

THE NATIONAL DEVELOPMENT BANK OF PALAU

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# REQUEST FOR QUOTATION

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SUPPLY OF OFF GRID SOLAR PV SYSTEMS

REFERENCE: **REFWOG#001**

JUNE 2010

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# REQUEST FOR QUOTATION

## Off Grid Solar PV Systems

### 1 Background

As part of the Sustainable Economic Development through Renewable Energy Applications (SEDREA) project funded by UNDP/GEF, the National Development Bank of Palau (NDBP) is establishing the Renewable Energy Fund Window (REFW) to provide affordable capital for renewable energy projects.

Work undertaken on the project to date has identified that the installation of solar photovoltaic (PV) systems on properties that do not have access to main electricity grid as an economically and logistically viable alternative source of electric power, provided a subsidised loan programs is available for the purchase of these systems.

The NDBP now wishes to proceed to install an initial number of pilot off-grid solar photovoltaic systems and is issuing this Request for Quotation to secure the necessary equipment and materials for this program. This is the first phase of a multi-year program and NDBP expects to purchase additional systems as specified in this Request for Quotation.

The ability of the equipment supplied to perform in accordance with internationally recognised standards for solar products and to offer long term reliable service under extreme tropical coastal conditions is of utmost importance. Only equipment that has been used successful for not less than five (5) years in similar environments will be considered.

### 2 Scope and Conditions of Supply

Quotations are sought from suitably qualified manufacturers and suppliers for the production, supply and delivery to Koror, Republic of Palau for the items listed herein.

The supply is to provide the identified component to allow the installation of off grid solar PV systems. Systems are anticipated to have a nominal 500Wp to 1,000Wp capacity. Installation of the off grid PV systems will be undertaken by local contractors under a separate contract.

#### 2.1 Quotation Quantity

Due to the unique requirements of Solar Photovoltaic Pilot Projects being undertaken by NDBP, the actual quantities to be purchased are not yet fixed although a maximum quantity to be ordered is given for guidance.

- The maximum quantity to be ordered (inclusive of all components of the Grid-Connect System) will be based on the volume of a shipping container.
- The maximum quantity to be ordered for each component has been provided under the "Maximum quantity" column in the quotation table in Annex A.

- The prices quoted should be in the range from one (1) unit to the maximum quantity stated.

## 2.2 Additional Conditions

While specific brands are identified in the Specifications for particular items, alternatives may be considered. In all cases, whether these nominated brands are offered or not, NDBP reserves the right to purchase all or only part of the component list from any supplier.

The Supplier will provide, in the English language, full operating and maintenance manuals for each of the components offered with detailed parts lists as appropriate. Such manuals shall be provided in hard copy (3 pieces each) and an electronic version for each manual.

## 2.3 Warranties

- The Supplier will provide warranties for all components as defined herein and such warranty shall provide for the timely full replacement including delivery to Koror, at no cost to NDBP, of any component that may fail or fail to perform according to the agreed specifications within the Warranty Period.
- It is expected that the warranty for solar panels will be 10 years for physical problems and 25 years for the output staying within 15% of the rated value. For the inverter proposed a 10 year standard warranty is expected. Other components should be warranted for not less than five years. Any exceptions to these periods should be clearly indicated.
- All warranties will clearly acknowledge the extreme tropical environment in which the systems are to be installed.

## 3 Pricing

- All prices will be quoted in US Dollars.
- Where quantity discounts are available, please note in the "Quantity for Price Quoted" column the quantity at which the reduced price is offered and note in the "Unit Price Quoted" column the unit price at that quantity and greater.
- Prices shall be firm and valid for 90 days from the date of the closing of the Request for Quotation.
- Subject to any mutually agreed variations, acceptance of any quotation within the period of validity will bind the Supplier to deliver on the basis of the pricing as quoted and within the period offered.

**NDBP has no obligation to accept any quotation sought under this Request for Quotation.**

## 4 Warranties

- The Supplier will provide warranties for all components as defined herein and such warranty shall provide for the timely full replacement including delivery to Koror, at no cost to NDBP, of any component that may fail or fail to perform according to the agreed specifications within the Warranty Period.
- The Warranty will clearly acknowledge the extreme tropical environment in which the systems are to be installed.

## 5 Queries during Period of Request

All queries related to this Request for Quotation and prior to the closing time and date should be submitted electronically to

Kaleb Udui  
President  
National Development Bank of Palau  
at [kudui@ndbp.com](mailto:kudui@ndbp.com)

**and copied electronically in full to:**

Frederic Crampe  
Managing Director  
ReEx Capital Asia Pte Ltd  
at [frederic.crampe@reexasia.com](mailto:frederic.crampe@reexasia.com)

Suppliers who wish to be copied any such queries and responses should register their interest in quoting and receiving such information with those listed above.

No unsolicited enquiries will be accepted after the closing time and date, nor with regard to NDBP's decision on award.

## 6 Submission of Offers

### 6.1 Items to be submitted

Offers are to include:

- A brief description of the Supplier and his qualifications to offer the items sought under this Request for Quotation.
- An acknowledgement that the Supplier if selected will enter into the Contract as shown in Appendix A. Any proposed variations should be indicated.
- Full pricing for each and every component offered detailed to at least the extent shown in Appendix B.
- Confirmation of delivery time from signature of Contract.
- Full descriptive material, test reports and specifications for all components. These should all be in English, in clean and legible copies.
- A copy of all proposed warranties.

- Any such other information that the Supplier may see necessary to fully explain its offer.

## 6.2 Submission

Offers are to be submitted as follows:

### A.

**1 full hard copy to the address below clearly marked:**

**“Request for Quotation – Off Grid Solar PV Systems”**

#### **Couriered to:**

Addressee	Kaleb Udui
Position/Title	President
Company	National Development Bank of Palau
Address	Main Branch, Ngetkib Village P.O. Box 816 Koror, Republic of Palau 96940

### B.

**An electronic copy of all materials in Word, Excel or PDF format to:**

Addressee	Kaleb Udui
Position/Title	President
Company	National Development Bank of Palau
Email	<a href="mailto:kudui@ndbp.com">kudui@ndbp.com</a>

#### **Copied electronically in full to:**

Addressee	Frederic Crampe
Position/Title	Managing Director
Company	ReEx Capital Asia Pte Ltd
Address	16 Collyer Quay Hitachi Tower #10 Singapore 049318
Email	<a href="mailto:frederic.crampe@reexasia.com">frederic.crampe@reexasia.com</a>

## 6.3 Closing of Acceptance of Offers

The full hard copy and electronic copies should be received **by 5pm on Friday, the 2<sup>nd</sup> of July 2010.**

Offers received after this time and date will be rejected. The receipt of offers will be acknowledged electronically.

## 6.4 Opening of Offers and Review

No offers will be opened before the time and date of the Acceptance of Offers stated above. The opening of offers may begin immediately after the Closing of the Acceptance of Offers to shorten the period of evaluation. The opening will not be done in public.

## 6.5 Evaluation of Offers

All information submitted will be treated in Confidence to the extent protected by the laws of the Republic of Palau, and not disclosed to third parties, with the exception of NDBP, UNDP, Palau Energy Office (PEO), Government of Palau and ReEx Capital Asia Pte Ltd and Mr Herb Wade (who together are acting as consultants to NDBP). It is anticipated that the evaluation and decision to proceed to place orders will occur within 14 days of the Opening of Offers.

### 6.5.1 Technical Evaluation Criteria

- The tenders will be evaluated by a tender committee that may include representatives of UNDP, PEO and ReEx Capital Asia under the management of NDBP.
- Tenders will be ranked according to their combined technical (*St*) and financial (*Sf*) scores using weights (T= 0.6, the weight given to the Technical Proposal; F = 0.4 the weight given to the Financial Proposal; (T + F =1).
- The lowest price (*Fm*) will be given a financial score (*Sf*) of 100 points. The financial scores (*Sf*) of the other tenders will be computed according to the formula:

$$Sf = 100 \times Fm/F,$$

(In which *Sf* is the financial score, *Fm* is the lowest price and *F* the price of the proposal under consideration.

- The Total score will be determined by:

$$S \text{ (Total Score)} = (St \times 0.6) + (Sf \times 0.4)$$

- The firm achieving the highest combined technical and financial score will be invited for negotiations.
- The following table displays the technical evaluation criteria and their respective weights:

#### Technical Tender Evaluation Criteria

Qualification of Company (Weight)	20%
(i) Track record with PV grid connect systems	70
(ii) Experience with overseas sales and shipping	30
Total Points	100

Qualification of Product (Weight)	50%
(i) Conformity with Specifications	40
(ii) Ability to be operated and maintained in Palau	30
(iii) Redundancy	30
Total Points	100

After Sales Service (Weight)	20%
(i) Proximity of agent	20
(ii) Spare parts access (dispatch and delivery modality)	40
(iii) Warranty duration	40
Total Points	100

<b>Delivery Time (Weight)<sup>1</sup></b>	<b>10%</b>
(i) Delivery time (Fastest)	100
Total Points (Possible)	100

The key element in evaluation is that the components offered meet and/or exceed the specifications and performance requirements as described in this Request for Quotation. Warranties offered, delivery time and the competence and experience of the supplier in delivering similar systems are all of importance. As the NDBP reserves the right to select components from different bidders, the final total price, whether sourced from one or more than one supplier, will then influence the decisions on which offers to accept. To minimise the potential additional cost of shipping from more than one location, fully compliant bids from well qualified suppliers will, subject to pricing, be preferred.

## 7 Detailed Specifications of System and Components

### 7.1 Photovoltaic Panels

- The photovoltaic modules shall be warranted to provide their rated output at standard conditions within  $\pm 20\%$  for a minimum of 20 years under the harsh tropical, coastal conditions at the sites. A copy of the complete warranty terms must be provided with the tender.
- Photovoltaic modules of the model offered must have been tested by an internationally recognized testing facility and certified by that facility to meet internationally accepted standards.
- The construction must allow the safe maintenance of at least 600V differential between the panel frame and internal cell wiring.
- Cells will be made of monocrystalline or polycrystalline silicon. Amorphous or thin film type construction is not acceptable.
- PV modules must be framed with aluminium or marine grade stainless steel with appropriate seals to prevent water and corrosion damage to the active components of the panel.
- High strength glass must be used for the transparent cover. The backing of the panel may be high strength glass or other material impermeable to water that is accepted under the applicable international standards.
- By-pass diode and blocking diode protection for reverse current and shading effect reduction are not required for individual panels but individual panel by-pass diodes may be included.
- Panel Wp ratings shall be no less than 160 Wp nor no more than 250 Wp.
- Panel shall contain 72 solar cells in two 36 cell strings that can be connected in parallel for 12V battery charging or in series for 24V battery charging.
- Connections may be either by standard "quick connect" type socket and plug wiring or by screw type terminals.

<sup>1</sup> Delivery time score =  $Sdt$ : ( $Sdt = 100 \times Dtf/Dt$ )

$Dtf$  is the shortest proposed number of weeks required to completion after signing of contract and  $Dt$  is the completion time of the bidder



The contractor will include as a part of the tender response at least the following information for the panels to be supplied:

- Voc, Isc, Imppp, Vmpp, and Wp at standard conditions
- The relationship between temperature and module output over the cell temperature range 25°C to 75°C
- The IV (current/voltage) curves for 250, 500, 800, and 1000 W/m<sup>2</sup> solar inputs
- Physical size and weight
- Details of the materials used in construction, including the frame, the connection boxes, the backing material and the encapsulation material.
- Number of cells per panel
- Type of cells provided (monocrystalline or polycrystalline)

The results of type tests carried out on the module type at ESTI (or an equivalent institution) using the CEC Specifications No. 503 or to International standard IEC-61215 shall be provided.

A statement of warranties in effect for the proposed module type must be provided with full details of the terms of those warranties for both physical defects and capacity loss.

## 7.2 Photovoltaic Module Support Structures

- All arrays are expected to be mounted on good quality metal roofing fastened to wooden purlins that are in turn fastened to wooden trusses; however mountings should also be suitable for use with pre-fabricated steel buildings. For panel mounting rails, a spacing of 600 mm between purlins is to be assumed.
- The panel mounting framing must support the panels in a manner that allows adequate air flow between the metal roofing and the back of the panels to keep heating of the panels to a minimum.
- A spacing between the back of the panel and the highest part of the roofing metal that is between 60mm and 100mm will be acceptable.
- All metal components and fastening hardware that are in actual contact with the steel roof must be marine grade stainless steel or a non-conducting material.
- Direct aluminium to steel contact at any point in the assembly will not be acceptable.
- The tilt and direction of the roof surface will be maintained in the PV array therefore there is no requirement to provide a mounting that is not parallel to the roof surface.
- The fastening method will be such as to always penetrate the corrugated metal at a high point on its surface and will include appropriate seals that prevent roof leaks due to the panel attachment for the life of the installation which is to be at least 20 years.
- All structures must be able to resist at least 20 years of outdoor exposure in the location's harsh tropical coastal environment without any appreciable corrosion or structural fatigue.
- Full technical specifications and detailed assembly instructions shall be provided with the quotation showing the construction and assembly of the mounting structures and the details of the mounting of the modules and their attachment onto the supporting structure. These must specifically include physical size, and details of materials used in

construction.

- Panel mountings supplied shall be standard commercial units manufactured specifically for mounting of solar panels on metal roofing and shall be adjustable to fit standard solar panels in the 150-250Wp range.

### 7.3 Solar Charge Controller

- The charge controller must be capable of charging either 12V or 24V open cell lead acid batteries.
- High voltage cut-off shall be no less than 14.4V.
- Low voltage cut-off shall be no higher than 11.7V.
- The controller shall be capable of either PCM or “on-off” type of control.
- The rated amperes shall be no less than 15A.
- The controller supplied must have a history of reliable use in the Pacific Islands or similar environments for at least five (5) years.

The Morningstar model ProStar 15 A 12/24V controller is prequalified.

### 7.4 Wiring

- Panel wiring shall be single conductor double insulated stranded copper wire with the conductor at least 4mm<sup>2</sup> in cross-sectional area or AWG 10 or larger.
- The minimum insulation voltage specification for the supplied cable will be 600VDC.
- The outside insulation sheath shall be specifically intended for outdoor use in high UV and high ambient temperature environments.
- Supplier will provide full specifications for the wire and insulation materials that are supplied.
- Wire specifically intended for use in off grid-connected solar systems will be given preference.
- Indoor wiring shall be standard two conductor house wiring 12AWG or 2.5 mm<sup>2</sup> stranded or solid copper wire.

### 7.5 Dedicated Inverters

- Inverters supplied shall provide pure sine wave output at 120V 60Hz.
- Continuous power rating shall be no less than 300 W.
- The unit shall be capable of providing 600W for at least 5 seconds without overheating.
- Protection against reverse polarity, over current and over temperature will be included.
- Units should be capable of supplying power to video systems and small refrigerators.
- The input voltage shall be 12V DC.

The Morningstar SureSine model is pre-qualified for supply.

### 7.6 DC lights and sockets

- For 12V installations, 12VDC CFL type lights in the range 12W to 15W will be supplied.
- Lights will be expected to operate reliably at a voltage range of 10.7V to 16V DC.
- Rated life will be at least 2,500 hours of operation.
- Sockets supplied will be suitable for use with the DC CFL lights supplied.
- Screw type connections with capacity for connection to 10 AWG wire are required.

## 7.7 Batteries

- The preferred manufacturing and shipping source is Motolite/Oriental battery models from the Philippine Battery Corp.<sup>2</sup>
- Cells supplied must will be Oriental Stationary Battery model PS210
- Lead-Acid batteries shall consist of either multiples of 2V cells, multiples of 6V batteries or 12V batteries connected in series.
- Cells shall have an Ampere Hour rating of 180-220 Ah at C10.
- Batteries shall be designed for deep cycle operation and long cycle life.
- Batteries shall be provided in dry charge state and the proper tropical region electrolyte provided with at least 10% extra provided to allow for spillage.
- Batteries will be shipped dry with the electrolyte needed to activate the cells also included.
- The 12V configuration will require 6 PS210 cells. The 24V configuration will require 12 PS210 cells.

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<sup>2</sup> As future replacement batteries will be ordered in small quantities, batteries of Philippines manufacture are desired since shipment from the Philippines will be easy as many partially filled containers originate in the Philippines for delivery and shipment to Palau.

Also, the batteries specified are designed to be used with small off-grid systems similar to the systems that will be in operation in Palau, this ensures maximum system efficiency. Although there are batteries from other brands that are also designed for use with small off-grid systems, none of these batteries are produced in the Philippines and referring to the explanation above, it is not recommended to accept batteries from other sources.

## 8 Appendix A – Off Grid System Components Quotation

Due to the specific requirements of the solar PV system in Palau, NDBP would like to request for a separate quotation to supply individual components as opposed to a quotation for components as part of a module package.

### 8.1 General conditions

- NDBP reserves the right to select the specific components as quoted by the bidder.
- The prices quoted will be FOB
- The prices quoted will be valid for a 90 day period

### 8.2 Price Schedule

- The following table is to be used for the quotation of prices.
- The actual quantities to be purchased are not yet fixed though a maximum quantity to be ordered is given for guidance.
- It is intended to purchase sufficient materials to fill a container for shipment. Therefore the prices that are to be provided are for a range of quantities, from an amount sufficient for a nominally 200Wp installation to the maximum listed.
- Where quantity discounts are available, in preparing the quotation please note in the quantity column the quantity at which a reduced price is offered and note in the Prices column the unit price at that quantity and greater.
- Prices listed are to be FOB your location. Note that a separate quotation for a container to be shipped from your location to Palau is also requested.
- Once the vendor is selected a final quantity for each item will be ordered using the price schedule provided by the selected vendor and the final price for the shipment shall be CIF which will equal the cost of the purchased items plus shipping insurance plus the cost of shipment to Palau.
- The purchaser will cover all costs (storage, local transport, customs, etc.) after the container is placed on the wharf in Palau.

For all items, a separate specification sheet must be provided that includes all the detailed specifications as referenced in the Request for Quotations technical specifications section.

Item	Maximum Quantity	Quantity for Price Quoted	Unit Price Quoted (US\$)
<b>Photovoltaic Panels</b>	200	1 panel	
Manufacturer, model number and Wp rating		(e.g. 50)	(e.g. \$170)
		(e.g. 100)	(e.g. \$168)
<b>Charge/discharge controller</b>	100	1 unit	
Manufacturer and model			
<b>300 W Inverter (for appliance use)</b>	200	1 unit	
Manufacturer and model			
<b>DC Lights and sockets</b>	500	1 unit	
Manufacturer and model			
<b>Panel connecting wire</b>	500 meters	10 meters	
<b>Batteries*</b>	120*	1 unit	
Manufacturer, model, voltage and Ah rating at C10			
<b>Cost of Shipping a Single 20 Ft Container)</b> (From point of supply to Koror, Palau)			

\*Quantity is based on the supply of 2V cells. If 6V batteries are proposed, the maximum quantity will be 30, if 12V batteries are supplied the maximum quantity will be 15.

## 9 APPENDIX B – Off-Grid PV Draft Contract

The successful bidder will be required to enter into a Contract with NDBP as detailed below:

### CONTRACT

<b>Contract Title and Number</b>	<b>Off-GRID SOLAR PV SYSTEMS</b>
<b>Name and Address and Contact information of CONTRACTOR</b>	<b>Vendor Name:</b> <b>Contact Name:</b>  <b>Address:</b> 1) 2) <b>Phone:</b> <b>Fax:</b> <b>E-mail:</b>
<b>Contract amount</b>	<b>\$ [Insert Amount]</b>
<b>Beginning and Completion Date</b>	<i>Contract period is <u>xx</u> calendar days.</i> <i>Contract execution date by Contractor: _____</i>  <i>Contract completion date: _____</i>
<b>NDBP Project Manager</b>	<i>Kaleb Udui, President</i> <i>Phone: Fax: E-Mail:</i>

This agreement and contract (hereafter referred to as “Contract”) is made and entered into this **day of** , 2010, by and between the National Development Bank of Palau hereinafter known as [NDBP] and **[Insert Contractor Name]**, hereinafter referred to as Contractor.

Whereas, NDBP has an immediate need for the supply of Modular Off-grid Solar Photovoltaic Systems as herein specified for installation under a renewable energy program for the Republic of Palau; and

Whereas, NDBP issued a Request for Quotation for the supply and delivery of modular off-grid solar PV systems of a nominal capacity between 500Wp to 1,000Wp and

Whereas, pursuant to the Request for Quotation NDBP received proposals from various individuals and companies; and

Whereas, NDBP evaluated the proposals from each bidder; and

Whereas, based on Contractor’s proposal, Contractor was determined by NDBP to provide the best products and services at the best price and that entering into this Contract is in the best interest of NDBP;

Now therefore, in consideration of the mutual covenants, terms, and conditions set forth in this Contract, Attachment A Request for Quotation and Attachment B (Contractor's Quotation, product details and specifications, and subsequent communications), both incorporated and made a part hereof, NDBP and Contractor agree as follows:

**SECTION ONE**

**DESCRIPTION OF SCOPE OF CONTRACTOR'S OBLIGATIONS AND WORK**

Contractor shall, in accordance with the terms of this contract, including its Attachments A and B hereto which are hereby incorporated herein by this reference and within the contract time specified in Section Three of this contract, sell, supply and deliver to NDBP the Off-grid solar PV systems with all accessories, components, and parts specified herein below in subsection A, perform the services specified in subsection B below, and provide the maintenance and all required or necessary parts list manuals in English for regular maintenance and overhauls of off-grid solar PV systems as specified in this subsection C of this Contract. Contractor shall also perform other obligations specified for it elsewhere in this Contract.

**A. Off-Grid Solar Photovoltaic Modular Systems**

Contractor shall sell, supply, deliver, and transfer ownership of and title to NDBP the Modular Off-grid Solar PV Systems more specifically described below, with the specifications indicated as follows:

**PRODUCT**

<u>QUANTITY</u>	<u>PRODUCT NAME</u>	<u>PRODUCT DETAILS</u>	<u>PRODUCT SPECS</u>
1	Xxx	Xxx	Xxx
1	Xxx	Xxx	Xxx
1	Xxx	Xxx	Xxx

The components of the foregoing Off-grid Modular Solar PV Systems must meet the following specifications as appropriate:

**Photovoltaic Panels**

- The photovoltaic modules shall be warranted to provide their rated output at standard conditions within  $\pm 20\%$  for a minimum of 20 years under the harsh tropical, coastal conditions at the sites.
- A copy of the complete warranty terms must be provided with the tender.
- Photovoltaic modules of the model offered must have been tested by an internationally recognized testing facility and certified by that facility to meet internationally accepted standards.
- The construction must allow the safe maintenance of at least 600V differential between

the panel frame and internal cell wiring.

- Cells will be made of monocrystalline or polycrystalline silicon. Amorphous or thin film type construction is not acceptable.
- PV modules must be framed with aluminium or marine grade stainless steel with appropriate seals to prevent water and corrosion damage to the active components of the panel.
- High strength glass must be used for the transparent cover. The backing of the panel may be high strength glass or other material impermeable to water that is accepted under the applicable international standards.
- By-pass diode and blocking diode protection for reverse current and shading effect reduction are not required for individual panels but individual panel by-pass diodes may be included.
- Panel Wp ratings shall be no less than 160 Wp nor no more than 250 Wp
- Panel shall contain 72 solar cells in two 36 cell strings that can be connected in parallel for 12V battery charging or in series for 24V battery charging.
- Connections may be either by standard “quick connect” type socket and plug wiring or by screw type terminals.

The contractor will include as a part of the tender response at least the following information for the panels to be supplied:

- Voc, Isc, Imp, Vmpp, and Wp at standard conditions
  - The relationship between temperature and module output over the cell temperature range 25°C to 75°C
  - The IV (current/voltage) curves for 250, 500, 800, and 1000 W/m<sup>2</sup> solar inputs
  - Physical size and weight
  - Details of the materials used in construction, including the frame, the connection boxes, the backing material and the encapsulation material.
  - Number of cells per panel
  - Type of cells provided (monocrystalline or polycrystalline)
- The results of type tests carried out on the module type at ESTI (or an equivalent institution) using the CEC Specifications No. 503 or to International standard IEC-61215 shall be provided.
  - A statement of warranties in effect for the proposed module type must be provided with full details of the terms of those warranties for both physical defects and capacity loss.

### **Photovoltaic Module Support Structure**

- All arrays are expected to be mounted on good quality metal roofing fastened to wooden purlins that are in turn fastened to wooden trusses; however mountings should also be suitable for use with pre-fabricated steel buildings. For panel mounting rails, a spacing of 600 mm between purlins is to be assumed.
- The panel mounting framing must support the panels in a manner that allows adequate air flow between the metal roofing and the back of the panels to keep heating of the panels to a minimum.



- A spacing between the back of the panel and the highest part of the roofing metal that is between 60mm and 100mm will be acceptable.
- All metal components and fastening hardware that are in actual contact with the steel roof must be marine grade stainless steel or a non-conducting material.
- Direct aluminium to steel contact at any point in the assembly will not be acceptable.
- The tilt and direction of the roof surface will be maintained in the PV array therefore there is no requirement to provide a mounting that is not parallel to the roof surface.
- The fastening method will be such as to always penetrate the corrugated metal at a high point on its surface and will include appropriate seals that prevent roof leaks due to the panel attachment for the life of the installation which is to be at least 20 years.
- All structures must be able to resist at least 20 years of outdoor exposure in the location's harsh tropical coastal environment without any appreciable corrosion or structural fatigue.
- Full technical specifications and detailed assembly instructions shall be provided with the quotation showing the construction and assembly of the mounting structures and the details of the mounting of the modules and their attachment onto the supporting structure. These must specifically include physical size, and details of materials used in construction.
- Panel mountings supplied shall be standard commercial units manufactured specifically for mounting of solar panels on metal roofing and shall be adjustable to fit standard solar panels in the 150-250Wp range.

### **Solar Charge controller**

- The charge controller must be capable of charging either 12V or 24V open cell lead acid batteries.
- High voltage cut-off shall be no less than 14.4V.
- Low voltage cut-off shall be no higher than 11.7V.
- The controller shall be capable of either PCM or "on-off" type of control.
- The rated amperes shall be no less than 15A.

The controller supplied must have a history of reliable use in the Pacific Islands or similar environments for at least five (5) years. The Morningstar model ProStar 15 A 12/24V is prequalified

### **Wiring**

- Panel wiring shall be single conductor double insulated stranded copper wire with the conductor at least 4mm<sup>2</sup> in cross-sectional area or AWG 10 or larger.
- The minimum insulation voltage specification for the supplied cable will be 600VDC.
- The outside insulation sheath shall be specifically intended for outdoor use in high UV and high ambient temperature environments.
- Supplier will provide full specifications for the wire and insulation materials that are supplied.
- Wire specifically intended for use in grid-connected solar systems will be given preference.

Indoor wiring shall be standard two conductor house wiring 12AWG or 2.5 mm<sup>2</sup> stranded or solid copper wire.

### **Dedicated Inverters**

- Inverters supplied shall provide pure sine wave output at 120V 60Hz.
- Continuous power rating shall be no less than 300 W.
- The unit shall be capable of providing 600W for at least 5 seconds without overheating.
- Protection against reverse polarity, over current and over temperature will be included.
- Units should be capable of supplying power to video systems and small refrigerators.
- The input voltage shall be 12V DC.

The Morningstar SureSine model is pre-qualified for supply.

### **DC lights and sockets**

- For 12V installations, 12VDC CFL type lights in the range 12W to 15W will be supplied.
- Lights will be expected to operate reliably at a voltage range of 10.7V to 16V DC.
- Rated life will be at least 2,500 hours of operation.
- Sockets supplied will be suitable for use with the DC CFL lights supplied.
- Screw type connections with capacity for connection to 10 AWG wire are required.

### **Batteries**

- The preferred manufacturing and shipping source is Motolite/Oriental battery models from the Philippine Battery Corp.
- Batteries will be made up of 2V cells connected in series.
- Cells supplied will be Oriental Stationary Battery model PS210.
- Batteries will be shipped dry with the electrolyte needed to activate the cells also included.
- The 12V configuration will require 6 PS210 cells. The 24V configuration will require 12 PS210 cells.

### **B. Manuals**

Concurrent with the delivery to NDBP of the modular solar PV systems Contractor shall provide installation, operation, maintenance and parts list manuals written in the English language for regular maintenance and major overhauls of the modular solar PV systems supplied to NDBP pursuant to subsection A of this Section.

## **SECTION TWO REPORTING**

The NDBP Contracting Officer is the NDBP President. Contractor shall liaise with the NDBP Procurement Officer or his designated alternative throughout the duration of this contract. Matters of an unusual nature should be reported immediately to the NDBP President.

SECTION THREE  
CONTRACT TIME

Contractor shall fully carry out and perform all of its duties and obligation set forth in this Contract within ..... (...) calendar days after the date of execution of this contract by Contractor. Contractor understands that prompt performance of all work is required by NDBP in order to meet its schedules and commitments and that time is of the essence with, in, and under this contract. The contract period may only be extended by a written agreement between NDBP and Contractor.

SECTION FOUR  
CONTRACT PRICE

Pursuant to the terms of Section Five of this Contract, NDBP will pay Contractor the total sum of [United States Dollars .....] (**US\$[Insert Amount in number]**) for full performance by Contractor of all of Contractor's duties and obligations set forth in this contract. The total contract price breakdown is as follows:

<u>Product Name</u>	<u>Product Details</u>	<u>Specs</u>	<u>Unit Price</u>	<u>Qty</u>	<u>AMOUNT</u>
Xxx	Xxx	Xxx	\$	2	\$
Xxx	Xxx	Xxx	\$	1	\$
Xxx	Xxx	Xxx	\$	1	\$

**SUB-TOTAL:** \$

<u>PRODUCT</u>	<u>Product Details</u>	<u>Specs</u>	<u>Unit Price</u>	<u>Qty</u>	<u>AMOUNT</u>
<u>Consummables</u>					
Xxx	Xxx	Xxx	\$	1	\$
Xxx	Xxx	Xxx	\$	1	\$
Xxx	Xxx	Xxx	\$	1	\$

**SUB-TOTAL:** \$

<u>SERVICES</u>	<u>Unit Price</u>	<u>Qty</u>	<u>AMOUNT</u>
Freight to Koror	\$	1	\$
Insurance for CIF delivery Koror			
<b>SUB-TOTAL:</b>			\$

**TOTAL AMOUNT:** \$

It is understood and accepted by Contractor that the price of \$ [Insert Amount] is NDBP's total monetary obligation owed to Contractor under this Contract and upon full payment of

such sum to Contactor by NDBP, Contactor shall have no other claims or demands for payment against or on NDBP and NDBP has no further liability to Contactor, under this Contract.

#### SECTION FIVE PROGRESS AND FINAL PAYMENT

Payment of Contractor under this Contract shall be as follows:

- a. 30% of the Contract price as advance payment, to be paid upon the execution of the Contract by Contractor and subject to the receipt of a satisfactory Payment Bond.
- b. 30% of the contract price upon presentation of the shipping documents, and proof of full insurance cover for the CIF delivery to the port of Koror, for the modular solar PV systems their accessories, components and parts;
- c. 30% of the contract price upon arrival in Palau of the modular solar PV systems their auxiliaries, components and parts and their satisfactory inspection, as determined by NDBP or their designated representative, as to compliance in all aspects;
- d. 10% of the contract price after the installation, testing, and commissioning of the first modular solar PV system(s) and acceptance of by the NDBP President, but no later than 30 days after clearance of the shipment from the Port of Koror.

Contractor shall invoice NDBP for each instalment specified above, invoices shall carry a NET30 payment term. Invoices shall detail the work performed or services rendered, or items supplied, the time involved, and the amounts to be paid. Before payments are made and as a condition for the release of payment on each invoice, the NDBP Project Manager shall certify each invoice for full assurance of compliance with industry quality standards and technical specifications detailed in this Contract and its attachments.

#### SECTION SIX PAYMENT BOND

Prior to commencing performance under this Contract, Contractor shall tender to NDBP, and to have in place at all times pertinent to this Contract, and prior to the release of any payments under this Contract a payment bond through a surety acceptable to the President of NDBP. Such payment bond shall be equal to or greater than 50% of the price specified in this Contract and proof of the purchase or acquisition of the payment bond shall be provided to NDBP's President forthwith. The NDBP President will release the payment bond twenty (20) days after the final payment, as described in SECTION FIVE under this Contract has been made by NDBP..

## SECTION SEVEN CHANGE ORDERS

NDBP may, by written change order, require changes within the general scope of this Contract, in the schedule, specifications, or quantity or work to be performed under and pursuant to this Contract, and Contractor shall be entitled to an adequate adjustment in the price or time or performance required by such change. Such equitable adjustment shall not exceed the most favorable price charged by Contractor for similar work and shall not exceed the sum of Twenty Five Thousand And No/100 (\$25,000.00). Contractor shall present all claims for equitable adjustment in writing to NDBP within ten (10) days of such written change order, or such additional time as NDBP, in its discretion, may allow, and shall contain such supporting information and documentation regarding the cost of such changes as NDBP may require. If not so presented, such claim shall be deemed waived. Nothing in this Contract shall be construed as relieving Contractor from proceeding with the Contract, as changed. In order to be binding, any and all amendments, including change orders, to this contract must be in writing, signed by both parties.

## SECTION EIGHT LIQUIDATED DAMAGES

In the event the Contractor shall fail to complete the work within the contract time specified in Section Three of this contract or any amendments to it, liquidated damages payable to the NDBP shall be computed at a rate of 1% per day on the total contract price. Sundays and legal Republic of Palau holidays shall be excluded in determining the number of days in the liquidated damages assessment period. All times stated in this Contract are of the essence for the purposes of liquidated damages. It is expressly understood and agreed by the parties that the time for completion of the work described herein is a reasonable time for the completion of same, taking into consideration anticipated sources and delivery of products, logistic factors and usual supply and shipping conditions.

## SECTION NINE CONFIDENTIAL INFORMATION

All media, documents, files, plans, drawings, reports, computer disks, magnetic media, electronic communications and reports, materials and information of any nature that are made available by NDBP to Contractor or that may become available to Contractor by virtue of this Contract or the relationship created by this Contract shall be held in strict confidence by Contractor and shall be used only in the performance of this Contract. All confidential disclosures made or such confidential information that is made available to Contractor by NDBP is made in reliance on this assurance.

## SECTION TEN OWNERSHIP OF WORK PRODUCTS

Any and all records, files, documents, plans, drawings, reports, computer disks, magnetic media, and other materials and work products produced or modified by the Contractor under this Contract shall become the property of NDBP upon payment of the contract price. NDBP shall have the complete right to use and re-use such work products in any manner deemed appropriate by NDBP

## SECTION ELEVEN WARRANTIES

The Supplier will provide warranties for all components as defined herein and such warranty shall provide for the timely full replacement including delivery to Koror, at no cost to NDBP, of any component that may fail or fail to perform according to the agreed specifications within the Warranty Period.

It is expected that the warranty for solar panels will be 10 years for physical problems and 25 years for the output staying within 15% of the rated value. For the inverter proposed a 10 year standard warranty is expected. Other components should be warranted for not less than five years. Any exceptions to these periods should be clearly indicated.

All warranties will clearly acknowledge the extreme tropical environment in which the systems are to be installed.

## SECTION TWELVE FAULTY WORK OR PRODUCTS; WARRANTIES

Contractor shall perform the work and all of its duties and obligations specified in and by this Contract in a professional manner meeting or exceeding the professional standards of the industry. Contractor shall guarantee the operational integrity of the products, work and services to be provided under this Contract and full compliance with the terms of this Contract and its attachments for the duration of time such products, work and services are utilized by NDBP, beginning from the date of the acceptance letter by the NDBP President. Any faults, defects, or problems discovered during this period shall be corrected promptly (within 10 days) by the Contractor at Contractor's expense.

If during the agreed Warranty period for the products any of the work is found to not conform with the requirements of this Contract, Contractor shall correct it at Contractor's expense promptly after receipt of written notice from NDBP to do so; if Contractor fails to do so, NDBP may make a claim against Contractor for breach of warranty.

If Contractor fails to make the necessary corrections, or persistently fails to perform in accordance with this Contract, NDBP may issue a written order to Contractor to stop its performance hereunder until the cause for the order is corrected or eliminated; provided, however, that the right of NDBP to stop performance by Contractor shall not give rise to a duty on the part of NDBP to exercise this right for the benefit of Contractor or any other person or entity.

## SECTION THIRTEEN TIME IS OF THE ESSENCE; TERMINATION; REMEDIES

Time is of the essence of this Contract. Contractor acknowledges that NDBP has an immediate need for the modular solar PV systems, and the services specified in this Contract. In the event that Contractor fails to perform as scheduled in this Contract, Contractor will be in breach of this Contract, and NDBP shall have the right to monetary compensation for value of replacement service to complete the project and to terminate

this contract upon written notice to Contractor whose address is [Insert Address]. NDBP shall also have all the rights and remedies provided by law, including but not limited to an award of reasonable attorney's fees and court costs in favor of it and against Contractor in the event of litigation initiated by NDBP against Contractor, in which NDBP is the prevailing party.

**SECTION FOURTEEN  
INDEMNIFICATION & INSURANCE**

Contractor shall indemnify NDBP and hold NDBP and NDBP's agents, servants, and employees, entirely harmless from and against any and all claims, damages, losses and expenses, including attorney's fees and court costs, arising out of or resulting from or in any way relating to Contractor's actions, services, work, and performance under this contract. Contractor shall further indemnify NDBP for any payment due to Contractor's suppliers and or sub-contractors in connection with this contract.

The Contractor shall arrange all insurances as necessary for the CIF delivery of the shipment to the port of Koror. This cover shall also provide for loss or damage to all good shipped up until they are unloaded at NDBP's designated warehouse within Koror. Evidence of such insurance shall be provided to the NDBP together with the shipping documents as indicated in SECTION FIVE.

**SECTION FIFTEEN  
COVENANT NOT TO ASSIGN**

It is agreed by the parties that there will be no assignment or transfer of this Contract, nor of any interest in this Contract without NDBP's prior written approval, and Contractor further covenants that Contractor and not a sub-contractor shall perform all duties and responsibilities to be performed hereunder. Should the Contractor decide to engage a sub-contractor, NDBP shall have the right to evaluate and accept or reject such a subcontractor.

**SECTION SIXTEEN  
APPLICABLE LAWS; VENUE**

This Contract shall be construed and enforced in accordance with the laws of the Republic of Palau. All claims and cases regarding this Contract shall be instituted only in the Palau Supreme Court or any competent court of Palau and judgments, rulings, decisions and orders rendered in such matters shall be enforceable in any courts outside of Palau against Contractor. Contractor specifically agrees to the jurisdiction of any competent Palau court, including the Palau Supreme Court, over it, and its officers and officials and in any and all cases, disputes, or claims brought before the court for resolution in Palau and agrees to be bound by Palau Court judgments and orders.

**SECTION SEVENTEEN  
ATTORNEYS' FEES**

In the event any action or case is filed in relation to this Contract, the unsuccessful party in the action or case shall pay to the successful party, in addition to all the sums that either party may be called on to pay, a reasonable sum for the successful party's attorney's fees,

including but not limited to those incurred for the enforcement of judgments, rulings decisions or orders and court costs, in and outside Palau.

#### SECTION EIGHTEEN

##### PROHIBITION AGAINST GRATUITIES, KICKBACKS OR CONTINGENCY FEES

It shall be a breach of ethical standards for Contractor to offer, give or agree to give an employee or former employee of NDBP, or for any employee or former employee of NDBP to solicit, demand, accept or agree to accept from Contractor, a gratuity or an offer of employment in connection with any decision, approval, disapproval, or recommendation, pertaining to this contract.

Contractor by execution of this Contract hereby warrants that it has not retained for a contingency fee any person to solicit or secure this or any contract of NDBP.

#### SECTION NINETEEN

##### MISCELLANEOUS PROVISIONS

Contractor agrees to retain all records of or relating to this contract, including but not limited to all invoices, payment receipts, drawings, plans, files, and other documents of or relating to this contract for three years after final payment and closure of any pending matters, and to permit NDBP unhindered access to such records.

NDBP shall have the right to examine, copy, and audit books and records of Contractor and any sub-contractor relating to this contract up to a year after the date of the Letter of Acceptance from NDBP pursuant to this Contract.

No waiver by any party of any right on any occasion shall be construed as a bar or waiver of any right or remedy on any future occasion.

As a condition precedent to receiving final payment of compensation under this Contract, Contractor shall execute and deliver a release, in a form approved by NDBP, of all claims known or unknown at the time of the final payment, against NDBP, their agents, and employees. If any obligations, liens, claims, security interests, or other encumbrances arising out to this Contract remain unsatisfied after payment is made to Contractor, Contractor agrees to indemnify or otherwise pay to NDBP any amounts NDBP may be compelled to pay in discharging such items, including all costs and reasonable attorney's fees.

#### SECTION TWENTY

##### NON EXCLUSIVITY

Notwithstanding any decision that NDBP may make to purchases products for any supplier, NDBP reserves the right that at any time, at any price, without limitation it may buy the same, similar, or replacement products from another supplier.



**SECTION TWENTY ONE  
FORCE MAJEUR**

Neither party will be in default nor liable for any delay or failure to comply with this Agreement due to any cause beyond the control of the affected party, excluding labor disputes, provided such party promptly notifies the other.

**SECTION TWENTY TWO  
ENTIRE AGREEMENT**

This Contract with its attachments (A and B) constitutes the entire binding agreement between the parties hereto and any prior understanding or representation of any kind preceding the date of this Contract shall not be binding on either party except to the extent incorporated in this Contract. No modification or amendment of this Contract shall be effect or binding on any of the parties hereto unless the same is reduced to writing and signed by the parties or their duly authorized agents.

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IN WITNESS WHEREOF, each party to this agreement has caused it to be executed on the dates indicated below.

**The National Development Bank of Palau**

Approved as to form and legality:

Date:

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NDBP Legal Counsel

Date:

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Kaleb Udui  
President, NDBP

Certified for the availability of funds:

Account No:

Date:

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CFO/Comptroller, NDBP

CONTRACTOR:

Date:

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[Insert Contractor Name]