not limited to, daily monitoring of system performance, preventive maintenance and repair works, technical support in case of unforeseen decreasing PV system performance, and end-user training.

The training shall include, but not limited to lectures and on-site strategy covering the methods of operation, maintenance, basic troubleshooting, and management of the facility. All costs and expenses for the training, except those incurred by PNOC which include, but not limited to their own transportation and accommodation expenses, shall be borne by the Contractor. A corresponding Certificate of Completion shall be issued to the participants in the training.

During the one-year O&M, the EPCC Contractor shall guarantee the minimum annual production of **61,623.20 kWh** for the rooftop solar PV system.

If ever the minimum annual PV production was not achieved mainly due to uncontrollable factors, then no penalty will be imposed on the Contractor. However, if defects in any of the system components, especially in the inverters, are found to contribute to the performance issues of the PV system, then the Contractor shall pay a corresponding compensation equivalent to the total amount of revenue lost to PNOC

from the declared minimum annual production guarantee of **61,623.20 kWh**. Moreover, the cost of any and all rework and/or restoration of damaged properties due to the Contractor's poor workmanship or negligence shall be borne by the Contractor.

5. Deliverables

The Contractor shall ensure that the following deliverables must be provided to PNOC with physical copies as the official submission and electronic copies as advance submissions. Any later correction and changes found necessary by PNOC and all resulting additional costs and/or delays shall be of the Contractor's account. PNOC reserves the right to reproduce any drawings or documents received from the Contractor as may be necessary.

The Contractor shall provide all the necessary deliverables before the start of the Testing and Commissioning, except for the deliverables that need to be submitted at earlier date for review and approval of PNOC (e.g., detailed project plan and timeline, site and energy yield assessment reports, detailed project designs and engineering plans, and procurement records and equipment warranties).

5.1. Documentation

- Detailed project plan and timeline
- Site and energy yield assessment reports
- Detailed project designs and engineering plans
- Procurement records
  - ✓ Bill of materials
  - ✓ Shop/fabrication drawings
- Installation and commissioning reports
- Wiring and termination diagrams
- As-Built Drawings (Power & Control Circuits) and Electronic Programs/Ladder Logic Diagrams
- Equipment and O&M manuals
- List of necessary spare parts, tools, and consumables
- Warranty certificates of the solar panels and Balance of System (BOS) and all other applicable system components and tools

5.2. Performance Guarantees

- Assurance of system performance metrics
- Warranty and maintenance agreements

5.3. Operation and Maintenance (O&M)

- Detailed one-year O&M plan
- Regular maintenance schedule and procedures
- Immediate response and repair protocols
- Performance monitoring and reporting
- List of necessary spare parts, tools, and consumables

6. Commencement Date and Period of Implementation

The commencement date of the Project shall be upon receipt of Notice to Proceed (NTP). There will be two (2) main activities for this entire engagement: the EPCC and O&M support. The duration of the EPCC and O&M support shall be **one hundred twenty (120) days maximum from the receipt date of the Notice to Proceed** and **365 days from the official start of operation of the 48 kWp rooftop solar PV system**, respectively.

7. Payment Terms

Milestone payments will be adopted where the payment shall be released upon reaching the specific project milestone, to ensure that these conform to the requirements set for the purpose.

The payments are subject to the usual government accounting and auditing requirements. Hence, the Contractor is expected to be familiar with the Government Accounting and Auditing Manual (GAAM).

Project Milestone*	Percentage of Payment
Completion of installation and testing & commissioning	90%
Handover and completion of training for building operators	10%

**Retention Money: 10% for every progress billing.*

8. Evaluation Criteria

Bids exceeding the identified Approved Budget for the Contract (ABC) will automatically be disqualified. The selection of the Contractor will be based on:

8.1. Experience and track record in similar projects

- Bidders must have completed solar PV contracts with a minimum total aggregate installed capacity of 1 MWp, where at least two (2) contracts must be fully operational for the last two (2) years from the date of bid submission.

8.2. Technical expertise and key personnel

The Contractor shall employ and certify to their competency the minimum key personnel dedicated for the project.

PERSONNEL	QTY	QUALIFICATIONS	EXPERIENCE
Project Manager	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) solar PV projects, one (1) of which with at least 50% of the project capacity (kWp) ● Minimum of three (3) years' experience in Solar Project Management
Electrical Design Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) solar PV projects, one (1) of which with at least 50% of the project capacity (kWp)

			● Minimum of three (3) years' experience in design of Solar Project
Project Site Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) years of experience in project supervision of solar PV projects, one (1) of which with at least 50% of the project capacity (kWp);
Safety Officer	1	With bachelor's degree and either BOSH or COSH certification	● Minimum of three (3) years of experience in Construction.
QA/QC Engineer	1	Shall be Licensed Electrical Engineer	● Minimum of three (3) years of experience in Construction of Solar PV Projects.
Testing and Commissioni ng Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three ● (3) years' experience in testing and commissioning of solar PV projects, one (1) of which with at least 50% of the project capacity (kWp); Must have adequate knowledge in inverter programming configuration and programmable logic controllers.

The Contractor may nominate the personnel in dual positions, except for the Project Manager, for as long as they are qualified and capable of doing multiple tasks and with the assurance that it can deliver the work on time without compromising the quality.

In case bidder has existing contract for Rooftop Solar PV System with PNOC, the bidder must propose different set of key personnel.

8.2.1. Roles of the Key Personnel

- Project Manager - Shall be the single point of contact with PNOC for all matters pertaining to the Project. The Project Manager shall always be available during weekly meetings and in cases where his/her presence is needed.
- Electrical Design Engineer - Shall be responsible for the engineering design of the PV system. The Design Team shall always be available during meetings pertaining to the design and specifications.
- Project Site Engineer - Shall be in-charge of the overall supervision of the project execution. The Project Engineer shall always be available at the site during the EPCC. During the three-year O&M period, he/she shall conduct all required O&M activities for the Project.
- Safety Officer – Shall ensure the safety and health of all personnel involved in the construction by monitoring and assessing possible hazards in the area.
- QA/QC Engineer – Shall ensure that all delivered materials and works performed are within standards and specifications.
- Testing and Commissioning Engineer – Shall lead the proper testing and commissioning of the PV system.

9. Project Schedule

As part of bid submission, the Contractor shall provide the project schedule, which should include key milestones such as:

9.1. Completion of site and energy yield assessments.
9.2. Procurement and delivery of equipment.
9.3. Completion of installation and commissioning.
9.4. Handover and training for building operators.
9.5. One-year O&M period.

The Contractor shall use applicable software or computer programs in presenting the project schedule.

10. Preliminary Design Drawings

The preliminary design shall be provided for the rooftop solar PV system to give an overview of the project to be developed, as part of the bid submission of the Contractor. This must be adequate and sufficient to understand the concept and orientation of the PV system being proposed. Design drawings shall be submitted in A3 size, including, but not limited to the following:

Sheet	Content
Cover Page	Project Title
G / 1	List of Drawings, Legend and General Notes
G / 2	Project Location Map, Site Development Plan, Project Site Conditions and Technical Features
E / 1	Tapping Point
E / 2	Single Line/Riser Diagram
E / 3	DC and AC Load Schedule Calculation
E / 4	Control and Monitoring System Topology
E / 5	Solar PV Array Stringing Plan
E / 6	DC, AC and Communication Cable Routing Details
E / 7	Proposed Grounding System Location and Wiring
E / 8	CT and Metering Installation
E / 9	Lightning Arrester and Grounding
S / 1	Solar PV Array Mounting & Framing Details
S / 2	Inverters Station and Tapping Point Station Details
S / 3	Access Ladders/railings for maintenance
S / 4	Concrete roof deck foundation and calculation (as needed)

11. Compliance with Industry Standards and Codes

Without limiting the Contractor's obligations, all engineering and construction/installation works performed, all equipment furnished, and all tests carried out under this Engagement shall be undertaken in accordance with latest industry standards and regulation, including, but not limited to the following:

- Grid Code or Distribution Code
- Distribution Services and Open Access Rules (DSOAR)
- Philippine Electrical Code (PEC)
- National Building Code of the Philippines (NBCP)
- National Fire Protection Association Standards (NFPA)
- National Structural Code of the Philippines (NSCP)
- Revised Fire Code of the Philippines of 2008
- International Electrotechnical Commission (IEC) Standards
- Underwriter's Laboratories Inc. (UL) and/or Factory Manual (FM) or equivalent Standards

12. Weekly Construction Meetings and Progress Reports

The Contractor shall conduct weekly construction meetings to be held either on site or online and provide progress reports. Progress reports must be submitted to PNOC also at a weekly basis, which shall include Program of Work, Materials Delivery Status and Accomplishment and Target Report. For urgent matters, PNOC may advise emergency meetings.

- Program of Work – Shall include PERT/CPM, S-Curve, Bar Chart, Manpower, and Equipment Utilization Schedule. The Contractor shall utilize applicable software or computer programs in presenting the Program of Work.
- Materials Delivery Status – Shall reflect the status of all materials being procured including the descriptions, quantity, name of suppliers, purchased order number, ETA site, etc.
- Accomplishment and Target Report – Shall be presented in MS PowerPoint or equivalent. It should include the percentage of weekly accomplishment, safety reports and targets. In case of delays or slippage, the Contractor shall provide a detailed "catch-up" plan.

13. Workmanship

The Contractor shall accept full responsibility for its work in the design, specifications, procurement, fabrication, manufacture, construction, erection, installation, calibration and testing, quality control, documentation, testing and commissioning and performance testing.

The Contractor shall be responsible for the safety and security of its personnel within the project site(s) and provide proper personal protective equipment (PPE).

The Contractor shall also be responsible for all compliance with the Distribution Utility (DU) and Energy Regulatory Commission (ERC) requirements to attain smooth synchronization and commercial operation.

The Contractor shall be deemed solely liable for all its suppliers and subcontractors and shall compensate PNOC against all third-party claims or infringement of patent, trademark, or industrial design rights arising from use of the supplied equipment or any part thereof.

14. Certificate of Acceptance

Certificate of Acceptance for accomplished works shall be issued to the Contractor by PNOC to certify its successful execution and performance.

- A Certificate of Partial Project Completion shall be issued after the 90% completion of the scope of work; and

- A Certificate of Final Acceptance shall be issued by PNOC after the completion of the defects and liability period and the submission of warranty certificates and security.

15. Project Turnover

The project shall be turned over to PNOC upon completion of the scope of work. The Contractor shall issue an endorsement letter for proper turnover.

16. Warranty Certificates

The Contractor shall turnover the warranty certificates for the following structures and equipment to PNOC prior to issuance of Certificate of Final Acceptance:

- A twenty-five (25)-year linear power warranty from the Manufacturer on the solar PV modules with at least eighty percent (80%) power output guaranteed at twenty-five (25) years. The solar PV module manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the modules were installed according to its requirements and specifications for installation.
- A fifteen (15)-year warranty on the permanent structures which include mounting and racking systems used in the rooftop solar PV system.
- A ten (10)-year warranty from the Manufacturer on the solar PV modules. The PV module-manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the PV modules were installed according to its requirements and specifications for installation.
- A five (5)-year warranty from the Manufacturer on the inverters. The inverter manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the inverters were installed according to its requirements and specifications for installation.
- A one (1)-year warranty for safety and protection devices, cables, instrumentation, and control/ communication devices including software, IP cameras and Web portal and all other accessories used in the solar PV system.

17. Defects and Liability Period

Defects and liability period shall include servicing of defective goods and services under the warranty obligations and conditions stipulated in the Contract.

Repairs, troubleshooting, and other after-sales support to commence within seven (7) calendar days upon receipt of notification from PNOC.

Replacement for locally available components shall not exceed fifteen (15) calendar days upon receipt of notification from PNOC.

Replacement for imported components shall not exceed sixty (60) calendar days upon receipt of notification from PNOC.

18. Spare Parts, Tools, and Consumables

The Contractor shall supply the necessary spare parts, tools, and consumables for the installation, testing and commissioning, as well as the operation and maintenance of the project. These items will be turned over to PNOC upon completion of testing and commissioning. Moreover, the bidder shall maintain a warehouse for the storage and immediate dispatch of solar panels (as spare parts) as needed.

Particulars	Qty	Unit
Solar panels (same with the minimum technical specifications stipulated in Section 21.3)	at least 1% of the total number of solar panels required for the Project	unit
DC Cables (same with the minimum technical specifications stipulated in Section 21.3)	as needed	meter
AC circuit breaker (same with the minimum technical specifications stipulated in Section 21.3)	1	set
Portable washer with pump, 7.5Mpa pressure, 5 liter/minute	1	unit
Dry Chemical Fire Extinguisher (10 pounds)	5	unit
RJ 45 connector (100pcs per pack)	3	pack
Electrical tape (0.16mm x 19mm x 8meters; black)	10	roll
Cable tie (UV resistant; 12”; 100pcs per pack)	3	pack
Rubber tape (18mm x 8meters; black)	3	length
Others (please specify, as needed)		

Allied Services

18.1. Markings and Labeling

The Contractor shall provide markings and labelling on all electrical equipment (including wires) in accordance with applicable codes and standards or as otherwise agreed upon with the building owner. Markings shall be clearly visible, located visibly on the equipment, constructed and installed to remain eligible for the whole of the design’s life of 25 years. The marking and labeling shall be compliant with the following codes:

- PEC article 6.90 and article 1.10
- UL 696

18.2. Safety Signages and Fire Extinguishers

The Contractor shall provide safety signages as per standards including warnings for high voltage, cable burial, etc.

The Contractor shall likewise provide a fire extinguisher to be mounted near each of the identified solar array stations, inverter station and tapping point station as per design drawings.

18.3. Power Supply

The Contractor shall provide power supply, complete with protection devices (e.g., circuit breakers, AVR, etc.) for equipment that will require power such as POE hub, inverter controller, router, etc. The Contractor shall identify the location of the tapping source and request permission to the building owner.

18.4. Water Source

The Contractor shall coordinate with the building owner for the location of the water source to be used during maintenance (e.g., PV module cleaning).

18.5. Canopy

In case an inverter station or any equipment is placed outdoors, a canopy shall be provided as per Manufacturer's standards and recommendation.

18.6. Access Platforms, Stairs and Safety Handrails

The Contractor shall provide access such as sufficient portable access ladder along the PV facility for safety and protection during construction and PNOC's operations and maintenance.

The Contractor shall provide anchors at strategic locations for safety harnesses.

18.7. Relocation or Modification of Existing Structures

The PV system shall be designed with no requirement for relocation or modification of the existing structures. In extreme cases when relocation or modification of existing structures is necessary, the Contractor shall submit modification or relocation plan to ensure that the structures shall be maintained, restored or upgraded.

19. Available Data and Schedule of Site Inspection

Potential bidders can access the relevant site data (e.g., electric consumption information, plans, and drawings) via the following link:

- **https://tinyurl.com/ACWD-BPS-LAB**

The site inspection is scheduled for February __ and __, 2025, from 9:00 AM to 12:00 PM (can be subject to change). Bidders must inform PNOC representatives in advance using the contact details provided below:

- **Louie Aaron L. Razon**: +639564761790
- **Richard Miguel D. Allauigan Jr.**: +639178460403
- **Patrick Jose IV V. Andaya**: +639369318841

20. Technical Specifications and Standards

20.1. Design Calculations

The design of the PV system shall be for a minimum service life of twenty-five (25) years. Design shall consider service conditions that will affect the performance of the solar PV system such as irradiation, UV radiation, temperature variations, rainfall intensity, humidity, pollution etc. Design shall be able to protect and harness the equipment from natural calamities such as earthquake, tropical typhoons, cyclones and wind gustiness prevailing in the Philippines.

20.1.1. Electrical Design

Maximum DC voltage per string shall not exceed 1500 Volts at a temperature of 15 degrees Celsius.

Minimum DC voltage per string shall be more than the "minimum input voltage" of the inverter at a temperature of 50 degrees Celsius.

Minimum DC voltage per string after 20 years shall be more than the "minimum input voltage" of the inverter at a temperature of 50 degrees Celsius.

Maximum DC power per array (combination of strings) shall be less than the maximum allowable generator power of inverter.

Maximum voltage drop between equipment to equipment shall not exceed 1% on DC system and 5% on AC system.

20.1.2. Structural Design

Seismic loading shall be selected to ensure the Performance Criteria set out below are achieved:

- All system's components which are critical to the generation of electricity shall remain undamaged and operational following a moderate earthquake;

- In case of a massive earthquake, the damage to structures and equipment shall be limited to that which can be repaired sufficiently quickly for the generation of electricity to resume safely within thirty (30) days, unless otherwise the main building has collapsed; and

- Potential costs of repair or replacement and the duration of inability to generate electricity after a large seismic event shall be minimized.

The wind resistant design required for the facility shall be at minimum of 270 kph. In case the basis for wind resistant design in the latest National Structural Code of the Philippines (NSCP) is higher, then NSCP shall govern.

20.2. Minimum PV System Components Specifications

20.2.1. Solar PV Modules

The modules must follow the IEC 61215 standards (i.e., Crystalline Silicon Terrestrial Photovoltaic modules; Design Qualification and Type). These shall be made of monocrystalline material solar cells, tested in extreme weather conditions,

and equipped with safety protection mechanisms. These shall also have a minimum efficiency of 17% at Standard Testing Conditions (STC). The solar PV panels supplied must include a performance warranty guaranteeing no more than 2% efficiency degradation in the first year and no more than 0.5% annual degradation thereafter. At the end of 25 years, the panels must still produce at least 85% of their original rated power output. The solar PV modules supplied must be manufactured by a Tier 1 manufacturer as defined by industry-recognized standards such as Bloomberg New Energy Finance (BNEF) or equivalent.

20.2.2. PV Mounting System

The PV mounting system shall be suited to the environment and atmospheric conditions (e.g., corrosion, salt). Structures shall be fixed, metallic and have appropriate design and adequate strength which can withstand the load of the modules, cyclonic and high wind velocities as applicable to the site condition. The material shall be robust and non-corrosive, made from anodized structural grade aluminum 6005 T5 and/or stainless steel components or equivalent. Use of different metals shall be avoided where practically possible to prevent galvanic corrosion. The structure shall prevent water accumulation. The mounting system must be compliant to AS/NZS1170.2:2011AMDT 2-2012 standard or equivalent.

20.2.3. Inverter

The inverter to be used shall be string type, weatherproof and equipped with a safety protection mechanism. The inverter shall be compatible with the existing electrical system. The inverter and its appurtenances shall be state-of-the-art with energy management and communication system and maximum power point trackers (MPPT) for optimum performance. The inverter shall have efficiency of not less than 98.5%, with a 10-year guaranteed service life. It also must have the following minimum communication specifications: WLAN/Ethernet, Wi-Fi, and 4G/3G/2G.

The inverter shall provide Application Programming Interface (API) access, allowing other applications or systems to communicate with it and retrieve data. This capability will facilitate the integration of inverter data into a unified monitoring system, supporting PNOC in implementing the Rooftop Solar PV System for Government Buildings (RGB) initiative.

The mounting shall be robust and non-corrosive, made from hot-dipped galvanized structural steel or equivalent. The foundation shall be fixed and secured. The inverter shall have adequate spacing, free from obstructions and well ventilated.

20.2.4. Inverter Controller

The inverter controller shall be the central communication unit for system monitoring, recording data and controlling. It shall be capable of interconnection of other measuring devices such as solarimeter, weather-meter, etc.

20.2.5. DC Combiner

In cases where design requires the need for a DC combiner, the DC combiner shall be made of glass-fiber reinforced polyester material or approved equivalent.

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. Mounting may be wall-mounted type or stand-alone support. The dimensions and thickness are as per manufacturer's standard. It shall be rated 1500Vdc minimum.

The DC combiner shall have appropriate cable entry points, with cable glands, fitted for input and output cables and a lockable door.

The DC combiner shall be equipped with auxiliaries such as circuit breakers, surge protection devices and grounding terminals, mounted on DIN rail or equivalent and with adequate spacing for easy termination and testing. Auxiliaries shall conform to IEC standards or equivalent.
All circuit breakers and fuses shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The voltage rating shall be a minimum of 1000VDC. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.2.6. AC Combiner

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. Mounting may be wall-mounted type or stand-alone support. The dimensions and thickness are as per manufacturer's standard. It shall be rated 0.6/1kV minimum.

The AC collector shall have appropriate cable entry points, with cable glands, fitted for input and output cables and lockable doors.

The AC collector shall be equipped with auxiliaries such as circuit breakers (mounted on busbar with adequate spacer) and neutral and grounding terminal mounted on DIN rail or equivalent and with adequate spacing for easy termination and testing. Auxiliaries shall conform to IEC standards or equivalent.

All circuit breakers shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The minimum voltage rating shall be equivalent to inverter output voltage. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.2.7. Transformer

In cases where design requires the need for a transformer, the transformer configuration shall be based on the system configuration or topology between the inverter i.e., TN-S, TN-C, TN-C-S, TT and IT and grounding configuration and voltage.

Depending on the location, the transformer shall either be outdoor type or indoor type in compliance with NEMA or IP standards. The compartment shall be metal-enclosed and non-corrosive. The transformer shall be dry-type, self-cooled and floor mounted. The foundation shall be equipped with an anti-vibration pad or equivalent. The transformer shall be UL/IEC listed or equivalent.

20.2.8. Transient Voltage Surge Suppressor with Isolation Switch

The TVSS shall be capable of bi-directional filtering of harmonics and surges that may be created from the PV system and from the grid.

The surge protection devices shall be compatible with the existing electrical system. The ampere-interrupting capacity (AIC) rating of the devices shall be equal to or greater than the available fault current to which they might be subjected.

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. It shall be rated 0.6/1kV minimum.

20.2.9. PV Generation (Revenue) Meter Including CT/PT and Terminals

The PV generation (revenue) meter shall be digital multi-function power meters complete with CTs and potential fuses. The meter shall conform to the following minimum requirements:

- IEC or ANSI revenue metering standards (i.e., Class 0.3 accuracy); and
- Capable of providing outputs and terminal strips for remote monitoring and data acquisition using RS485 or equivalent.

The meter shall be boxed in a standard enclosure with a viewing window made of fiberglass or equivalent.

20.2.10. ECB Main Disconnect Switch

The enclosed circuit breaker shall act as the main fault current protection device and disconnect switch to isolate the solar PV system from the existing electrical system. Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. The dimensions and thickness as per manufacturer's standard. It shall be rated 0.6/1kV minimum.

The circuit breaker shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The minimum voltage rating shall be equivalent to system voltage. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.2.11. Cables

PV cables shall be copper type. It shall be UV-rated, sunlight-resistant, water-proof protection and manufactured under UL standard. It shall be designed and manufactured in accordance with:

- IEC 60811: Insulation and Fire Protection
- IEC 60227 and IEC 60502: Design
- IEC 60228: Conductors
- UL 1581 (Xeno-Test), ISO 4892-2 (Method A) or HD 506/A1-2.4.20: DC solar cables

All power cables shall be of XLPE insulated with PVC sheathed, 0.6/1kV single or multicore, stranded copper conductor. The conductor shall be made from electrical purity copper for power cables and annealed high conductivity copper for control cables. Conductors shall be stranded for copper power cables and solid for copper control cables.

All cables shall be designed to withstand the mechanical, electrical, and thermal stresses under the steady state and transient/ fault conditions. All cables shall be suitable for high ambient temperature, high humidity and tropical climatic conditions. All cables shall be color coded as per IEC 60364 and should be provided with tag/marking.

All cable ties should be UV protected and can withstand high heat stress without damaging the cables. Cable ties shall conform to EN 50146 and IEC 62275 standards.

Cables to be supplied are categorized as follows:

Particular	Description	Requirement
PV String Cables	Cables from PV strings to DC Enclosures	Must be 2 x 6mm^2
DC Enclosure Cables	Cables from DC Enclosures to Inverters	As per PEC Standards
Inverter Cables	Cables from Inverters to AC Collector	As per PEC Standards
AC Collector Cables	Cables from AC Collector to Transformer	As per PEC Standards
Transformer Cables	Cables from Transformer to ECB for Disconnect Switch	As per PEC Standards
Tapping Point Cables	Cables from ECB for Disconnect Switch to tapping point	As per PEC Standards
Grounding Cables	Cables for grounding	As per PEC Standards
Neutral Cables	Cables for Neutral	As per PEC Standards
Communication Cables	Cables for Controls and Monitoring	UTP, Ethernet, CAT5/CAT6
Power Supply Cables	Cables for 220-240V power supply	As per PEC Standards

20.2.12. Raceways (Cable Trays, Conduits, PVC Pipes and Fittings, Accessories)

Cable trays and fittings shall be hot-dipped galvanized with a minimum of 2mm thickness in accordance with IEC standards or equivalent. Conduit shall be rigid steel in accordance with IEC standards or equivalent.

PVC systems that are to be buried underground shall conform to IEC 61386 Part 24 standards or equivalent.

Raceways shall be color coded as per standards or as per existing color coding of the building.

20.2.13. Lightning Arrester and Grounding System

In cases where design requires the need for a lightning arrester and grounding system, the lightning protection shall be made of conventional lightning protection or the Early Streamers Emission (ESE) type. It shall be equipped with a lightning strike counter. The protection radius shall cover the whole solar PV facility.

The grounding system shall have a maximum resistivity of 5 ohms. The size and diameter of bare copper and grounding rod shall be as per standard.

The safety protection devices shall provide optimum filtering in relation to the specification of inverter and PV panels. The surge protection device shall be compact and shall comply in accordance with the UL 1449 3rd edition testing, ANSI/IEEE C62 and ANSI/IEEE Std. 1100-1999

The surge protection devices shall be compatible with the existing electrical system. The ampere-interrupting capacity (AIC) rating of the devices shall be equal to or greater than the available fault current to which they might be subjected.

The grounding wires shall be placed in a standard UV-rated PVC or equivalent.

20.2.14. PV Monitoring and Data Acquisition System (Internet Connection)

The PV monitoring and data acquisition system shall be capable of both remote and onsite access and monitoring via a subscription-free online platform. The system shall be able to provide the following minimum data:

- energy generation (kWh);
- power (kW);
- power factor;
- voltage;
- current;
- irradiance;
- weather; and
- temperature

The system shall be capable of detecting failures and fault conditions.

Data transmission shall be real-time and shall be equipped with safety and high-security protocol. The data shall be displayed in graphical trends and in figures. Historical data shall be available for a minimum of one (1) year.

20.2.15. CCTV/IP Surveillance Camera

The CCTV/IP surveillance camera shall be capable of onsite monitoring, continuous recording, and remote access and monitoring via a subscription-free online platform. Viewing shall be real-time and can operate 24/7. Video recording shall be capable for a minimum of one (1) month. The camera shall be robust, weatherproof and with high-resolution.

Type	Fixed Bullet
Video Camera	2 units

Resolution	1080HD
Enclosure	Weatherproof, outdoor IP65 or equivalent, minimum
Hard Disk Drive	2TB SATA 6.0Gb/s Cache 64MB Surveillance Type
NVR	Minimum 8 Channel IP Camera, Resolution minimum of 1920x1080
POE Hub/Switch	8 ports
CPE/Router/Modem	1 × USB 2.0 Port for Connecting 4G/3G Modem as WAN Backup; 4 × Gigabit WAN/LAN Ports; Non-WIFI router

20.2.16. Communication and Control Cables, Radio Transmission or Fiber Optics or Equivalent

If long-distance controls are needed, a radio transmission or fiber optics or any equivalent communication protocol may be used. In the case of wireless communication, it shall be equipped with reliable communication equipment such that it will not create unacceptable delays and interference that would compromise the operability of the whole system.

Name of Company: _____

Authorized Representative: _____
(Name & Signature)

Lot No. : **3**
Description : **80 kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR**
Qty/UOM : **1 Lot**

Item No.	Technical Requirements		Statement of Compliance
1	**SOLAR PV MODULES**		
	General		
	Manufacturer	Supplier must specify	
	Model Number	Supplier must specify	
	Rated Capacity in Watt peak	Supplier must specify	
	Cell Type	N-Type Monocrystalline	
	Number of Cells	Supplier must specify	
	Efficiency	17%	
	Guaranteed Output (Minimum)		
	after 1 Year	97%	
	after 5 Years	95%	
	after 10 Years	90%	
	after 25 Years	80%	
	Warranty	10 Years (minimum)	
	Mechanical Characteristics		
	Dimension	Supplier must specify	
	Weight	30.6kg maximum	
	Front Cover Only (if monofacial), or Front and Back Cover (if bifacial	2.0mm to 3.2mm, High transmission, Tempered glass,	
	Frame	Anodized Aluminum Alloy	
	Junction Box Enclosure (minimum)	IP68 Rated	
	Connectors	MC4 or equivalent (1 male and 1 Female per module)	
	Cables Cross-Section Size	1*4.0mm^2 or equivalent	
	Electrical Parameters @ STC		
	Maximum system voltage (Vm_{ax})	Supplier must specify	
	Nominal Operating Temperature	Supplier must specify	
	Maximum Power Voltage (Vmp)	Supplier must specify	
	Maximum Power Current (Imp)	Supplier must specify	
	Open-circuit Voltage (V_{OC})	Supplier must specify	
	Short-circuit Current (I_{SC})	Supplier must specify	
	Temperature coefficient of Pmax	Supplier must specify	
	Temperature coefficient of Voc	Supplier must specify	
	Temperature coefficients of Isc	Supplier must specify	

1	**Standards and Certifications**		
	Manufacturer Category	Must be Tier1 - CATEGORY LISTED BY Bloomberg New Energy Finance Latest Report	
	Resilient in extreme weather condition	Compliant with IEC 61215 or equiv.	
	Wind load Capacity	2400 Pa	
	Static load Capacity	5400 Pa	
	Salt Mist Corrosion Resistant	Compliant with IEC 61701 or equiv.	
	Ammonia Corrosion Resistant	Compliant with IEC 62716 or equiv.	
	PV Module Electrical and Mechanical Operating Safety Qualification	Compliant with IEC 61730 or equiv.	
	Quality Management System	Compliant with ISO 9001 or equiv.	
	Occupational Health and Safety Management System	Compliant with OHSAS 45001 or equiv.	
	Environment Management System	ISO 14001: 2015 or equivalent	
	With authorized distributor in the Philippines	Must have certified and authorized service center in the Philippines	
2	**INVERTER**		
	Manufacturer	Supplier must specify	
	Model Number	Supplier must specify	
	Rated AC Power	Supplier must specify	
	Maximum AC Active Power	Supplier must specify	
	Type	String Type	
	Nominal Output Voltage	**Three-Phase, 220V to 240V or 400V to 480V**	
	Maximum Input Voltage	Supplier must specify	
	Operating Voltage/ Start Voltage	Supplier must specify	
	Maximum Input Current per MPPT / Maximum Short Circuit Current per MPPT	Supplier must specify	
	Number of MPPT Trackers/ Maximum Number of Inputs	Supplier must specify	
	Efficiency	98.5%, (minimum)	
	Dimension (W x H x D)	Supplier must specify	
	Weight	Supplier must specify	
	Operating temperature range	–25°C to +60°C (–13°F to +140°F)	
	Topology	Transformer-less	
	Degree of Protection	IP66 (minimum)	
		Anti-islanding Protection/AC	

2	Protective Devices	Output Overcurrent/DC Reverse Polarity Protection/Strings Monitoring/DC Surge Protection (Type II)/AC Surge Protection (Type II)	
	Display	Graphic LCD/LED	
	Warranty	5 Years	
	Standards and Certifications		
	Inverter	IEC 62109-1/IEC 62109-2 (Class I, grounded communication Class II, PELV	
		IEC 62116	
		IEC 61727	
3	**INVERTER CONTROLLER**		
	Manufacturer	Supplier must specify (Must be same with Inverter)	
	Model Number	Supplier must specify	
	Max. number of manageable device	20	
	Power Supply	100 to 240 V	
	Interaction	Supplier must specify	
	Operating temperature range	Supplier must specify	
	Communication Protocol	Supplier must specify	
	Mounting	DIN top-hat rails or wall mounting	
	Degree of Protection	IP65 (minimum)	
4	**MOUNTING STRUCTURE**		
	General		
	Manufacturer	Bidder must specify	
	Module Type Compatibility	Framed or frameless	
	Wind Speed	Customizable	
	Material	Anodized structural grade aluminum alloy (AL6005-T5) and stainless-steel components (SS/SUS 304)	
	Standard	Compliant with AS/NZS1170.2:2011 AMDT 2-2012 or equiv.	
	Major Components		
	L-clamp	Bidder must specify	
	End Clamp (part number)	Bidder must specify	
	Inter/Mid Clamp (part number)	Bidder must specify	
	Railing (part number)	Bidder must specify	
	Rail-Splicer (part number)	Bidder must specify	
	Mounting/L-Clamp (part number)	Bidder must specify	

	Other Components (as needed) Shall be determined as per actual site condition	
	OTHER COMPONENTS (refer to Section 21.2 Minimum PV System Components Specifications)	
5	DC Combiner (if needed)	
6	AC Combiner	
7	Transformer (if needed)	
8	Transient Voltage Surge Suppressor with Isolation Switch	
9	PV Generation (Revenue) Meter Including CT/PT and Terminals	
10	ECB Main Disconnect Switch	
11	Cables	
12	Raceways (Cable Trays, Conduits, PVC Pipes and Fittings, Accessories)	
13	Lightning Arrester and Grounding System (if needed)	
14	PV Monitoring and Data Acquisition System	
15	CCTV/IP Surveillance Camera	
16	Communication and Control Cables, Radio Transmission or Fiber Optics or Equivalent	

Terms of Reference

1. Project Description

The Philippine National Oil Company (PNOC), under its Three Arrows Strategy, is revolutionizing sustainable energy solutions by spearheading rooftop solar power projects for various government buildings. This initiative supports the government's strategy to reduce its dependence on international fuel markets and promote renewable energy use.

In line with the Inter-Agency Energy Efficiency and Conservation Committee (IAEECC) Resolution of 07 July 2023, government entities, including government-owned and controlled corporations (GOCCs), state universities and colleges (SUCs), and local government units (LGUs), are mandated to install at least 20% of their electricity requirements from Solar Photovoltaic (PV) systems or equivalent renewable energy technologies within three years.

Additionally, this project aligns with the Government Energy Management Program (GEMP), which encourages a minimum 10% reduction in electricity consumption across all government entities. By ensuring zero export of energy to the distribution grid, this forward-thinking project not only reduces costs but also elevates environmental stewardship, setting a new standard for green energy in the public sector.

PNOC invites submissions from reputable organizations (referred to as "the Contractor") capable of providing a comprehensive turnkey solution encompassing engineering, procurement, construction, commissioning, and testing and commissioning, and one-year operations and maintenance (referred to as "EPCTC") for the Project.

The project shall be named "**Supply, Delivery, Installation, Testing and Commissioning of 80kWp Solar PV Rooftop System at TESDA Regional Training Center - NCR**". The project site is located at TESDA Complex, East Service Road, Taguig City.

2. Objectives of the Contract

The intent of the Terms of Reference is to provide the general and technical requirements necessary for the implementation of the project. However, it is the Contractor's obligation to investigate and validate all information herewith as part of their work to be undertaken. Thus, any discrepancies in the TOR in accordance with applicable and generally accepted engineering and construction practices, government rules and regulation and the latest industry codes and standards for solar PV development shall not relieve the Contractor of the accuracy of their work.

a. **Define Project Scope**: Clearly outline the scope of work for the turnkey EPC (Engineering, Procurement, and Construction) contractor, including project preparation, procurement, installation, construction, testing, commissioning, and operation and maintenance (O&M).
b. **Establish Deliverables**: Specify the required deliverables, including documentation, performance guarantees, and O&M plans, to ensure comprehensive project execution and accountability.
c. **Set Performance Standards**: Provide criteria for the performance and quality of the solar PV systems, ensuring they meet industry standards and regulatory requirements.
d. **Detail Compliance Requirements**: Ensure the EPC contractor adheres to all relevant local, national, and international regulations and standards, promoting safety, reliability, and environmental responsibility.
e. **Specify Evaluation Criteria**: Establish the criteria for selecting the EPC contractor, focusing on experience, technical expertise, financial stability, and the quality of the proposed solutions.
f. **Ensure Zero Export Compliance**: Mandate that the solar PV systems operate with zero export to the distribution grid, ensuring on-site energy optimization and compliance with regulatory requirements.
g. **Provide Maintenance Guidelines**: Include a comprehensive one-year O&M plan to ensure the longevity, efficiency, and optimal performance of the installed solar PV systems.
h. **Promote Transparency and Reporting**: Require regular progress reports from the EPC contractor to PNOC, detailing project milestones, challenges, and resolutions, fostering transparency and effective project management.

3. Approved Budget for the Contract (ABC)

PNOC has an approved corporate budget in the amount of Four Million Six Hundred Thousand Pesos (Php 4,600,000.00) for the Project.

4. Scope of Works

The scope of work for the Contractor includes:

4.1. Project Preparation

The Contractor shall facilitate all preliminary and general works on time so that any issues or problems encountered can be addressed. If the Contractor fails to timely execute the works, then any delays due to pending issues and problems shall be of the Contractor's account.

- Kick-off Meeting

  The Contractor shall schedule a kick-off meeting no later than ten (10) calendar days starting from the date of commencement as stated in the NTP. The kick-off meeting shall be held at site to discuss mobilization and construction schedules and other details necessary prior project execution. All key personnel must be available during the kick-off meeting.

- Mobilization

  The Contractor shall facilitate the mobilization of manpower and equipment, including operating supplies and tools necessary for the project immediately after the kick-off meeting.

- Temporary Facilities and Storage/Staging Area

  The contractor shall be provided a temporary headquarters immediately after the kick-off meeting. The location of the headquarters and storage/staging area shall be determined with the consent of the building owner.

- Site Survey and Assessment

  The Contractor shall undertake its own site survey, verification, and assessment, including actual measurements of voltage, current, frequency and power quality for a period of seven (7) calendar days upon mobilization, identification of access, etc., to identify all necessary information about the site conditions and design parameters. Additionally, the Contractor shall perform an energy yield assessment to estimate the potential solar energy generation in the installation site

  The assessment shall also include the condition of roof and existence of roof leaks, and the safety and reliability of the existing electrical system(s) and the whole installation, and maintenance concerns. All findings and necessary engineering intervention shall be incorporated in the detailed project designs and engineering plans and shall be properly addressed during construction.

- Permits and Clearances

  The Contractor shall secure the construction permit, safety permit, building permit and other approvals, clearances, and licenses necessary prior to the start of construction and installation.

  The Contractor shall also secure necessary permits/documents as required by the Distribution Utility for the installation of the rooftop solar PV system on the installation site.

- Detailed Project Designs and Engineering Plans

  The Contractor shall submit Detailed Project Designs and Engineering Plans no later than ten (10) calendar days starting from the date of commencement stated in the NTP. The Detailed Project Designs and Engineering Plans must reflect all

additional requirements and information needed based on the reviewed preliminary design drawings.

The Detailed Project Designs and Engineering Plans shall be furnished using engineering standard templates, adequate, readable and must be written in English. The Contractor must use computer-aided design and drafting software (CAD) or equivalent. Likewise, electronic components with built-in programs and software shall be accompanied with their corresponding programs and ladder logic diagrams for submission to PNOC prior to the installation of the systems.
The Detailed Project Designs and Engineering Plans shall be signed and sealed by Professional Engineers (Electrical and/or Civil/Structural Engineer), and PNOC and building owner's authorized representatives. PNOC shall have the right to require the Contractor additional drawings or information as may be necessary.

The minimum number of original copies to be produced by the Contractor shall be 3 sets of A3 size and 2 electronic copies containing CAD and PDF files, as an advance copy. The Contractor must also submit a hard copy as an official document. PNOC reserves the right to reproduce any drawings or documents received from the Contractor as may be necessary.
To avoid revisions, the Contractor may submit first draft drawings or e-file via email before printing the Detailed Project Designs and Engineering Plans.

4.2. Procurement

The Contractor shall be responsible for the procurement of all equipment and construction materials, including consumables, necessary to complete the project.

All delivered equipment and construction materials, including consumables, shall be subject to testing and inspection by PNOC. Testing and inspection includes visual checking, measurement, validation of specifications (in the nameplates) and other applicable testing methods as deemed necessary. PNOC shall release a Materials Inspection Report (MIR) for the findings of the inspected materials. Any damage or deficiency shall be rectified or replaced by the Contractor without additional charges to PNOC.

- Equipment and Construction Materials

  The Contractor may source all equipment and construction materials, including consumables locally or abroad provided these shall conform to the required design specifications and standards. In case of changes in the source of supply or brand, the Contractor shall submit a letter of request stating the reasons for the changes for PNOC's review and approval.

- Factory Acceptance Test (FAT)

  The Contractor must provide any proof that the manufacturer's factory or fabricator's shop has passed the FAT for the solar panels and inverters. All related testing expenses shall be of the Contractor's account. Receipt and acceptance of the Certified Test Reports and Inspection & Testing Certificate by PNOC shall in no way relieve the Contractor of its responsibility.

- Handling and Delivery

  The Contractor shall perform proper packing, loading, transportation, hauling and unloading of equipment in accordance with the Manufacturer's standards and recommendations. All duties and taxes including export permits and clearances, insurances and warranties shall be of the Contractor’s account. The equipment and construction materials shall be delivered directly to the project site(s).

  The Contractor shall secure handling and delivery manuals from the Manufacturer.

  The Contractor shall notify PNOC for all incoming materials and submit Delivery Receipt upon delivery for inspection and acceptance by PNOC prior to installation.

  All equipment shall be delivered unbroken, not deformed and without cracks and scratches.

  In general, the packaging of the equipment shall be based on generally accepted industry practices or standards. Packaging shall be adequate to prevent damage from any mechanical stresses that may occur and to ensure safety during loading, hauling, unloading, unpacking and storage.

  Boxes shall contain barcode sheet/label showing the following information:

  ✓ Name of the Manufacturer;
  ✓ Model Number;
  ✓ Code No./Serial Number;
  ✓ Product Barcode; and
  ✓ Manufacturing Date.

- On-Site Storage

  The Contractor shall perform on-site storage of equipment and construction materials in accordance with the Manufacturer's standards and recommendations. Equipment shall be placed at the designated storage/staging area.

  The Contractor shall secure equipment on-site storage manuals from the manufacturer.

4.3. Installation and Construction

The Contractor shall provide all consumables, tools, equipment, and manpower, including PPE, necessary to perform the necessary works.

The Contractor shall only be allowed to work at the designated area agreed upon with PNOC to avoid any interruptions to the on-going operations and activities at the site.

In case of concrete drilling or breaking, the Contractor must ensure that such work shall not compromise the integrity of the existing structures.

In the case of painting, appropriate painting shall be used for the structures to be painted in accordance with applicable standards. The painting shall be done with a primer and topcoat as a minimum.

In the case of earthworks and concreting, it shall be performed in accordance with applicable codes and standards. Concrete foundations must be designed using applicable mixtures and with reinforcing bars as per standards.

The PV system shall be designed for simple mechanical on-site installation with no requirement for welding or complex machinery at the Site. In extreme cases where welding or machinery is necessary, the Contractor shall submit welding methodology. Welding shall be tested as per standards.

The Contractor must also ensure minimal disruption to the daily operations of the installation site.

- Pre-Leak and Post-Leak Test

  The Contractor shall conduct pre-leak test prior to, and after the installation of PV modules and appurtenances, respectively. Schedule of the leak test shall be properly coordinated with PNOC and building owner representatives.

  The Contractor shall submit a leak test procedure for review and approval by PNOC prior to execution.

- Work Permit

  The Contractor shall coordinate with PNOC representative for every work to be performed prior to execution. The work to be performed shall specify the following:

  ✓ Type of Work, such as: Hot works/Cold work/Working at Heights/Confined Space/Concrete Chipping/Excavation works;
  ✓ Target Start and End Dates;
  ✓ Methodology;
  ✓ Hazard associated with the Works;
  ✓ Safety and precautionary measures;
  ✓ Equipment and construction materials with attached approved brochures and/or drawings; and
  ✓ Equipment, Tools, and Personal Protective Equipment (PPE).

- Mounting and Installation of Equipment

  All equipment shall be mounted in accordance with engineering and construction standards and practices and manufacturers' recommendations and standards and

safety and health standards. Spacing, orientation, and location shall be based on the approved Detailed Project Designs and Engineering Plans.

- Cabling and Raceway Routing

  DC cables shall be housed in a hot dip galvanized cable tray/ladder with cover. All AC cables shall be housed in rigid steel conduit. Instrumentation and communication cables shall be housed in a separate UV rated conduit.

  For buried cables, it must be housed in a PVC pipe with concrete trench, warning tape or tiles placed above and marking posts at suitable intervals on the surface. The minimum depth of burial is 700mm depending on the location and condition of the ground surface.

  Cables shall occupy less than 66% of the raceway space and properly loop, not too tight to avoid any damages to the wires.

  DC cables shall be installed in a manner which minimizes induction loops between positive and negative cables. For string cables, large loops of excess DC cabling shall be avoided.

  The raceway shall be placed in a manner that it will not create any obstructions or hazards to operations and maintenance.

  The Contractor shall use pull box/junction box on all intersections and sharp curves or bends and provide rubber and bushing on all junctions and endings to avoid cut in the wire insulation. The Contractor shall apply silicone sealant, as applicable, on raceway openings to prevent access of dirt, water, and vermin.

  The Contractor shall comply with the Distribution Utility (DU) Net-Metering requirements for the cable installation and other electrical components.

- Grounding, Termination, and Interconnection

  All equipment shall have adequate grounding. All cables shall be properly dressed/secured/fixed and terminated using terminal lugs, clamps, crimps and solder. There should be no exposed conductors to avoid short circuits and arc flash.

  The Contractor shall request a schedule for shutdown for the interconnection to the existing electrical distribution system.

  The Contractor shall conduct a torque test after termination and interconnection.

- Lifting

  Appropriate lifting equipment shall be utilized when performing heavy lifting. Access shall be identified to avoid obstructions. Schedule of lifting shall be properly coordinated with the building owner.

- Foundations and Structural Supports

Structural supports necessary for the mounting of equipment (e.g., inverters, enclosures, transformers, PV modules, etc.) shall be made of hot dip galvanized structural steel minimum of 2 mm metal thickness and minimum coating thickness of 3 mils as per ASTM A 386 or equivalent. In case the galvanized coating is damaged during installation, the Supplier shall apply the necessary rectification in accordance with ASTM A 780-01 (Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings).

Reinforced (with deformed bars) concrete blocks/ballast or foundations may be provided to provide stability.

For penetrated supports, it shall be non-corrosive, and waterproof using flashings, gasket or other approved chemical sealing and coating material. In case of concrete penetration, the anchor bolts (dowel) shall be made also of hot-dipped galvanized or equivalent.

4.4. Testing and Commissioning

The Contractor shall conduct testing and commissioning for a minimum of seven (7) days upon completion of the installation of the PV system, to be witnessed by PNOC and representatives of the building owner. The schedule and duration of the testing and commissioning shall be mutually agreed by the Contractor, PNOC and building owner. However, the testing and commissioning activities shall be satisfactorily completed within the time required under the contract.

Any corrections resulted from the error in the workmanship or design made by the Contractor which were found during the conduct of testing and commissioning or prior to the rooftop solar PV system operation thereon, with the resulting extra expenses due to repair or cost for the replacement for damaged equipment/materials shall be solely charged to the account of the Contractor.

Testing and commissioning shall be performed in a systematic process whereby all systems and equipment are tested and brought into operation and performed interactively according to the design intent and in accordance with the performance criteria set upon. Equipment and accessories shall be inspected to determine the completeness of the PV system and conformance in accordance with the Specifications. All testing instruments including consumables, temporary structures, and manpower required for the testing and commissioning activities shall be provided and at the account of the Contractor.

The Contractor shall ensure that the rooftop solar PV system operates with zero export to the Distribution Grid by configuring inverters to clip any excess energy generated.

The Contractor shall also arrange the joint inspection with the representatives of Distribution Utility and the Office of Building Official (if applicable) to conduct demonstration of the required features of the rooftop solar PV system. This is for the eventual acceptance of the system by the DU and LGU-OBO by furnishing the necessary certificates.

PNOC shall release a "Certificate of Project Completion" after the Testing and Commissioning provided that all works have been performed and all issues have been addressed.

- Testing and Commissioning Plan

  The Contractor shall submit a TCP/Procedures prior to the conduct of testing and commissioning for PNOC's review and approval.

  The TCP shall include the following information:

  - ✓ Itinerary (date) of the testing and commissioning;
  - ✓ Detailed methodology and step-by-step procedures;
  - ✓ List of tools and equipment, including PPE, to be used;
  - ✓ Manpower requirement;
  - ✓ Hazards and safety protocol; and
  - ✓ Target results or acceptance criteria.

- Testing and Commissioning Works

  The minimum testing and commissioning shall include the following:

  - ✓ Inspection and calibration of tools and testing instruments;
  - ✓ Visual and physical (quality and quantity) inspection of the installed equipment and appurtenances;
  - ✓ Torque test of all terminations and mounting;
  - ✓ Continuity test (open circuit and closed circuit) of all breakers, fuses, switches, protection devices and other equipment with circuitry;
  - ✓ Insulation test of all DC and AC wires including grounding (line-to-line and line-to-ground);
  - ✓ Open circuit voltage/ short circuit current string test;
  - ✓ Polarity test;
  - ✓ Phase sequence test;
  - ✓ AC operating voltage test;
  - ✓ Inverter synchronization test;
  - ✓ Inverter frequency test;
  - ✓ Inverter power generation test;
  - ✓ Operating voltage and operating current string test;
  - ✓ Thermal scanning;
  - ✓ Optimizer Device Functionality;
  - ✓ Voltage Harmonic Rise - should not be greater than 5% or inverter specification (whichever is lower);
  - ✓ Lighting Arrester Grounding and Counter Tests;
  - ✓ Anti-Islanding Test;
  - ✓ Cease to Energize Test; and
  - ✓ Other necessary tests

The minimum tools and equipment to be used shall include the following:

Torque wrench;
Clamp Meter;
Irradiance meter;
Thermal scanner;
Power Quality Analyzer;
2-way radios;
Insulation Resistance Tester;
Earth Ground Tester; and
Lock-out/tag-out

The Contractor may use a multi-function instrument that is capable of performing the testing and commissioning such as a solar PV installation tester.

Personnel who will conduct the testing and commissioning shall be equipped with the minimum PPE:

- ✓ Safety shoes (Electrical hazard compliant);
- ✓ Safety jacket;
- ✓ Safety pants;
- ✓ Electrical gloves (1kV); and
- ✓ Protective eye glass.

The Contractor shall also provide first-aid kit and fire extinguisher (dry powder).

- Testing and Commissioning Report

The Contractor shall submit the TCR after the completion of the testing and commissioning. The TCR shall be reviewed and accepted by PNOC and building owner representative(s).

4.5. Operation and Maintenance

The Contractor shall perform a one-year O&M support to PNOC. The Contractor shall provide a comprehensive one-year maintenance plan, which shall include, but not limited to, daily monitoring of system performance, preventive maintenance and repair works, technical support in case of unforeseen decreasing PV system performance, and end-user training.

The training shall include, but not limited to lectures and on-site strategy covering the methods of operation, maintenance, basic troubleshooting, and management of the facility. All costs and expenses for the training, except those incurred by PNOC which include, but not limited to their own transportation and accommodation expenses, shall be borne by the Contractor. A corresponding Certificate of Completion shall be issued to the participants in the training.

During the one-year O&M, the EPCC Contractor shall guarantee the minimum annual production of **99,373.00 kWh** for the rooftop solar PV system.

If ever the minimum annual PV production was not achieved mainly due to uncontrollable factors, then no penalty will be imposed on the Contractor. However, if defects in any of the system components, especially in the inverters, are found to contribute to the performance issues of the PV system, then the Contractor shall pay a corresponding compensation equivalent to the total amount of revenue lost to PNOC from the declared minimum annual production guarantee of **99,373.00 kWh**. Moreover, the cost of any and all rework and/or restoration of damaged properties due to the Contractor's poor workmanship or negligence shall be borne by the Contractor.

5. Deliverables

The Contractor shall ensure that the following deliverables must be provided to PNOC with physical copies as the official submission and electronic copies as advance submissions. Any later correction and changes found necessary by PNOC and all resulting additional costs and/or delays shall be of the Contractor's account. PNOC reserves the right to reproduce any drawings or documents received from the Contractor as may be necessary.

The Contractor shall provide all the necessary deliverables before the start of the Testing and Commissioning, except for the deliverables that need to be submitted at earlier date for review and approval of PNOC (e.g., detailed project plan and timeline, site and energy yield assessment reports, detailed project designs and engineering plans, and procurement records and equipment warranties).

5.1. Documentation

- Detailed project plan and timeline
- Site and energy yield assessment reports
- Detailed project designs and engineering plans
- Procurement records
  - ✓ Bill of materials
  - ✓ Shop/fabrication drawings
- Installation and commissioning reports
- Wiring and termination diagrams
- As-Built Drawings (Power & Control Circuits) and Electronic Programs/Ladder Logic Diagrams
- Equipment and O&M manuals
- List of necessary spare parts, tools, and consumables
- Warranty certificates of the solar panels and Balance of System (BOS) and all other applicable system components and tools

5.2. Performance Guarantees

- Assurance of system performance metrics
- Warranty and maintenance agreements

5.3. Operation and Maintenance (O&M)

- Detailed one-year O&M plan
- Regular maintenance schedule and procedures

- Immediate response and repair protocols
- Performance monitoring and reporting
- List of necessary spare parts, tools, and consumables

6. Commencement Date and Period of Implementation

The commencement date of the Project shall be upon the receipt of Notice to Proceed (NTP). There will be two (2) main activities for this entire engagement: the EPCC and O&M support. The duration of the EPCC and O&M support shall be **one hundred twenty (120) days maximum from the receipt date of the Notice to Proceed** and **365 days from the official start of operation of the 80 kWp rooftop solar PV system**, respectively.

7. Payment Terms

Milestone payments will be adopted where the payment shall be released upon reaching the specific project milestone, to ensure that these conform to the requirements set for the purpose.

The payments are subject to the usual government accounting and auditing requirements. Hence, the Contractor is expected to be familiar with the Government Accounting and Auditing Manual (GAAM).

Project Milestone*	**Percentage of Payment**
Completion of installation and testing & commissioning	90%
Handover and completion of training for building operators	10%

**Retention Money: 10% for every progress billing.*

8. Evaluation Criteria

Bids exceeding the identified Approved Budget for the Contract (ABC) will automatically be disqualified. The selection of the Contractor will be based on:

8.1. Experience and track record in similar projects

- Bidders must have completed solar PV contracts with a minimum total aggregate installed capacity of 1 MWp, where at least two (2) contracts must be fully operational for the last two (2) years from the date of bid submission.

8.2. Technical expertise and key personnel

The Contractor shall employ and certify to their competency the minimum key personnel dedicated for the project.

PERSONNEL	**QTY**	**QUALIFICATIONS**	**EXPERIENCE**
Project Manager	1	Shall be Licensed Electrical Engineer	• Has completed at least three (3) solar PV projects, one (1) of which with at least 50% of the project capacity (kWp) • Minimum of three (3) years' experience in Solar Project Management

Electrical Design Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) solar PV projects, one (1) of which with at least 50% of the project capacity (kWp) ● Minimum of three (3) years' experience in design of Solar Project
Project Site Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three (3) years of experience in project supervision of solar PV projects, one (1) of which with at least 50% of the project capacity (kWp);
Safety Officer	1	With bachelor's degree and either BOSH or COSH certification	● Minimum of three (3) years of experience in Construction.
QA/QC Engineer	1	Shall be Licensed Electrical Engineer	● Minimum of three (3) years of experience in Construction of Solar PV Projects.
Testing and Commissioning Engineer	1	Shall be Licensed Electrical Engineer	● Has completed at least three ● (3) years' experience in testing and commissioning of solar PV projects, one (1) of which with at least 50% of the project capacity (kWp); Must have adequate knowledge in inverter programming configuration and programmable logic controllers.

The Contractor may nominate the personnel in dual positions, except for the Project Manager, for as long as they are qualified and capable of doing multiple tasks and with the assurance that it can deliver the work on time without compromising the quality.

In case bidder has existing contract for Rooftop Solar PV System with PNOC, the bidder must propose different set of key personnel.

8.2.1. Roles of the Key Personnel

- Project Manager - Shall be the single point of contact with PNOC for all matters pertaining to the Project. The Project Manager shall always be available during weekly meetings and in cases where his/her presence is needed.
- Electrical Design Engineer - Shall be responsible for the engineering design of the PV system. The Design Team shall always be available during meetings pertaining to the design and specifications.
- Project Site Engineer - Shall be in-charge of the overall supervision of the project execution. The Project Engineer shall always be available at the site during the EPCC. During the three-year O&M period, he/she shall conduct all required O&M activities for the Project.
- Safety Officer – Shall ensure the safety and health of all personnel involved in the construction by monitoring and assessing possible hazards in the area.

- QA/QC Engineer – Shall ensure that all delivered materials and works performed are within standards and specifications.
- Testing and Commissioning Engineer – Shall lead the proper testing and commissioning of the PV system.

9. Project Schedule

As part of bid submission, the Contractor shall provide the project schedule, which should include key milestones such as:

9.1. Completion of site and energy yield assessments.
9.2. Procurement and delivery of equipment.
9.3. Completion of installation and commissioning.
9.4. Handover and training for building operators.
9.5. One-year O&M period.

The Contractor shall use applicable software or computer programs in presenting the project schedule.

10. Preliminary Design Drawings

The preliminary design shall be provided for the rooftop solar PV system to give an overview of the project to be developed, as part of the bid submission of the Contractor. This must be adequate and sufficient to understand the concept and orientation of the PV system being proposed. Design drawings shall be submitted in A3 size, including, but not limited to the following:

Sheet	Content
Cover Page	Project Title
G / 1	List of Drawings, Legend and General Notes
G / 2	Project Location Map, Site Development Plan, Project Site Conditions and Technical Features
E / 1	Tapping Point
E / 2	Single Line/Riser Diagram
E / 3	DC and AC Load Schedule Calculation
E / 4	Control and Monitoring System Topology
E / 5	Solar PV Array Stringing Plan
E / 6	DC, AC and Communication Cable Routing Details
E / 7	Proposed Grounding System Location and Wiring
E / 8	CT and Metering Installation
E / 9	Lightning Arrester and Grounding
S / 1	Solar PV Array Mounting & Framing Details
S / 2	Inverters Station and Tapping Point Station Details
S / 3	Access Ladders/railings for maintenance
S / 4	Concrete roof deck foundation and calculation (as needed)

11. Compliance with Industry Standards and Codes

Without limiting the Contractor's obligations, all engineering and construction/installation works performed, all equipment furnished, and all tests carried out under this Engagement

shall be undertaken in accordance with latest industry standards and regulation, including, but not limited to the following:

- Grid Code or Distribution Code
- Distribution Services and Open Access Rules (DSOAR)
- Philippine Electrical Code (PEC)
- National Building Code of the Philippines (NBCP)
- National Fire Protection Association Standards (NFPA)
- National Structural Code of the Philippines (NSCP)
- Revised Fire Code of the Philippines of 2008
- International Electrotechnical Commission (IEC) Standards
- Underwriter's Laboratories Inc. (UL) and/or Factory Manual (FM) or equivalent Standards

12. Weekly Construction Meetings and Progress Reports

The Contractor shall conduct weekly construction meetings to be held either on site or online and provide progress reports. Progress reports must be submitted to PNOC also at a weekly basis, which shall include Program of Work, Materials Delivery Status and Accomplishment and Target Report. For urgent matters, PNOC may advise emergency meetings.

- Program of Work – Shall include PERT/CPM, S-Curve, Bar Chart, Manpower, and Equipment Utilization Schedule. The Contractor shall utilize applicable software or computer programs in presenting the Program of Work.
- Materials Delivery Status – Shall reflect the status of all materials being procured including the descriptions, quantity, name of suppliers, purchased order number, ETA site, etc.
- Accomplishment and Target Report – Shall be presented in MS PowerPoint or equivalent. It should include the percentage of weekly accomplishment, safety reports and targets. In case of delays or slippage, the Contractor shall provide a detailed "catch-up" plan.

13. Workmanship

The Contractor shall accept full responsibility for its work in the design, specifications, procurement, fabrication, manufacture, construction, erection, installation, calibration and testing, quality control, documentation, testing and commissioning and performance testing.

The Contractor shall be responsible for the safety and security of its personnel within the project site(s) and provide proper personal protective equipment (PPE).

The Contractor shall also be responsible for all compliance with the Distribution Utility (DU) and Energy Regulatory Commission (ERC) requirements to attain smooth synchronization and commercial operation.
The Contractor shall be deemed solely liable for all its suppliers and subcontractors and shall compensate PNOC against all third-party claims or infringement of patent, trademark, or industrial design rights arising from use of the supplied equipment or any part thereof.

14. Certificate of Acceptance

Certificate of Acceptance for accomplished works shall be issued to the Contractor by PNOC to certify its successful execution and performance.

- A Certificate of Partial Project Completion shall be issued after the 90% completion of the scope of work; and

- A Certificate of Final Acceptance shall be issued by PNOC after the completion of the defects and liability period and the submission of warranty certificates and security.

15. Project Turnover

The project shall be turned over to PNOC upon completion of the scope of work. The Contractor shall issue an endorsement letter for proper turnover.

16. Warranty Certificates

The Contractor shall turnover the warranty certificates for the following structures and equipment to PNOC prior to issuance of Certificate of Final Acceptance:

- A twenty-five (25)-year linear power warranty from the Manufacturer on the solar PV modules with at least eighty percent (80%) power output guaranteed at twenty-five (25) years. The solar PV module manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the modules were installed according to its requirements and specifications for installation.
- A fifteen (15)-year warranty on the permanent structures which include mounting and racking systems used in the rooftop solar PV system.
- A ten (10)-year warranty from the Manufacturer on the solar PV modules. The PV module-manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the PV modules were installed according to its requirements and specifications for installation.
- A five (5)-year warranty from the Manufacturer on the inverters. The inverter manufacturer shall confirm that the warranty applies on an "as installed basis," i.e., it will confirm the inverters were installed according to its requirements and specifications for installation.
- A one (1)-year warranty for safety and protection devices, cables, instrumentation, and control/ communication devices including software, IP cameras and Web portal and all other accessories used in the solar PV system.

17. Defects and Liability Period

Defects and liability period shall include servicing of defective goods and services under the warranty obligations and conditions stipulated in the Contract.

Repairs, troubleshooting, and other after-sales support to commence within seven (7) calendar days upon receipt of notification from PNOC.

Replacement for locally available components shall not exceed fifteen (15) calendar days upon receipt of notification from PNOC.

Replacement for imported components shall not exceed sixty (60) calendar days upon receipt of notification from PNOC.

18. Spare Parts, Tools, and Consumables

The Contractor shall supply the necessary spare parts, tools, and consumables for the installation, testing and commissioning, as well as the operation and maintenance of the project. These items will be turned over to PNOC upon completion of testing and commissioning. Moreover, the bidder shall maintain a warehouse for the storage and immediate dispatch of solar panels (as spare parts) as needed.

Particulars	Qty	Unit
Solar panels (same with the minimum technical specifications stipulated in Section 21.3)	at least 1% of the total number of solar panels required for the Project	unit
DC Cables (same with the minimum technical specifications stipulated in Section 21.3)	as needed	meter
AC circuit breaker (same with the minimum technical specifications stipulated in Section 21.3)	1	set
Portable washer with pump, 7.5Mpa pressure, 5 liter/minute	1	unit
Dry Chemical Fire Extinguisher (10 pounds)	5	unit
RJ 45 connector (100pcs per pack)	3	pack
Electrical tape (0.16mm x 19mm x 8meters; black)	10	roll
Cable tie (UV resistant; 12”; 100pcs per pack)	3	pack
Rubber tape (18mm x 8meters; black)	3	length
Others (please specify, as needed)		

Allied Services

18.1. Markings and Labeling

The Contractor shall provide markings and labelling on all electrical equipment (including wires) in accordance with applicable codes and standards or as otherwise agreed upon with the building owner. Markings shall be clearly visible, located visibly on the equipment, constructed and installed to remain eligible for the whole of the design’s life of 25 years. The marking and labeling shall be compliant with the following codes:

- PEC article 6.90 and article 1.10
- UL 696

18.2. Safety Signages and Fire Extinguishers

The Contractor shall provide safety signages as per standards including warnings for high voltage, cable burial, etc.

The Contractor shall likewise provide a fire extinguisher to be mounted near each of the identified solar array stations, inverter station and tapping point station as per design drawings.

18.3. Power Supply

The Contractor shall provide power supply, complete with protection devices (e.g., circuit breakers, AVR, etc.) for equipment that will require power such as POE hub, inverter controller, router, etc. The Contractor shall identify the location of the tapping source and request permission to the building owner.

18.4. Water Source

The Contractor shall coordinate with the building owner for the location of the water source to be used during maintenance (e.g., PV module cleaning).

18.5. Canopy

In case an inverter station or any equipment is placed outdoors, a canopy shall be provided as per Manufacturer's standards and recommendation.

18.6. Access Platforms, Stairs and Safety Handrails

The Contractor shall provide access such as sufficient portable access ladder along the PV facility for safety and protection during construction and PNOC's operations and maintenance.

The Contractor shall provide anchors at strategic locations for safety harnesses.

18.7. Relocation or Modification of Existing Structures

The PV system shall be designed with no requirement for relocation or modification of the existing structures. In extreme cases when relocation or modification of existing structures is necessary, the Contractor shall submit modification or relocation plan to ensure that the structures shall be maintained, restored or upgraded.

19. Available Data and Schedule of Site Inspection

Potential bidders can access the relevant site data (e.g., electric consumption information, plans, and drawings) via the following link:

- **https://bit.ly/TESDA-RTC-NCR**

The site inspection is scheduled for February 7 and 14, 2025, from 9:00 AM to 12:00 PM (can be subject to change). Bidders must inform PNOC representatives in advance using the contact details provided below:

- **Louie Aaron L. Razon**: +639564761790

- **Richard Miguel D. Allauigan Jr.**: +639178460403
- **Patrick Jose IV V. Andaya**: +639369318841

20. Technical Specifications and Standards

20.1. Important Design Request for the Building Owner

The Contractor shall use two brands of solar PV modules, ensuring an equal number of modules from each brand. Both brands must be installed with the same orientation.

Both solar PV module brands must have the same technical specifications (e.g., must have the same rating, and be both monofacial or bifacial), and meet the minimum technical specifications outlined in the Terms of Reference.

20.2. Design Calculations

The design of the PV system shall be for a minimum service life of twenty-five (25) years. Design shall consider service conditions that will affect the performance of the solar PV system such as irradiation, UV radiation, temperature variations, rainfall intensity, humidity, pollution etc. Design shall be able to protect and harness the equipment from natural calamities such as earthquake, tropical typhoons, cyclones and wind gustiness prevailing in the Philippines.

20.2.1. Electrical Design

Maximum DC voltage per string shall not exceed 1500 Volts at a temperature of 15 degrees Celsius.

Minimum DC voltage per string shall be more than the "minimum input voltage" of the inverter at a temperature of 50 degrees Celsius.

Minimum DC voltage per string after 20 years shall be more than the "minimum input voltage" of the inverter at a temperature of 50 degrees Celsius.

Maximum DC power per array (combination of strings) shall be less than the maximum allowable generator power of inverter.

Maximum voltage drop between equipment to equipment shall not exceed 1% on DC system and 5% on AC system.

20.2.2. Structural Design

Seismic loading shall be selected to ensure the Performance Criteria set out below are achieved:

- All system's components which are critical to the generation of electricity shall remain undamaged and operational following a moderate earthquake;

- In case of a massive earthquake, the damage to structures and equipment shall be limited to that which can be repaired sufficiently quickly for the generation of

electricity to resume safely within thirty (30) days, unless otherwise the main building has collapsed; and

- Potential costs of repair or replacement and the duration of inability to generate electricity after a large seismic event shall be minimized.

The wind resistant design required for the facility shall be at minimum of 270 kph. In case the basis for wind resistant design in the latest National Structural Code of the Philippines (NSCP) is higher, then NSCP shall govern.

20.3. Minimum PV System Components Specifications

20.3.1. Solar PV Modules

The modules must follow the IEC 61215 standards (i.e., Crystalline Silicon Terrestrial Photovoltaic modules; Design Qualification and Type). These shall be made of monocrystalline material solar cells, tested in extreme weather conditions, and equipped with safety protection mechanisms. These shall also have a minimum efficiency of 17% at Standard Testing Conditions (STC). The solar PV panels supplied must include a performance warranty guaranteeing no more than 2% efficiency degradation in the first year and no more than 0.5% annual degradation thereafter. At the end of 25 years, the panels must still produce at least 85% of their original rated power output. The solar PV modules supplied must be manufactured by a Tier 1 manufacturer as defined by industry-recognized standards such as Bloomberg New Energy Finance (BNEF) or equivalent.

20.3.2. PV Mounting System

The PV mounting system shall be suited to the environment and atmospheric conditions (e.g., corrosion, salt). Structures shall be fixed, metallic and have appropriate design and adequate strength which can withstand the load of the modules, cyclonic and high wind velocities as applicable to the site condition. The material shall be robust and non-corrosive, made from anodized structural grade aluminum 6005 T5 and/or stainless steel components or equivalent. Use of different metals shall be avoided where practically possible to prevent galvanic corrosion. The structure shall prevent water accumulation. The mounting system must be compliant to AS/NZS1170.2:2011AMDT 2-2012 standard or equivalent.

20.3.3. Inverter

The inverter to be used shall be string type, weatherproof and equipped with a safety protection mechanism. The inverter shall be compatible with the existing electrical system. The inverter and its appurtenances shall be state-of-the-art with energy management and communication system and maximum power point trackers (MPPT) for optimum performance. The inverter shall have efficiency of not less than 98.5%, with a 10-year guaranteed service life. It also must have the following minimum communication specifications: WLAN/Ethernet, Wi-Fi, and 4G/3G/2G.

The inverter shall provide Application Programming Interface (API) access, allowing other applications or systems to communicate with it and retrieve data. This capability will facilitate the integration of inverter data into a unified monitoring

system, supporting PNOC in implementing the Rooftop Solar PV System for Government Buildings (RGB) initiative.

The mounting shall be robust and non-corrosive, made from hot-dipped galvanized structural steel or equivalent. The foundation shall be fixed and secured. The inverter shall have adequate spacing, free from obstructions and well ventilated.

20.3.4. Inverter Controller

The inverter controller shall be the central communication unit for system monitoring, recording data and controlling. It shall be capable of interconnection of other measuring devices such as solarimeter, weather-meter, etc.

20.3.5. DC Combiner

In cases where design requires the need for a DC combiner, the DC combiner shall be made of glass-fiber reinforced polyester material or approved equivalent. Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. Mounting may be wall-mounted type or stand-alone support. The dimensions and thickness are as per manufacturer's standard. It shall be rated 1500Vdc minimum.

The DC combiner shall have appropriate cable entry points, with cable glands, fitted for input and output cables and a lockable door.

The DC combiner shall be equipped with auxiliaries such as circuit breakers, surge protection devices and grounding terminals, mounted on DIN rail or equivalent and with adequate spacing for easy termination and testing. Auxiliaries shall conform to IEC standards or equivalent.

All circuit breakers and fuses shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The voltage rating shall be a minimum of 1000VDC. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.3.6. AC Combiner

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. Mounting may be wall-mounted type or stand-alone support. The dimensions and thickness are as per manufacturer's standard. It shall be rated 0.6/1kV minimum.

The AC collector shall have appropriate cable entry points, with cable glands, fitted for input and output cables and lockable doors.

The AC collector shall be equipped with auxiliaries such as circuit breakers (mounted on busbar with adequate spacer) and neutral and grounding terminal mounted on DIN rail or equivalent and with adequate spacing for easy termination and testing. Auxiliaries shall conform to IEC standards or equivalent.

All circuit breakers shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The minimum voltage rating shall be equivalent to inverter output voltage. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.3.7. Transformer

In cases where design requires the need for a transformer, the transformer configuration shall be based on the system configuration or topology between the inverter i.e., TN-S, TN-C, TN-C-S, TT and IT and grounding configuration and voltage.

Depending on the location, the transformer shall either be outdoor type or indoor type in compliance with NEMA or IP standards. The compartment shall be metal-enclosed and non-corrosive. The transformer shall be dry-type, self-cooled and floor mounted. The foundation shall be equipped with an anti-vibration pad or equivalent. The transformer shall be UL/IEC listed or equivalent.

20.3.8. Transient Voltage Surge Suppressor with Isolation Switch

The TVSS shall be capable of bi-directional filtering of harmonics and surges that may be created from the PV system and from the grid.

The surge protection devices shall be compatible with the existing electrical system. The ampere-interrupting capacity (AIC) rating of the devices shall be equal to or greater than the available fault current to which they might be subjected.

Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. It shall be rated 0.6/1kV minimum.

20.3.9. PV Generation (Revenue) Meter Including CT/PT and Terminals

The PV generation (revenue) meter shall be digital multi-function power meters complete with CTs and potential fuses. The meter shall conform to the following minimum requirements:

- IEC or ANSI revenue metering standards (i.e., Class 0.3 accuracy); and
- Capable of providing outputs and terminal strips for remote monitoring and data acquisition using RS485 or equivalent.

The meter shall be boxed in a standard enclosure with a viewing window made of fiberglass or equivalent.

20.3.10. ECB Main Disconnect Switch

The enclosed circuit breaker shall act as the main fault current protection device and disconnect switch to isolate the solar PV system from the existing electrical system. Enclosure protection shall be sealed, dust proof, vermin, waterproof and sturdy – compliant to IP65/NEMA 3R or equivalent. The dimensions and thickness as per manufacturer's standard. It shall be rated 0.6/1kV minimum.

The circuit breaker shall be compliant with IEC 60947 Part I-III, IS 60947 Part I-III and EN 50521 or equivalent. The minimum voltage rating shall be equivalent to

system voltage. The ampere trip/ampere frame, number of poles and other mechanical parameters shall be as per Design standards.

20.3.11. Cables

PV cables shall be copper type. It shall be UV-rated, sunlight-resistant, water-proof protection and manufactured under UL standard. It shall be designed and manufactured in accordance with:

- IEC 60811: Insulation and Fire Protection
- IEC 60227 and IEC 60502: Design
- IEC 60228: Conductors
- UL 1581 (Xeno-Test), ISO 4892-2 (Method A) or HD 506/A1-2.4.20: DC solar cables

All power cables shall be of XLPE insulated with PVC sheathed, 0.6/1kV single or multicore, stranded copper conductor. The conductor shall be made from electrical purity copper for power cables and annealed high conductivity copper for control cables. Conductors shall be stranded for copper power cables and solid for copper control cables.

All cables shall be designed to withstand the mechanical, electrical, and thermal stresses under the steady state and transient/ fault conditions. All cables shall be suitable for high ambient temperature, high humidity and tropical climatic conditions. All cables shall be color coded as per IEC 60364 and should be provided with tag/marking.

All cable ties should be UV protected and can withstand high heat stress without damaging the cables. Cable ties shall conform to EN 50146 and IEC 62275 standards.

Cables to be supplied are categorized as follows:

Particular	Description	Requirement
PV String Cables	Cables from PV strings to DC Enclosures	Must be 2 x 6mm^2
DC Enclosure Cables	Cables from DC Enclosures to Inverters	As per PEC Standards
Inverter Cables	Cables from Inverters to AC Collector	As per PEC Standards
AC Collector Cables	Cables from AC Collector to Transformer	As per PEC Standards
Transformer Cables	Cables from Transformer to ECB for Disconnect Switch	As per PEC Standards
Tapping Point Cables	Cables from ECB for Disconnect Switch to tapping point	As per PEC Standards
Grounding Cables	Cables for grounding	As per PEC Standards
Neutral Cables	Cables for Neutral	As per PEC Standards

Communication Cables	Cables for Controls and Monitoring	UTP, Ethernet, CAT5/CAT6
Power Supply Cables	Cables for 220-240V power supply	As per PEC Standards

20.3.12. Raceways (Cable Trays, Conduits, PVC Pipes and Fittings, Accessories)

Cable trays and fittings shall be hot-dipped galvanized with a minimum of 2mm thickness in accordance with IEC standards or equivalent. Conduit shall be rigid steel in accordance with IEC standards or equivalent.

PVC systems that are to be buried underground shall conform to IEC 61386 Part 24 standards or equivalent.

Raceways shall be color coded as per standards or as per existing color coding of the building.

20.3.13. Lightning Arrester and Grounding System

In cases where design requires the need for a lightning arrester and grounding system, the lightning protection shall be made of conventional lightning protection or the Early Streamers Emission (ESE) type. It shall be equipped with a lightning strike counter. The protection radius shall cover the whole solar PV facility.

The grounding system shall have a maximum resistivity of 5 ohms. The size and diameter of bare copper and grounding rod shall be as per standard.

The safety protection devices shall provide optimum filtering in relation to the specification of inverter and PV panels. The surge protection device shall be compact and shall comply in accordance with the UL 1449 3rd edition testing, ANSI/IEEE C62 and ANSI/IEEE Std. 1100-1999

The surge protection devices shall be compatible with the existing electrical system. The ampere-interrupting capacity (AIC) rating of the devices shall be equal to or greater than the available fault current to which they might be subjected.

The grounding wires shall be placed in a standard UV-rated PVC or equivalent.

20.3.14. PV Monitoring and Data Acquisition System (Internet Connection)

The PV monitoring and data acquisition system shall be capable of both remote and onsite access and monitoring via a subscription-free online platform. The system shall be able to provide the following minimum data:

- energy generation (kWh);
- power (kW);
- power factor;
- voltage;
- current;
- irradiance;
- weather; and
- temperature

The system shall be capable of detecting failures and fault conditions.

Data transmission shall be real-time and shall be equipped with safety and high-security protocol. The data shall be displayed in graphical trends and in figures. Historical data shall be available for a minimum of one (1) year.

20.3.15. CCTV/IP Surveillance Camera

The CCTV/IP surveillance camera shall be capable of onsite monitoring, continuous recording, and remote access and monitoring via a subscription-free online platform. Viewing shall be real-time and can operate 24/7. Video recording shall be capable for a minimum of one (1) month. The camera shall be robust, weatherproof and with high-resolution.

Type	Fixed Bullet
Video Camera	2 units
Resolution	1080HD
Enclosure	Weatherproof, outdoor IP65 or equivalent, minimum
Hard Disk Drive	2TB SATA 6.0Gb/s Cache 64MB Surveillance Type
NVR	Minimum 8 Channel IP Camera, Resolution minimum of 1920x1080
POE Hub/Switch	8 ports
CPE/Router/Modem	1 × USB 2.0 Port for Connecting 4G/3G Modem as WAN Backup; 4 × Gigabit WAN/LAN Ports; Non-WIFI router

20.3.16. Communication and Control Cables, Radio Transmission or Fiber Optics or Equivalent

If long-distance controls are needed, a radio transmission or fiber optics or any equivalent communication protocol may be used. In the case of wireless communication, it shall be equipped with reliable communication equipment such that it will not create unacceptable delays and interference that would compromise the operability of the whole system.

Name of Company: _____

Authorized Representative: _____
(Name & Signature)

Section VIII. Checklist of Technical and Financial Documents

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

☐ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;

Technical Documents

☐ (b) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**

☐ (c) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided for in Sections 23.4.1.3 and 23.4.2.4 of the 2016 revised IRR of RA No. 9184, within the relevant period as provided in the Bidding Documents; **and**

☐ (d) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;

or

Original copy of Notarized Bid Securing Declaration; **and**

☐ (e) Conformity with the Technical Specifications, which may include production/delivery schedule, manpower requirements, and/or after-sales/parts, if applicable; **and**

☐ (f) Original duly signed Omnibus Sworn Statement (OSS);

and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

☐ (g) Certificate of site and assessment survey signed by PNOC representative and bidder.

☐ (h) Resume/Curriculum Vitae and PRC license (if applicable) of key personnel

☐ (i) List with proof of completed Solar PV contracts with minimum aggregate installed capacity of 1MWp where at least two (2) contracts fully operational for the last two (2) years from the date of submission.

☐ (j) Project Schedule (Please refer to Item 9 of the Term of Reference, pp.46-47, 74, 102)

☐ (k) Preliminary Design Drawing (Please refer to Item 10 of each Term of Reference, pp.46-47,74, 102)

Financial Documents

☐ (l) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC);

or

A committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation.

Class "B" Documents

☐ (m) If applicable, a duly signed joint venture agreement (JVA) in case the joint venture is already in existence;

or

duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

Other documentary requirements under RA No. 9184 (as applicable)

☐ (n) *[For foreign bidders claiming by reason of their country's extension of reciprocal rights to Filipinos]* Certification from the relevant government office of their country stating that Filipinos are allowed to participate in government procurement activities for the same item or product.

☐ (o) Certification from the DTI if the Bidder claims preference as a Domestic Bidder or Domestic Entity.

25 FINANCIAL COMPONENT ENVELOPE

☐ (a) Original of duly signed and accomplished Financial Bid Form; **and**

☐ (b) Original of duly signed and accomplished Price Schedule(s).

Section IX. Bidding Forms

STATEMENT OF SINGLE LARGEST COMPLETED CONTRACT SIMILAR TO THE CONTRACT TO BE BID

This is to certify that (Bidder) has completed the below-listed contract within five (5) years prior the deadline of submission and opening of bids.

Date of the Contract	Contracting Party	Name of Contract	Nature of Contract	Amount of Contract	Contract Duration	Issuance Date of Certification Satisfactory Service

Name and Signature of Authorized Representative

Date

*Notes:

a) Cut-off date as of **DEADLINE OF SUBMISSION OF BIDS**.
b) **"Name of Contract". Indicate here the Nature/ Scope of the Contract for the Procuring Entity to determine the relevance of the entry with the Procurement at hand.**

STATEMENT OF ALL: (i) ONGOING CONTRACTS (GOVERNMENT AND PRIVATE) AND; (ii) AWARDED BUT NOT YET STARTED CONTRACTS

This is to certify that (Bidder) has the following ongoing and awarded but not yet started contracts:

Date of the Contract	Contracting Party	Name of Contract	Nature of Contract	Amount of Contract	Contract Duration	Value of Outstanding Works

Name and Signature of Authorized Representative

Date

*Instructions:

a) State all ongoing contracts including those awarded but not yet started (government and private contracts which may be similar or not similar to the project called for bidding) as of **DEADLINE OF SUBMISSION OF BIDS.**
b) If there is no ongoing contract including awarded but not yet started as of the aforementioned period, state none or equivalent term.
c) The total amount of the ongoing and awarded but not yet started contracts should be consistent with those used in the Net Financial Contracting Capacity (NFCC) in case an NFCC is submitted as an eligibility document.
d) **"Name of Contract". Indicate here the Nature/ Scope of the Contract for easier tracking of the entries/ representations.**

BID FORM

Date :_____
Project Identification No.:_____

To: [name and address of Procuring Entity]

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to *[supply/deliver/perform] [description of the Goods/Services]* inconformity with the said PBDs for the sum of *[total Bid amount in words and figures]* or the total calculated bid price, as evaluated and corrected for computational errors, and other bid modifications in accordance with the Price Schedules attached herewith and made part of this Bid. The total bid price includes the cost of all taxes, such as, but not limited to: *[specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties]*, which are itemized herein or in the Price Schedules,

If our Bid is accepted, we undertake:

a. To deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements of the Philippine Bidding Documents(PBDs);

b. To provide a performance security in the form, amounts, and within the times prescribed in the PBDs;

c. to abide by the Bid Validity Period specified in the PBDs and it shall remain binding upon us 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 PBDs.

The undersigned is authorized to submit the bid on behalf of *[name of the bidder]* as evidenced by the attached *[state the written authority]*.

We acknowledge that failure to sign each and every page of this Bid Form, including the attached Schedule of Prices, shall be a ground for the rejection of our bid.

Name of Authorized Representative:_____

Legal capacity:_____ Signature:_____

Duly authorized to sign the Bid for and behalf of:_____

Date:_____

Price Schedule for Goods Offered from Within the Philippines

1	2	3	4	5	6	7	8	9	10
Item	Description	Country of Origin	Quantity	Unit Price EXW per item	Transportation and all other costs incidental to delivery, per item	Sales and other taxes payable if Contract is awarded, per item	Cost of Incidental Services, if applicable, per item	Total Price, per unit (col 5+6+7+8)	Total Price delivered Final Destination (col 9) x (col 4)

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

Price Schedule for Goods Offered from Abroad

1	2	3	4	5	6	7	8	9
Item	Description	Country of Origin	Quantity	Unit price CIF port of entry (specify port) or CIP named place (specify border point or place of destination	Total CIF or CIP price per item (col 4x5)	Unit Price Delivered Duty Unpaid (DDU)	Unit price Delivered Duty Paid (DDP)	Total Price delivered DDP (col 4x8)

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

REPUBLIC OF THE PHILIPPINES)
CITYOF_____)S.S.

BID SECURING DECLARATION

Project Identification No.: ***[Insert number]***

To: *[Insert name and address of the Procuring Entity]*

I/We, 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 procurement 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 RA No. 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; and
    c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this_____day of *[month] [year]* at *[place of execution]*.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant

SUBSCRIBED AND SWORN to before me this ___ day of *[month] [year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no._____ issued on ____ at _____.

Witness my hand and seal this ___ day of *[month] [year]*.

NAME OF NOTARY PUBLIC
Serial No. of Commission _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. _____ *[date issued], [place issued]*
IBP No. _____ *[date issued], [place issued]*

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

CONTRACTAGREEMENT

THIS AGREEMENT made the day of_____20___ between [name of PROCURING ENTITY] of the Philippines (hereinafter called "the Entity") of the one part and [name of Supplier] of [city and country of Supplier] (hereinafter called "the Supplier/Service Provider") of the other part;

WHEREAS, the Entity invited Bids for certain goods and ancillary services, particularly [brief description of goods and services] and has accepted a Bid by the Supplier for the supply of those goods and services in the sum of *[contract price in words and figures in specified currency]* (hereinafter called "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. The following documents as required by the 2016 revised Implementing Rules and Regulations of Republic Act No. 9184 shall be deemed to form and be read and construed as integral part of this Agreement, *viz.*:

   i. Philippine Bidding Documents(PBDs);
      i. Schedule of Requirements;
      ii. Technical Specifications;
      iii. General and Special Conditions of Contract; and
      iv. Supplemental or Bid Bulletins, if any

   ii. Winning bidder's bid, including the Eligibility requirements, Technical and Financial Proposals, and all other documents or statements submitted;

      Bid form, including all the documents/statements contained in the Bidder's bidding envelopes, as annexes, and all other documents submitted (*e.g.*, Bidder's response to request for clarifications on the bid), including corrections to the bid, if any, resulting from the Procuring Entity's bid evaluation;

   iii. Performance Security;

   iv. Notice of Award of Contract; and the Bidder's conforme thereto; and

   v. Other contract documents that maybe required by existing laws and/or the Procuring Entity concerned in the PBDs. **Winning bidder agrees that additional contract documents or information prescribed by the GPPB that are subsequently required for submission after the contract execution, such as the Notice to Proceed, Variation Orders, and Warranty Security, shall likewise form part of the Contract.**

3. In consideration for the sum of *[total contract price in words and figures]* or such other sums as may be ascertained, *[Named of the bidder]* agrees to *[state the object of the contract]* in accordance with his/her/its Bid.

4. The *[Name of the procuring entity]* agrees to pay the above-mentioned sum in accordance with the terms of the Bidding.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of the Republic of the Philippines on the day and year first above written.

For the Entity:	**For the Supplier/Service Provider**
By	By:
_____	_____
President and Chief Executive Officer	*Insert Name of Signatory* *Insert Legal Capacity of the Signatory*

Witnesses

_____ _____

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

ACKNOWLEDGMENT

Before me, a notary public for and in the City of _____, this _____, personally appeared the following:

Name	Competent Evidence of Identity	Date/Place Issued

Known to me to be the same persons who executed the foregoing Contract Agreement consisting of three (3) pages, including the page on which this Acknowledgment is written, but excluding Annexes, and they acknowledged to me that the same is their free and voluntary act and deed, as well as that of their respective principals.

WITNESS MY HAND AND SEAL, on the date and in the place first above written.

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OMNIBUS SWORN STATEMENT

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITYOF_____)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. *[Name of Bidder]* hereby assigns the following contact number/s and e-mail address/es as the official telephone/fax number and contact reference of the company where the PROCURING ENTITY notices may be transmitted.

Telephone No/s.	:	_____
Fax No/s.	:	_____
E-mail Add/s.	:	_____

It is understood that notices/s transmitted in the above-stated telephone/fax numbers and/or e-mail address/es are deemed received as of its transmittal and the reckoning period for the reglementary periods stated in the bidding documents and the revised Implementing Rules and Regulations of Republic Act No. 9184 shall commence from receipt thereof.

11. **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

SUBSCRIBED AND SWORN to before me this ___ day of *[month] [year]*at*[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no._____ issued on ____ at _____.

Witness my hand and seal this ___ day of *[month] [year]*.

NAME OF NOTARY PUBLIC
Serial No. of Commission _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. _____ *[date issued], [place issued]*
IBP No. _____ *[date issued], [place issued]*

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Series of _____

REPUBLIC OF THE PHILIPPINES)
CITYOF_____) S.S.

PERFORMANCE SECURING DECLARATION

Invitation to Bid: [Insert Reference Number indicated in the Bidding Documents]
To: [Insert name and address of the Procuring Entity]

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, to guarantee the faithful performance by the supplier/distributor/manufacturer/contractor/consultant of its obligations under the Contract, I/we shall submit a Performance Securing Declaration within a maximum period of ten (10) calendar days from the receipt of the Notice of Award prior to the signing of the Contract.

2. I/We accept that: I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of one (1) year for the first offense, or two (2) years **for the second offense**, upon receipt of your Blacklisting Order if I/We have violated my/our obligations under the Contract;

3. I/We understand that this Performance Securing Declaration shall cease to be valid upon:

    a. issuance by the Procuring Entity of the Certificate of Final Acceptance, subject to the following conditions:
        i. Procuring Entity has no claims filed against the contract awardee;
        ii. It has no claims for labor and materials filed against the contractor; and
        iii. Other terms of the contract; or

    b. replacement by the winning bidder of the submitted PSD with a performance security in any of the prescribed forms under Section 39.2 of the 2016 revised IRR of RA No. 9184 as required by the end-user.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this_____day of [month] [year] at [place of execution].

[Insert NAME OFBIDDERORITS AUTHORIZEDREPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant

SUBSCRIBED AND SWORN to before me this ___ day of *[month] [year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no._____ issued on ____ at _____.

Witness my hand and seal this ___ day of *[month] [year]*.

NAME OF NOTARY PUBLIC
Serial No. of Commission _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. _____ *[date issued], [place issued]*
IBP No. _____ *[date issued], [place issued]*

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NET FINANCIAL CONTRACTING CAPACITY

Current Assets	_____
Less: Current Liabilities	_____
Total	_____
Multiply by K	**15**
Total	_____
Less: Value of All Outstanding Works or Projects Under On-going Contracts	_____
Net Financial Contracting Capacity	_____

Net Financial Contracting Capacity (NFCC)

NFCC = at least equal to the Approved Budget

= [(current assets - current liabilities) (K) - (value of all outstanding works or projects under on-going contracts, including awarded contracts yet to be started)]

Name of Company: _____

Authorized Representative: _____

signature over printed name


Republic of the Philippines
gppb
Government Procurement Policy Board