

GREENHEAT CORPORATION
(SUPPLIER)

BY:


ROBERTO R. MARTIN
General Manager

CONTRACT NO. LOG MSSP 2022-03-026-GRJ

**DESIGN, SUPPLY, DELIVERY, INSTALLATION, TESTING
AND COMMISSIONING OF PALUMBANES ISLAND
SOLAR PV-DIESEL HYBRID SYSTEM (WITH ESS)
HO-PIG21-023 / PB211124-JC00426**

KNOW ALL MEN BY THESE PRESENTS:

This Contract made and entered into in Quezon City, Philippines, by and between:

The **NATIONAL POWER CORPORATION**, a government-owned and controlled corporation duly organized and existing under and by virtue of Republic Act No. 6395, as amended, with its principal office address at NPC Building, BIR Road corner Quezon Avenue, Diliman, Quezon City, Philippines, represented herein by its Officer-in-Charge, **ATTY. MELCHOR P. RIDULME**, who is duly authorized to represent it in this transaction, hereinafter referred to as **NPC**;

- and -

GREENHEAT CORPORATION, a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines, with office address at Marine Technology Building, A. Soriano corner Arzobispo Street, Intramuros, Manila, Philippines, herein represented by its General Manager, **MR. ROBERTO R. MARTIN**, who is duly authorized to represent it in this transaction, hereinafter referred to as **SUPPLIER**.

WITNESSETH: That -

WHEREAS, on 03 November 2021, NPC posted the Invitation to Bid for the Public Bidding for the Design, Supply, Delivery, Installation, Testing and Commissioning of Palumbanes Island Solar PV-Diesel Hybrid System (with ESS);

WHEREAS, there were (3) prospective bidders who secured the bidding documents and participated in the bidding conducted on 02 December 2021;

WHEREAS, SUPPLIER's bid offer was considered as the lowest calculated and responsive bid;


WHEREAS, NPC accepted the said bid of the SUPPLIER;

SIGNED IN THE PRESENCE OF:

NATIONAL POWER CORPORATION
(NPC)

BY:


ATTY. MELCHOR P. RIDULME
Officer-in-Charge, NPC


FREDERICK B. BARRIOS
Officer-in-Charge, PMD
(NPC)


MARY JOY CAINEROS
(SUPPLIER)

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ROBERTO R. MARTIN
General Manager

SIGNED IN THE PRESENCE OF:


M. Chay
M. Chay
(SUPPLIER)


FREDERICK B. BARRIOS
Officer-in-Charge, PMD
(NPC)

NATIONAL POWER CORPORATION
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Officer-in-Charge, NPC

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

A. Hybrid System

a. Solar PV Plant

- Design, supply, delivery, installation, testing and commissioning of Solar PV Plant with a total installed capacity of at least 30kW Solar PV System consisting of solar panels, string inverters with PV/Solar Controller, DC boxes/AC combiner box, control and monitoring system, lighting system, lightning protection and grounding system, structural support, interconnection lines and its appurtenances, metering system, harmonic & surge filter, electro-mechanical equipment and all other necessary components and associated auxiliaries;
- Supply, delivery, installation and testing of 50kVA Solar PV Plant transformer complete with the necessary protections and accessories as well as the construction and testing of the corresponding transformer pad;
- Design, supply, delivery and installation of guard post and comfort room in reference to the material specification requirements in the Civil Bid Drawings;
- Supply, delivery, installation and testing of power, control and instrumentation cables including ground conductors, conduit and other appurtenances required to power and interface the supplied equipment which form part the Solar PV System, Energy Storage System (ESS) and Power and Energy Management System (PEMS);
- Design, supply, delivery, installation and testing of grounding system to be located at Solar PV Plant (SPP), ESS and at the newly installed facility(ies) included in this contract;
- Supply and erection of take-off structure(s) complete with line materials and protection;
- Supply, delivery and installation of perimeter lighting as shown in the Electrical Bid Drawings;
- Design, supply, delivery, installation and testing of 13.8kV overhead tie line for the interconnection and/or integration of the solar PV system to the existing DPP;
- Supply and delivery of all the required and necessary tools and accessories for the safe and reliable operation and maintenance of the Hybrid System; and

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gensets, String Inverters, Power Conversion System and other components which are not specifically mentioned into this scope but requires controlling, monitoring and data acquisition.

SUMMARY OF MAIN EQUIPMENT TO BE SUPPLIED/INSTALLED BY SUPPLIER						
Capacity of Solar PV System (kW)	No. & Capacity of Solar PV Plant Transformer (KVA)	Capacity and Energy of ESS (kW/kWh)	No. & Capacity of ESS Transformer (KVA)	Power, Control & Instrumentation Cables (Lot)	13.8kV over-head tie line (Lot)	Water Piping System (Lot)
30	1 x 50; 480V/13.8 kV, 3Ø	20/20	1 x 50; 13.8 kV, 3Ø	1	1	1

B. Operation and Maintenance

- a. Provide at least one (1) year Operation and Maintenance (O&M) and supervision to ensure compliance to warranty requirements with regular diagnostics and monitoring of the supplied equipment/system covering all areas reckoned from the final acceptance date; and
- b. The Supplier shall submit seven (7) sets of hard copy of approved Operation and Maintenance Manual including two (2) sets of electronic copies in DVDs to be submitted ten (10) calendar days after the testing and commissioning. Operation and Maintenance Manuals shall include Parts List and Preventive Maintenance Schedule of all components/equipment during the operating life of the Solar PV power system.

C. Other Allied Services

- a. Conduct actual inspection of the project site and make assessment on its physical condition, and determine the extent of the scope of works required for the solar PV power system;
- b. Inspection, testing and commissioning of all major equipment and their auxiliaries for the verification of their compliance to the set minimum functions, features, capabilities, limitations in accordance to technical specifications, contract provisions and guarantees;
- c. Construction of temporary storage facilities for electrical and construction materials, drainage system, perimeter fence, foundations and other civil works, including demobilization, removal of temporary facilities and clean-up work, shall conform with all the requirements stated in Section VI – Part I - CW– Civil Works;
- d. World Meteorological Organization (WMO) compliant automated weather monitoring and logging system with data logger, at least two (2) pyranometers – one shall be installed horizontally and the other is the same as the orientation of the panels, one (1) ambient air

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MARY JOY CARIBALE
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SIGNED IN THE PRESENCE OF:


M. Joy Caringal
(SUPPLIER)


FREDERICK B. BARRIOS
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- 6. Technical Data Sheet for Solar PV Plant and Energy Storage System transformer;
- 7. Technical Data Sheet for Energy Storage System and its appurtenances; and
- 8. Technical Data Sheet for Power and Energy Management System and if applicable its appurtenances.

- b. The Solar PV System must be designed for a minimum service life of twenty (20) years;
- c. The Supplier shall provide all the necessary protection for the Solar PV System required by Philippine Electrical Code (PEC) and other applicable regulatory agencies;
- d. The Supplier shall design the structural support of the solar PV system based on the latest National Structural Code of the Philippines (NSCP);
- e. Design standards shall be in accordance with appropriate standards and accepted detailed design practice as required by existing laws and regulations;
- f. Design standards for structures shall consider, among other things, the optimum safety of structures to minimize possible damages from tropical typhoons, cyclones and wind gustiness prevailing in the area;
- g. All proposed designs and methodology of installation provided by the Supplier shall be reviewed and approved prior to its implementation and installation. The Supplier shall provide the said design within seven (7) calendar days after the kick-off meeting and prior installation works. Refer to the list in Section VI-Part II, Technical Data Sheets, Annex H;
- h. The Supplier shall submit drawings and documents for NPC's approval of major materials and equipment such as schematics and wiring diagrams, dimensioned drawings, solar PV system layout, interconnecting diagrams identifying by terminal numbers, among others;
- i. The Supplier shall submit system configuration of the Solar Plant for approval of NPC (e.g. number of solar panels in series/parallel, number of solar panels per string/MPPT/array);
- j. Output and Performance Ratio calculation shall be calculated using the latest version of PVsyst software reckoned from the bid opening date; and
- k. Equipment to be supplied including spares of the same class shall bear the same manufacturer's name and model.

E. Solar PV Mounting Structures and Required Civil Works and Installations

- a. Delivery of labor and supervision, materials and supplies, tools, and equipment for the construction of civil works including detailed design

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occurrence of the damage of structures/properties with NO
ADDITIONAL PAYMENT BY NPC.

SPARE PARTS

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

Spare parts shall include all the items that are expected to be consumed or replaced during the test and commissioning stage. However, should the Supplier borrow any items from the supplied Spare Parts during the test and commissioning, a replacement shall be ordered immediately.

All the spare parts shall arrive at plant site before the start of test and commissioning, complete with markings showing the description or code numbers to facilitate identification and retrieval.

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

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

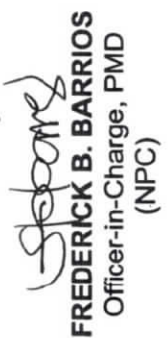
Spare Parts for Solar PV System

Spare Parts for Data Monitoring System as specified in Section VI-GW-6.3 Other Allied Services item d, shall be supplied. The Supplier shall supply the following:

- a. Two (2) units – Memory Card/Data Storage of maximum capacity dedicated to the supplied data logger.
- b. Three (3) pieces – Wind Anemometers
- c. One (1) piece – Solar Pyranometer
- d. One (1) set – Thermocouple¹ for Solar Module temperature with mounting adhesive/connector.
- e. One (1) piece – Thermocouple with radiation shield for ambient air temperature measurement

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MARY JOY CHIRINO
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Tools for Solar PV System

Tools for Solar PV System shall be supplied by the Supplier which shall consist of the following:

- a. One (1) unit – Toolbox
- b. One (1) set – Insulation Resistance Tester (with rated voltage at 250V/500V/1000V)
- c. One (1) set – Earthing Resistor (0 – 1000 ohms)
- d. One (1) set – Voltmeter (with a minimum rated voltage of 600VAC and 1.1kVDC)
- e. One (1) set – Clamp Meter (with minimum rated current of 500A)
- f. One (1) unit – PVC hose, flexible and robust, 20mm Ø, at least 30m length with drum or reel assembly.
- g. One (1) unit – Extendable/telescopic panel cleaning pole with squeegee and sponge, at least 12ft (fully extended) length with hose attachment (20mm Ø hose)

Tools for Power and Energy Management System (PEMS) and Energy Storage System (ESS)

Tools for PEMS and ESS shall be supplied by the Supplier which shall consist of the following:

- a. One (1) Desktop computer (Minimum of Intel I7 Processor, 16 GB RAM, 1-TB HDD, 2Ghz, 32" screen size and with the latest pre-installed windows operating system compatible with manufacturer's or supplier's software) needed in programming the PEMS and ESS control setting complete with licensed CD-ROM drive dongles including other digital components that require exclusive programs from the manufacturer with free update throughout the operating life of the equipment. The desktop shall also have an uninterruptable power supply (UPS).
- b. Back-up copies of control programs (firmware and other configuration software)

FIRE FIGHTING SYSTEM

This section provides the essential information for the design, manufacture, fabrication, supply, installation, delivery to site and test of the specified Fire Fighting System.

All equipment and materials necessary for the complete installation shall be furnished complete, even though not necessarily mentioned in this specification but are necessary for the safe and reliable operation of the Fire Fighting System.

All the Fire Fighting System equipment shall be supplied by the Supplier complete with their corresponding technical brochures written in English that would aid in the installation, operation, and maintenance of the equipment.

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MARY JOY CARINGAL
(SUPPLIER)


FREDERICK B. BARRIOS
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be supplied and installed by the Supplier. The cost of which shall be included in the cost for the installation of respective equipment.

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

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

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

SIGNED IN THE PRESENCE OF:


MARY JOY ABING
(SUPPLIER)

PACKING, SHIPMENT AND STORAGE

A. Packing/Crating

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

Equipment shall be completely drained of all water and thoroughly dry prior to shipment. When such draining requires removal of plugs, drain valves, etc., the Supplier shall make sure that these parts are re-inserted or reassembled prior to shipment. Other fluids (coolant, fuel oil, lube oil, etc.) shall be drained only if the Supplier deems it necessary.

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

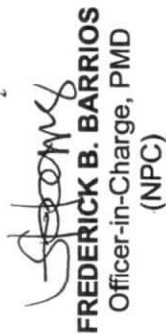
Flanged connections shall be protected by a ½ inch (13mm) or thicker plywood disc, or suitable alternate, bolted to the face of the flange.

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

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

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

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

B. Shipment/Transport

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

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

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

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ATTY. MELCHOR P. RIDULME
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