

## REQUEST FOR QUOTATION (RFQ)

RFQ Reference: RFQ_008_2022 Solar System for UNDP Lao PDR	Date: 15 September 2022
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### SECTION 1: REQUEST FOR QUOTATION (RFQ)

UNDP kindly requests your quotation for the provision of goods, works and/or services as detailed in Annex 1 of this RFQ.

This Request for Quotation comprises the following documents:

Section 1: This request letter

Section 2: RFQ Instructions and Data

Annex 1: Terms of Reference for Solar PV system

Annex 2: Quotation Submission Form

Annex 3: Technical and Financial Offer

When preparing your quotation, please be guided by the RFQ Instructions and Data. Please note that quotations must be submitted using Annex 2: Quotation Submission Form and Annex 3 Technical and Financial Offer, by the method and by the date and time indicated in Section 2. It is your responsibility to ensure that your quotation is submitted on or before the deadline. Quotations received after the submission deadline, for whatever reason, will not be considered for evaluation.

Thank you and we look forward to receiving your quotations.

Issued by:

Signature: \_\_\_\_\_

Name: Surith Sengsavang

Title: UNDP Procurement and Admin Analyst

Date: 8 September 2022 Please take note of the following **requirements and conditions** pertaining to the supply of the abovementioned good/services:

## SECTION 2: RFQ INSTRUCTIONS AND DATA

<b>Introduction</b>	<p>Bidders shall adhere to all the requirements of this RFQ, including any amendments made in writing by UNDP. This RFQ is conducted in accordance with the <a href="#">UNDP Programme and Operations Policies and Procedures (POPP) on Contracts and Procurement</a></p> <p>Any Bid submitted will be regarded as an offer by the Bidder and does not constitute or imply the acceptance of the Bid by UNDP. UNDP is under no obligation to award a contract to any Bidder as a result of this RFQ.</p> <p>UNDP reserves the right to cancel the procurement process at any stage without any liability of any kind for UNDP, upon notice to the bidders or publication of cancellation notice on UNDP website.</p>
<b>Deadline for the Submission of Quotation</b>	<p><b>11:00 AM Vientiane time, Wednesday, 26 October 2022</b></p> <p><u>Other activities/key dates are as follows:</u></p> <ul style="list-style-type: none"> <li>• Confirmation of participation in Main Site Visit and Bidders Conference: <b>Monday, 3 October 2022</b></li> <li>• Main Site Visit: <b>Thursday, 6 October 2022, at 2pm local time</b></li> <li>• Bidders' Conference: <b>Tuesday, 11 October 2022, at 2pm local time</b></li> <li>• 2nd Optional Site Visit: <b>Monday, 17 October 2022, at 2pm local time</b></li> <li>• Request for Clarification: <b>Tuesday, 18 October 2022</b></li> </ul>
<b>Method of Submission</b>	<p>Quotations must be submitted as follows:</p> <p><input type="checkbox"/> E-tendering</p> <p><input checked="" type="checkbox"/> Dedicated Email Address. We accept proposal submitted via the email below only <a href="mailto:lao.procurement@undp.org">lao.procurement@undp.org</a></p> <p><input type="checkbox"/> Courier / Hand delivery</p> <p><input type="checkbox"/> Other <a href="#">Click or tap here to enter text.</a></p> <p>Bid submission address: <a href="#">UNDP Lao PDR, Lane Xang Avenue, Ban Hatsady-Tai, P.O.Box 345, Vientiane, Lao PDR</a></p> <ul style="list-style-type: none"> <li>▪ File Format: PDF</li> <li>▪ File names must be maximum 60 characters long and must not contain any letter or special character other than from Latin alphabet/keyboard.</li> <li>▪ All files must be free of viruses and not corrupted.</li> <li>▪ Max. File Size per transmission: 20 MB</li> <li>▪ Mandatory subject of email: <a href="mailto:lao.procurement@undp.org">lao.procurement@undp.org</a></li> <li>▪ Multiple emails must be clearly identified by indicating in the subject line "email no. X of Y", and the final "email no. Y of Y".</li> <li>▪ It is recommended that the entire Quotation be consolidated into as few attachments as possible.</li> <li>▪ The bidder should receive an email acknowledging email receipt.</li> </ul>

<b>Cost of preparation of quotation</b>	UNDP shall not be responsible for any costs associated with a Supplier's preparation and submission of a quotation, regardless of the outcome or the manner of conducting the selection process.
<b>Supplier Code of Conduct, Fraud, Corruption,</b>	<p>All prospective suppliers must read the United Nations Supplier Code of Conduct and acknowledge that it provides the minimum standards expected of suppliers to the UN. The Code of Conduct, which includes <b>principles on labour, human rights, environment and ethical conduct</b> may be found at: <a href="https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct">https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct</a></p> <p>Moreover, UNDP strictly enforces a policy of zero tolerance on proscribed practices, including fraud, corruption, collusion, unethical or unprofessional practices, and obstruction of UNDP vendors and requires all bidders/vendors to observe the highest standard of ethics during the procurement process and contract implementation. UNDP's Anti-Fraud Policy can be found at <a href="http://www.undp.org/content/undp/en/home/operations/accountability/audit/office_of_audit_andinvestigation.html#anti">http://www.undp.org/content/undp/en/home/operations/accountability/audit/office_of_audit_andinvestigation.html#anti</a></p>
<b>Gifts and Hospitality</b>	<p>Bidders/vendors shall not offer gifts or hospitality of any kind to UNDP staff members including recreational trips to sporting or cultural events, theme parks or offers of holidays, transportation, or invitations to extravagant lunches, dinners or similar. In pursuance of this policy, UNDP: (a) Shall reject a bid if it determines that the selected bidder has engaged in any corrupt or fraudulent practices in competing for the contract in question; (b) Shall declare a vendor ineligible, either indefinitely or for a stated period, to be awarded a contract if at any time it determines that the vendor has engaged in any corrupt or fraudulent practices in competing for, or in executing a UNDP contract.</p>
<b>Conflict of Interest</b>	<p>UNDP requires every prospective Supplier to avoid and prevent conflicts of interest, by disclosing to UNDP if you, or any of your affiliates or personnel, were involved in the preparation of the requirements, design, specifications, cost estimates, and other information used in this RFQ. Bidders shall strictly avoid conflicts with other assignments or their own interests, and act without consideration for future work. Bidders found to have a conflict of interest shall be disqualified.</p> <p>Bidders must disclose in their Bid their knowledge of the following: a) If the owners, part-owners, officers, directors, controlling shareholders, of the bidding entity or key personnel who are family members of UNDP staff involved in the procurement functions and/or the Government of the country or any Implementing Partner receiving goods and/or services under this RFQ.</p> <p>The eligibility of Bidders that are wholly or partly owned by the Government shall be subject to UNDP's further evaluation and review of various factors such as being registered, operated and managed as an independent business entity, the extent of Government ownership/share, receipt of subsidies, mandate and access to information in relation to this RFQ, among others. Conditions that may lead to undue advantage against other Bidders may result in the eventual rejection of the Bid.</p>
<b>General Conditions of Contract</b>	<p>Any Purchase Order or contract that will be issued as a result of this RFQ shall be subject to the General Conditions of Contract</p> <p>Select the applicable GTC:</p> <p><input checked="" type="checkbox"/> <a href="#">General Terms and Conditions / Special Conditions for Contract.</a></p> <p><input type="checkbox"/> <a href="#">General Terms and Conditions for de minimis contracts (services only, less than \$50,000)</a></p>

	<input type="checkbox"/> <a href="#">General Terms and Conditions for Works</a> Applicable Terms and Conditions and other provisions are available at <a href="#">UNDP/How-we-buy</a>
<b>Special Conditions of Contract</b>	<input checked="" type="checkbox"/> Cancellation of PO/Contract if the delivery/completion is delayed by [45 days] <input type="checkbox"/> Others [pls. specify]
<b>Eligibility</b>	<p>A vendor who will be engaged by UNDP may not be suspended, debarred, or otherwise identified as ineligible by any UN Organization or the World Bank Group or any other international Organization. Vendors are therefore required to disclose to UNDP whether they are subject to any sanction or temporary suspension imposed by these organizations. Failure to do so may result in termination of any contract or PO subsequently issued to the vendor by UNDP.</p> <p>It is the Bidder's responsibility to ensure that its employees, joint venture members, sub-contractors, service providers, suppliers and/or their employees meet the eligibility requirements as established by UNDP.</p> <p>Bidders must have the legal capacity to enter a binding contract with UNDP and to deliver in the country, or through an authorized representative.</p>
<b>Currency of Quotation</b>	Quotations shall be quoted in <a href="#">USD</a>
<b>Joint Venture, Consortium or Association</b>	<p>If the Bidder is a group of legal entities that will form or have formed a Joint Venture (JV), Consortium or Association for the Bid, they shall confirm in their Bid that : (i) they have designated one party to act as a lead entity, duly vested with authority to legally bind the members of the JV, Consortium or Association jointly and severally, which shall be evidenced by a duly notarized Agreement among the legal entities, and submitted with the Bid; and (ii) if they are awarded the contract, the contract shall be entered into, by and between UNDP and the designated lead entity, who shall be acting for and on behalf of all the member entities comprising the joint venture, Consortium or Association.</p> <p>Refer to Clauses 19 – 24 under <a href="#">Solicitation policy</a> for details on the applicable provisions on Joint Ventures, Consortium or Association.</p>
<b>Only one Bid</b>	<p>The Bidder (including the Lead Entity on behalf of the individual members of any Joint Venture, Consortium or Association) shall submit only one Bid, either in its own name or, if a joint venture, Consortium or Association, as the lead entity of such Joint Venture, Consortium or Association.</p> <p>Bids submitted by two (2) or more Bidders shall all be rejected if they are found to have any of the following:</p> <ul style="list-style-type: none"> <li>a) they have at least one controlling partner, director or shareholder in common; or</li> <li>b) any one of them receive or have received any direct or indirect subsidy from the other/s; or</li> <li>c) they have the same legal representative for purposes of this RFQ; or</li> <li>d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about, or influence on the Bid of, another Bidder regarding this RFQ process;</li> <li>e) they are subcontractors to each other's Bid, or a subcontractor to one Bid also submits another Bid under its name as lead Bidder; or</li> <li>f) some key personnel proposed to be in the team of one Bidder participates in more than one Bid received for this RFQ process. This condition relating to the personnel, does not apply to subcontractors being included in more than one Bid.</li> </ul>
<b>Duties and taxes</b>	Article II, Section 7, of the Convention on the Privileges and Immunities provides, inter alia, that the United Nations, including UNDP as a subsidiary organ of the General Assembly of the United Nations, is exempt from all direct taxes, except

	<p>charges for public utility services, and is exempt from customs restrictions, duties, and charges of a similar nature in respect of articles imported or exported for its official use. All quotations shall be submitted net of any direct taxes and any other taxes and duties, unless otherwise specified below:</p> <p>All prices must:</p> <p><input type="checkbox"/> be inclusive of VAT and other applicable indirect taxes</p> <p><input checked="" type="checkbox"/> be exclusive of VAT and other applicable indirect taxes</p>
<b>Language of quotation</b>	<p>English</p> <p>Including documentation including catalogues, instructions and operating manuals.</p>
<b>Documents to be submitted</b>	<p>Bidders shall include the following documents in their quotation:</p> <p><input checked="" type="checkbox"/> Annex 2: Quotation Submission Form duly completed and signed</p> <p><input checked="" type="checkbox"/> Annex 3: Technical and Financial Offer duly completed and signed and in accordance with the Schedule of Requirements in Annex 1</p> <p><input checked="" type="checkbox"/> Company Profile.</p> <p><input checked="" type="checkbox"/> Registration certificate;</p> <p><input checked="" type="checkbox"/> List and value of projects performed for the last 3 years plus client's contact details who may be contacted for further information on those contracts;</p> <p><input checked="" type="checkbox"/> List and value of ongoing Projects with UNDP and other national/multi-national organization with contact details of clients and current completion ratio of each ongoing project;</p> <p><input type="checkbox"/> Statement of satisfactory Performance (Certificates) from the top XXXX clients in terms of Contract value in similar field;</p> <p><input checked="" type="checkbox"/> Completed and signed CVs for the proposed key Personnel;</p> <p>In addition, bidders are required to provide the following as part of the technical offer, presenting 9 separate attachments:</p> <ol style="list-style-type: none"> <li>Technical description of offer, including comprehensive description and diagrammatical representation of the technical solution offered.</li> <li>Datasheets and certificates of the required standards of the main components.</li> <li>Bill of Materials (BoM).</li> <li>Bidder's Statement Regarding Deviations/Non-Compliance (as per template provided in Appendix I in the ToR).</li> <li>Topics and content to be covered during training.</li> <li>Plan for bi-annual maintenance by the local partner, lasting for 3 years. Include the comprehensive details for procedures to be carried out during periodic inspection.</li> <li>Details on freight, logistics and installation plan in terms of timelines, delivery time and production time.</li> <li>Proposed work plan and approach criteria in relation to the requirements in the terms of reference (TORs).</li> <li>Risk assessment and Mitigation plan.</li> </ol> <p>In case the bidder is not a company registered and based in Lao, and a local partner is required as per section 3.1 of the TOR, the following documents shall be included:</p> <ol style="list-style-type: none"> <li>Letter signed by both parties confirming relationship between the supplier and local service provider.</li> <li>Official documentation stating that the Local Partner is a registered business in the country.</li> </ol>

	<p>c. A detailed profile of the local service provider including documentary evidence of similar services performed by the company.</p> <p>Bidders are required to provide the following as part of the financial offer (Annex 3):</p> <p>a. Price and Delivery Schedule Form: Fully completed and duly authorized (see Annex 3). Please note all costs should be specified as indicated in the Price and Delivery Schedule Form. Therefore, the price of an item must not be included into another item.</p> <p><input type="checkbox"/> Other Click or tap here to enter text.</p>
<b>Quotation validity period</b>	Quotations shall remain valid for <b>60 days</b> from the deadline for the Submission of Quotation.
<b>Price variation</b>	No price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted at any time during the validity of the quotation after the quotation has been received.
<b>Partial Quotes</b>	<input checked="" type="checkbox"/> Not permitted <input type="checkbox"/> Permitted
<b>Alternative Quotes</b>	<input checked="" type="checkbox"/> Not permitted
<b>Payment Terms</b>	Total Acquisition <input checked="" type="checkbox"/> 30% upon complete delivery of goods. <input checked="" type="checkbox"/> 60% upon complete installation and commissioning of the system <input checked="" type="checkbox"/> 10% after 6 months of stabilization period. Maintenance <input checked="" type="checkbox"/> 1/3 at the end of the 1st year <input checked="" type="checkbox"/> 1/3 at the end of the 2nd year <input checked="" type="checkbox"/> 1/3 at the end of the 3rd year
<b>Conditions for Release of Payment</b>	1st installment: 30% of total acquisition <input checked="" type="checkbox"/> Written Acceptance of Goods based on inspection and full compliance with RFQ requirements  2nd installment: 60% of total acquisition Upon commissioning of the system as per Annex 1, section 3.7.1.7 <input checked="" type="checkbox"/> Submission of Deliverables <input checked="" type="checkbox"/> Passing Inspection <input checked="" type="checkbox"/> Complete Installation <input checked="" type="checkbox"/> Passing all Testing (including UAT) <input checked="" type="checkbox"/> Completion of Training on Operation and Maintenance and online monitoring.  3rd installment: 10% of total acquisition <input checked="" type="checkbox"/> after 6 months of the total stabilization period  1st installment: 1/3 of total maintenance <input checked="" type="checkbox"/> Deliver of 1st and 2nd visit report and checklist  2nd installment: 1/3 of total maintenance <input checked="" type="checkbox"/> Deliver of 3rd and 4th visit report and checklist  3rd installment: 1/3 of total maintenance <input checked="" type="checkbox"/> Deliver of 5th and 6th visit report and checklist

<b>Contact Person for correspondence, notifications and clarifications</b>	E-mail address: surith.sengsavang@undp.org and copy <a href="mailto:itm.green.energy@undp.org">itm.green.energy@undp.org</a>
<b>Clarifications</b>	Requests for clarification from bidders will not be accepted any later than <b>8</b> days before the submission deadline. Responses to request for clarification will be communicated <b>on UNDP Website</b> <a href="https://www.undp.org/laopdr/procurement">https://www.undp.org/laopdr/procurement</a> by <b>18 October 2022</b>
<b>Evaluation method</b>	<input checked="" type="checkbox"/> The Contract or Purchase Order will be awarded to the lowest price substantially compliant offer <input type="checkbox"/> Other
<b>Evaluation criteria</b>	<input checked="" type="checkbox"/> Full compliance with all requirements as specified in Annex 1 <input checked="" type="checkbox"/> Full acceptance of the General Conditions of Contract <input checked="" type="checkbox"/> Comprehensiveness of after-sales services <input checked="" type="checkbox"/> Earliest Delivery /shortest lead time
<b>Right not to accept any quotation</b>	UNDP is not bound to accept any quotation, nor award a contract or Purchase Order
<b>Right to vary requirement at time of award</b>	At the time of award of Contract or Purchase Order, UNDP reserves the right to vary (increase or decrease) the quantity of services and/or goods, by up to a maximum twenty-five per cent (25% ) of the total offer, without any change in the unit price or other terms and conditions.
<b>Type of Contract to be awarded</b>	<input checked="" type="checkbox"/> Purchase Order <input type="checkbox"/> <a href="#">Contract Face Sheet</a> (Goods and-or Services)
<b>Expected date for contract award.</b>	<b>28 November 2022</b>
<b>Publication of Contract Award</b>	UNDP will publish the contract awards valued at USD 100,000 and more on the websites of the CO and the corporate UNDP Web site.
<b>Policies and procedures</b>	This RFQ is conducted in accordance with <a href="#">UNDP Programme and Operations Policies and Procedures</a>



## UN House Vientiane Solar PV System Expansion



### Annex 1 - Terms of Reference:

Solar Grid-tied System Expansion for UNDP LAO PDR CO, contributing to Create Smart UN Facilities Powered by Renewable Energy

**Solar PV  
Capacity (kWp)**



40

**Renewable  
Fraction (%)**



46

**CO<sub>2</sub> Reductions  
(tons/year)**



25.2



# About

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*Prepared 08/06/2022*  
*Last Update: 30/08/2022 by*

ITM Green Energy Team.

**ISO 9001** *Approved for Release by*  
Gerald Demeules  
*Global ICT Advisor*



# Terms of Reference: Solar System Expansion

## UN House Vientiane Solar PV Expansion

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Acronyms

- COB** - Close of Business
- HQ** - Head Quarters
- ICT** - Information and Communications Technology
- IoT** - Internet of Things
- O&M** - Operation and Maintenance
- ITM** - Information and Technology Management
- PCMM** - Power Consumption Measuring and Monitoring
- PU** - Procurement Unit
- SDGs** - Sustainable Development Goals
- TOR** - Terms of Reference
- UAT** - User Acceptance Test
- UNDG** - United Nations Development Group
- UNDP** - United Nations Development Programme



# Terms of Reference: Solar PV System Expansion

## UN House in the Lao People's Democratic Republic

### Scope of the Document

The Terms of Reference (TOR) sets the requirements to facilitate smart and clean energy solutions to secure activities in **Vientiane's UN House** by supplying, installing, commissioning (including complete civil works), and after-sales services for the solar PV system expansion at the **UN House in Lao People's Democratic Republic (PDR)**. An overall high-quality system is expected, as the system will be a showcase for other compounds.

### Structure of the Document

The ToR include the following components:

1. Introduction
2. Project Description
3. Statement of Work
4. Price and Delivery Schedule Forms
5. Project Management and Communication Plan

All the requirements included in this ToR are numbered and boxed.

### 1. Introduction

The **UN House Lao PDR**, in cooperation with the UNDP Information & Technology Management (ITM) Green Energy Team, has taken initial steps toward implementing a solar installation on their premises. This endeavor will comprise of an **additional 40kWp solar PV system**, to be added as an extension of the already existing 71.55 kWp grid-tied PV system.

The load has been estimated from PCMM sensors, local energy resources, and data provided by UNDP Lao CO colleagues in the site survey assessment. Based on the projection of the load consumption for the building, the expanded solar PV system will be able to cover approximately 46% of the electricity consumption.

Expanding the UN House's renewable energy supply implies strong environmental incentives. Going solar will save approximately an additional 25 tons of CO<sub>2</sub> emissions yearly, effectively reducing UN House Laos's carbon footprint and environmental burden. This will institute the United Nations Sustainable Development Goals while being an opportunity to promote green energy solutions and inspire local economies to adopt similar solutions. A solar system expansion in the UN House will enhance business continuity and work environment, as well as reduce climate impact. All while promoting sustainable development in the region.



## 1.1 Sustainable Development Goals

The Sustainable Development Goals (SDGs) are the blueprint for achieving a better and more sustainable future for all. They address the global challenges we face, including poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect, and to leave no one behind, we must achieve each Goal and target by 2030.<sup>1</sup> As a leading agency in the fight against climate change, UNDP is committed to “walking the talk” by demonstrating that we run our operations in a resources-efficient, sustainable, and accountable way.



Figure 1 - The Global Goals for Sustainable Development

Substantial progress has been achieved in making UNDP “greener,” more resilient operations both at Head Quarters and in many COs and Regional Centers. Around the world, our offices are working to minimize the environmental impact associated with operations, from green building renovations and sustainable procurement practices to staff training and bicycling programs. By now, over 20 UNDP COs - out of 167 - have installed or are installing photovoltaic systems to reduce Green House Gas (GHG) emissions and enhance office energy security. Recently UNDP adopted a ‘Climate Neutrality and Sustainability Plan for Global UNDP Operations’ committing UNDP to reduce GHG emissions by 10% over five years and achieving climate neutrality for global operations starting effective 2014 <sup>2</sup>.

<sup>1</sup> About the Sustainable Development Goals

(<https://www.un.org/sustainabledevelopment/sustainabledevelopment-goals/>)

<sup>2</sup> UNDP - Greening the Blue Initiative (<http://www.greeningtheblue.org/what-the-un-is-doing/unitednationsdevelopment-programme-undp>)



## 1.2 Smart UN Facilities

The concept of Smart UN Facilities revolves around using data insights and interconnected technologies to transform UN COs and related facilities into “smart” premises; in effect, local capacity to carry out the UN’s goals is augmented. This concept is rooted in two aspects, which are manifested in multiple technology systems provided by ITM:

1. Fourth Industrial Revolution - the advent of connected technologies, including robotics, the Internet of Things (IoT), and autonomous vehicles.
2. Smart cities - utilization of sensors for data collection, insights, analysis, and subsequent enhancement of services.

Given the benefits, it makes the first step in transitioning into a low-carbon and digital organization through the smart integration of various equipment. As it is depicted below, [Figure 2](#) shows the main technologies that set and establish Smart UN Facilities, including:

- Smart Energy & Mobility
- Smart Connectivity - ICT, Business Intelligence & AI
- Smart Data & Internet of Things
- Smart Security

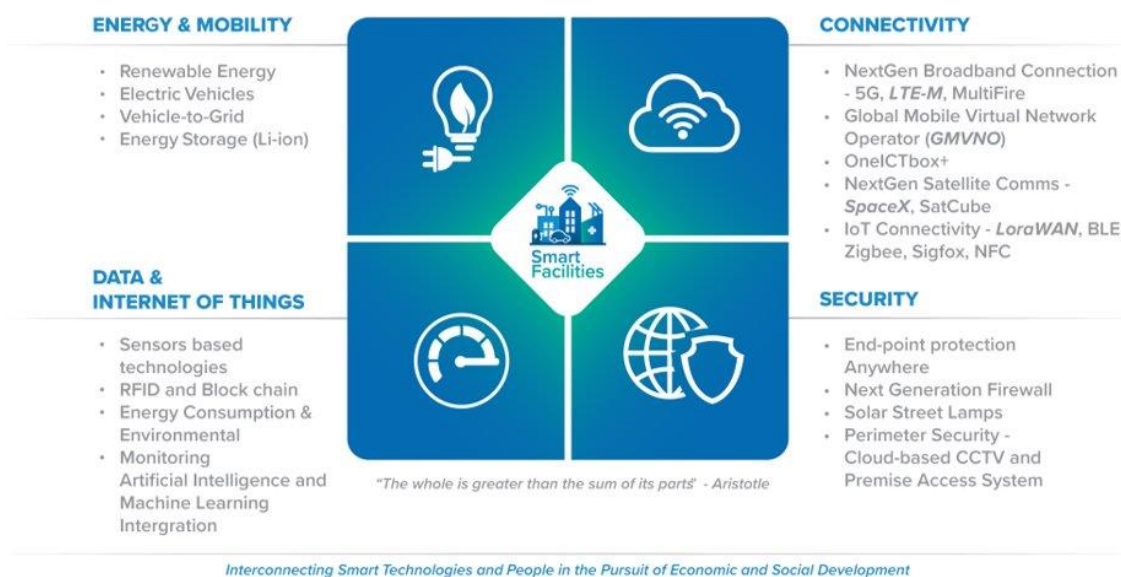


Figure 2 - Smart UN Facilities Framework

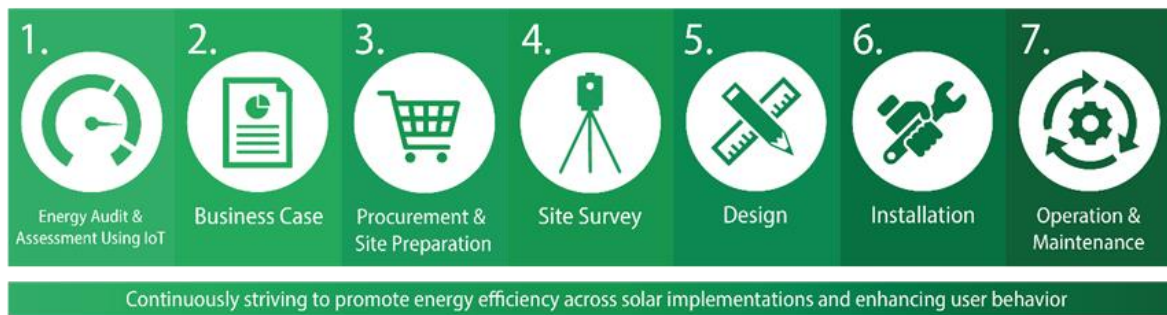
## 1.3 Seven Step Green Energy Process

Use of the United Nations Development Group's recommended 7-Step process is being adopted for this project. The approach is a holistic end-to-end process with a preliminary assessment of project practicability and the post-installation operation & maintenance. This solution is depicted in Figure 3 below and elaborated in the subsequent text.





## 7 STEP GREEN ENERGY SOLUTION



Recognized best practice by UNDG for Solar implementation

Figure 3 - Seven Step Green Energy Solution

### Step 1: Energy Audit & Assessment using IoT

- a. The CO installs Internet of Things (IoT) devices to measure their load consumption, if applicable.
- b. ITM monitors the quality of the grid and generator(s). The proposed solution for the solar PV system should be compatible with this monitoring system.
- c. The CO is required to complete a **Preliminary Site Survey** form, which will provide detailed information on the physical structure and the electrical installations.
- d. The CO can choose to have a technical assessment mission to carry out the Preliminary Site Survey of the premises.

### Step 2: Business Case

- a. This step serves to provide essential information and data for decision-making. With the information gathered during Assessment using IoT and CO schematics, ITM compiles a load profile of the energy consumption for the respective CO. This enables an analysis resulting in the drafting of a business case that presents potential green energy solutions for the CO.

### Step 3: Procurement & Site Preparation

- a. Compilation and publication of solicitation documents will be carried out in accordance with UNDP rules as applied by PU in such projects.
- b. Before the bids are placed, all interested vendors perform a **Site Visit** to collect all the detailed data required for them to formulate their offer.
- c. Evaluation of bids/proposals will be carried out jointly between ITM, CO, PU, and if desired a government representative/focal point.

### Step 4: Site-survey - vendor

- a. The vendor carries out a **Site Survey** to exhaustively consider all aspects that can adversely affect the implementation of the project and information for the final project's design, including required materials/equipment and time frames.



- b. The vendor acts as the implementer, working closely with the focal point at the CO, where necessary, and ITM exercises technical oversight and project management. Submission of the final **Site Survey Report** marks the end of this step.

### Step 5: Design

- a. The selected vendor drafts the final system design, considering findings from the site survey in the previous step.
- b. As part of technical oversight, ITM must endorse the final design before the actual installation starts. Submission of the final design and implementation schedule marks the end of this step.

### Step 6: Installation

- a. The vendor carries out all the necessary installations, in the process giving regular progress updates to all stakeholders.
- b. Critical milestones are defined, at which point, ITM makes the necessary assessments as part of the technical oversight.
- c. Six-month stabilization period allows the end-user to get acquainted with the system and basic troubleshooting.
- d. Among other critical requirements, the step entails end-to-end testing, physical inspection of the installation, user training, and complete system documentation.
- e. This step involves carrying out User Acceptance, in which all parties play a role. A signed checklist confirming full compliance with all requirements marks the end of the step, giving way to Operation & Maintenance (O&M).

### Step 7: Operation & Maintenance

- a. Regular bi-annual maintenance (the first 3 years of maintenance is included in the quote presented in the business case) and regular monitoring from UNDP.

### Communication and Publicity

Parallel to the Seven Step Green Energy Solution process of green energy solution, ITM Communications Team and the Communications CO Team carry out the promotions of the successful project within the country and globally through the UN network. This process involves highlighting the benefits of the installed system and spread word about the human impact. Furthermore, this aims at motivating similar installations in other parts of the country.



## 2. Project Description

### 2.1 Project Objectives

The main goal of the smart solar system expansion is to provide **affordable green energy** solutions for the UN smart facility. ITM requires **high quality** for the system as it will also serve as a showcase on a national and international scale. The following document provides requirements and guidelines for the project, but an innovative solution proposal is highly encouraged to improve the system.

### 2.2 Project High Level Requirements

This project seeks to enhance the energy supply for the UN House in Vientiane, Lao PDR, with renewable energy. The current energy supply for the compound is based on an existing 71.55 kWp grid-tied Solar PV System, a very reliable grid, and diesel generator of 110 kVA used as a back-up power source. There are no outages recorded due to the highly reliable grid supply and the generator only serves the premises in case of any power cuts from the grid. The generator's integration and maintenance are out of the scope of this RFQ.

The requirement is for the vendor to provide a comprehensive offer for a **Grid-tied solar PV turnkey expansion solution** based on the following configuration.

1. Supply a **40 kWp Solar PV Turnkey Solution** to be added as an expansion of the current 71.55 kWp solar system.
2. Installation, User Acceptance Test (UAT), and Commissioning of the final system.
3. Integration of the final solution into the facility and the existing setup.
4. Provision of bi-annual maintenance and after-sales by the local partner (for 3 years).
  - a. The bi-annual maintenance shall be provided for the total system, including the existing 71.55 kWp that is already installed. The detailed information of this system is provided in this ToR.
5. Training of the users on the system must also be provided to guarantee they will be able to perform the system's first-level operation and maintenance effectively.

The setup will be based on Solar PV + Grid. The expanded Solar PV System is required to serve as the priority energy source with the grid. In case of insufficient electricity production by the PV system, the UN House's load will be supplied by the national grid. In case of power outages, the system will use the diesel generator to meet the energy requirements. Integration of the diesel generator is not in the scope of this RFQ; however, the supplier will be responsible of taking appropriate measures to ensure that under no circumstance energy is fed back to the generator.

Additionally, the UN House's existing 71.55 kWp grid-tied solar system is not required to be integrated with the new system in the scope of this project, but both systems should run in parallel to the grid.

Upon expansion of the grid-tied solar PV system, the overall system is expected to provide around 46% of the total electricity demand of the site. A set of energy efficiency measures (out of the scope of this RFQ)



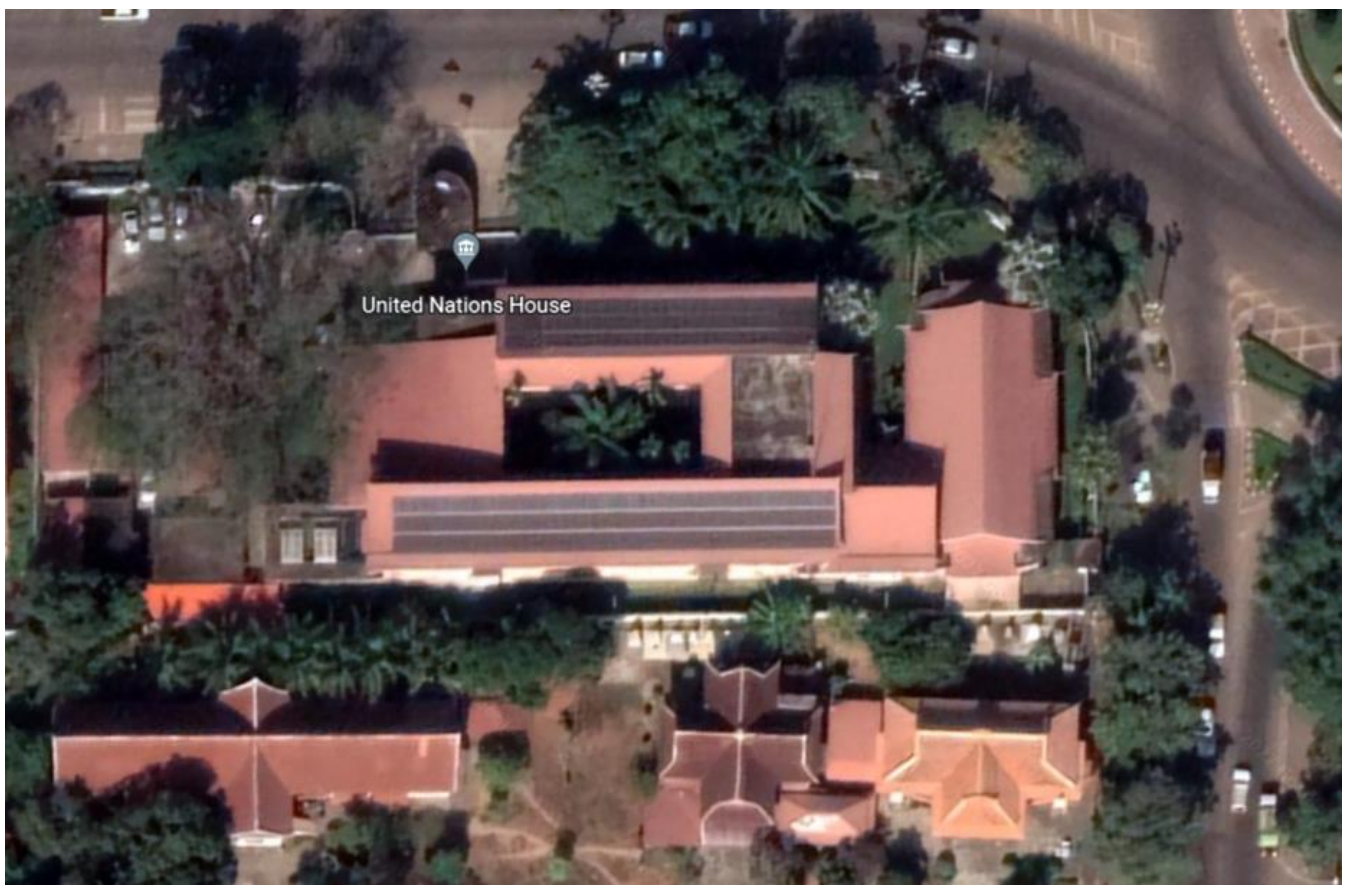
have also been suggested (sealing openings, increasing temperature set on ACs, and providing motion sensors for ACs), which means the UN House can potentially reduce its current consumption, therefore, increasing the system's renewable fraction.

The Solar PV + Grid system is expected to operate in a robust, intelligent, and automated manner regarding energy supply for the UN House. The system's proposal shall include an intelligent energy supply and management, prioritizing PV, and if more energy is required, supply the loads with the grid or generator in case of outages.

## 2.3 Site Description

The UN House is located at: **Lane Xang Avenue, P.O. Box 345, Vientiane, Lao PDR**, at the following GPS Coordinates: 17.9692835, 102.6178686. The energy system will need to cover the load of the UN House. The compound's aerial view can be seen below in [Figure 4](#).

A storage area can be made available on the UN's House premises to place the goods during the installation. However, space may be limited, and the vendors must assess any security issues linked to the equipment's storage on-site.



*Figure 4 - Aerial view of the UN House premises*





## 2.4 Weather on Site

The climate in Laos is tropical, and humid. It is influenced by the southeast monsoon which brings up to 70% of high humidity and rainfall. It is further characterized by a dry season from mid-October to April and the wet season, from May to mid-October. In Vientiane, the climate is tropical and warm the whole year. Average precipitation in Vientiane can go as high as 3000 millimeters (mm) during the year. Average annual temperatures around the plains are between 25 - 27°C, and about 20°C observed in the eastern and northern mountainous regions. Solar irradiance levels are in the range of 3.6 - 5.5 kWh/m<sup>2</sup> per day in Laos with an average of 1800 - 2000 hours of sunlight annually.

## 2.5 Potential Location of PV Panels and the technical room

The solar panels are suggested to be located on the roof of one of the buildings in on the premises. The suggested layout for the PV modules is shown in [Figure 5](#). The existing technical room in the CO can be used to accommodate the new system equipment.



*Figure 5 - Proposed Area for PV panels - UN House Laos*

## 2.6 Estimated Load Consumption

PCMM sensors and electricity bills were used to measure the consumption of the mainline and the individual load of different blocks in the compound. Through these devices, over one year of consumption data was collected. Using the data from the PCMM sensors and electricity bills, a yearly load profile was generated. Day-to-day and seasonal variability have been included to provide the most realistically possible load estimation. The final load profile used for the simulations is shown in [Figure 6](#) and



**Note** that the load profile is for the whole building after the 71.55kWp solar system has been installed and in use. Thus, the analyses based on mainline and electricity bills is showing the electricity purchase from the grid instead of the real capacity of the load.

More detailed information on the load requirements for this project can be consulted. In case bidders are interested in consulting this data, they should express their interest and provide an email to give access to the portal.

Table 1.

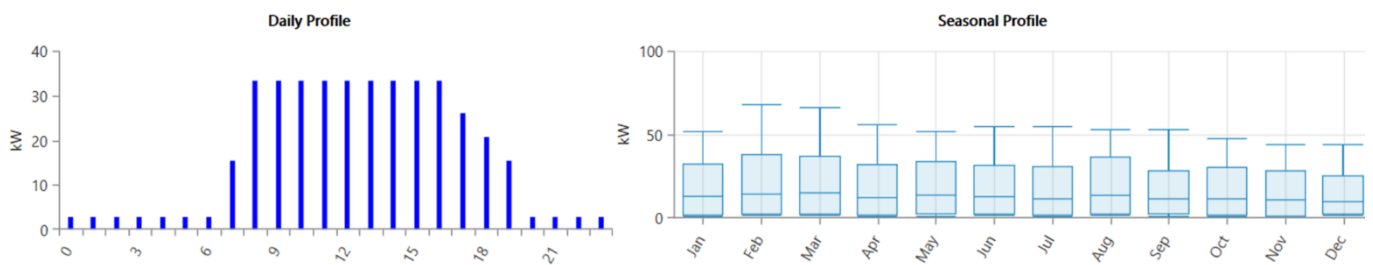


Figure 6 - UN House Laos Load Profile

Note that the load profile is for the whole building after the 71.55kWp solar system has been installed and in use. Thus, the analyses based on mainline and electricity bills is showing the electricity purchase from the grid instead of the real capacity of the load.

More detailed information on the load requirements for this project can be consulted. In case bidders are interested in consulting this data, they should express their interest and provide an email to give access to the portal.

Table 1 - Load Profile Metrics

Metric	Baseline
Average (kWh/day)	309
Average (kW)	12.88
Peak (kW)	67.55

2.7 Connectivity

There are two internet service providers at the CO and the current PV solar system is connected to the internet.

2.8 Grid Quality

The grid in Vientiane is provided by local utility EDL and is very reliable with close to no outages.



## 2.9 Existing solar installation

A 71.55 kWp grid-tied solar system has already been installed in Vientiane's UN House. The PV modules' layout is shown in Figure 4. This grid-tied solar system was installed in two phases in 2016 and 2021. The Solar field is composed of 300kWp PV panels mounted on the roof. The solar strings are collected into the three-phase inverter manufactured by SMA (Sunny Tripower 20000TL-30), which is mounted in the technical room. Each solar inverter has a capacity of 20 kW as shown in the datasheet presented in **Error! Reference source not found.** This system is not required to be integrated with the new system in the scope of this project, as both systems will be working in parallel. Nevertheless, the maintenance of this system shall be included as part of this RfQ.

Input (DC)			
Max. generator power	27000 Wp	36000 Wp	45000 Wp
DC rated power	15330 W	20440 W	25550 W
Max. input voltage	1000 V	1000 V	1000 V
MPP voltage range / rated input voltage	240 V to 800 V / 600 V	320 V to 800 V / 600 V	390 V to 800 V / 600 V
Min. input voltage / start input voltage	150 V / 188 V	150 V / 188 V	150 V / 188 V
Max. input current input A / input B	33 A / 33 A	33 A / 33 A	33 A / 33 A
Max. DC short-circuit current input A/input B	43 A / 43 A	43 A / 43 A	43 A / 43 A
Number of independent MPP inputs / strings per MPP input	2 / A:3; B:3	2 / A:3; B:3	2 / A:3; B:3
Output (AC)			
Rated power (at 230 V, 50 Hz)	15000 W	20000 W	25000 W
Max. AC apparent power	15000 VA	20000 VA	25000 VA
AC nominal voltage	3 / N / PE; 220 V / 380 V 3 / N / PE; 230 V / 400 V 3 / N / PE; 240 V / 415 V		
AC voltage range	180 V to 280 V		
AC grid frequency / range	50 Hz / 44 Hz to 55 Hz 60 Hz / 54 Hz to 65 Hz		
Rated power frequency / rated grid voltage	50 Hz / 230 V		
Max. output current / Rated output current	29 A / 21.7 A	29 A / 29 A	36.2 A / 36.2 A
Power factor at rated power / Adjustable displacement power factor	1 / 0 overexcited to 0 underexcited		
THD	≤ 3%		
Feed-in phases / connection phases	3 / 3		
Efficiency			
Max. efficiency / European Efficiency	98.4% / 98.0%	98.4% / 98.0%	98.3% / 98.1%
Protective devices			
DC-side disconnection device	●		
Ground fault monitoring / grid monitoring	● / ●		
DC surge arrester (Type II) can be integrated	○		
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –		
All-pole sensitive residual-current monitoring unit	●		
Protection class (according to IEC 62109-1) / overvoltage category (according to IEC 62109-1)	I / AC: III; DC: II		
General data			
Dimensions (W / H / D)	661 / 682 / 264 mm (26.0 / 26.9 / 10.4 inch)		
Weight	61 kg (134.48 lb)		
Operating temperature range	–25 °C to +60 °C (–13 °F to +140 °F)		
Noise emission (typical)	51 dB(A)		
Self-consumption (at night)	1 W		
Topology / cooling concept	Transformerless / Opticool		
Degree of protection (as per IEC 60529)	IP65		
Climatic category (according to IEC 60721-3-4)	4K4H		
Maximum permissible value for relative humidity (non-condensing)	100%		
Features / function / Accessories			
DC connection / AC connection	SUNCLIX / spring-cage terminal		
Display	○		
Interface: RS485, Speedwire/Webconnect	○ / ●		
Data interface: SMA Modbus / SunSpec Modbus	● / ●		
Multifunction relay / Power Control Module	○ / ○		
Shade management SMA ShadeFix / Integrated Plant Control / Q on Demand 24/7	● / ● / ●		
Off-Grid capable / SMA Fuel Save Controller compatible	● / ●		
Guarantee: 5 / 10 / 15 / 20 years	● / ○ / ○ / ○		
Certificates and permits (more available on request)	AS 4777, BDEW 2008, C10/11, CE, CEI 0-16, CEI 0-21, CNS 15382, CNS 15426, DEWA 2.0, DK1, DK2, EN 50549-1, EN 50549-2, G99/1, EN 50438:2013*, IEC 60068-2-x, IEC 61727, IEC 62109-1/2, IEC 62116, IS 16221-1/2, IS 16169, MEA 2013, NBR 16149, NEN EN 50438, NRS 0972-1, PEA 2013, NTS, PPC, RD 1699/413, RD 661/2007, Res. n°7:2013, RfG compliant, SI4777, TOR generator, UTE C15-712-1, VDE 0126-1-1, VDE-ARN 4105, VDE-ARN 4110, VFR 2014		
* Does not apply to all national appendices of EN 50438			
Type designation	STP 15000TL-30	STP 20000TL-30	STP 25000TL-30

Figure 7- Solar Inverter datasheet









## 3. Statement of Work

### 3.1 Local Partner

In case the vendor is not located within a reasonable distance to allow for a response time within the maximum time specified in



Table 4, it must show proof of a formal agreement with a local representative with relevant experience to perform such requirements. **This agreement is designed for support in the deployment of the Solar System with regards to the site visit, installation, and after-sales services and maintenance processes<sup>3</sup>.** This aligns with UNDP's mission of developing local capacity. In case the vendor is based within a reasonable distance from UNDP Lao CO and can ensure to meet the required response times, a local partner is not necessary. **Please note that an exclusivity agreement with the local partner is not a requirement.**

**In case the vendor wishes to partner with a local representative, please include the following in the offer document:**

1. Letter signed by both parties, confirming the relationship between vendor and local partner.
2. Profile of the local partner, including documentary evidence of relevant experience and services.
3. Official documentation stating that the Local Partner is a registered business in the country.

Both the vendor and the local partner need to agree to the maintenance terms discussed in **section 3.6.1.6, and must be aware of the high-quality expectations for the solution, as the system will serve as a showcase at both national and international levels.** This needs to be proved through a signed document stating the mentioned points.

Note that the **vendor is responsible** for the requirements mentioned in **section 3.6.1.6** and not the local partner. As the local partner may be required to go on-site during the O&M phase for corrective maintenance and troubleshooting, it should be based in a strategic location within proximity to the Vientiane UN House.

### 3.2 After-sales services and response time

Represented by the local partner, the vendor must be able to comply with the minimum requirements for after-sales services and maintenance processes. The logistics should allow for a response time within the maximum time specified in

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<sup>3</sup> Please refer to Section 3.6 for vendor's tasks and responsibilities



**Table 4.** In case of a critical incident, the vendor/local partner shall acknowledge the issue and perform the required activities depending on the identified incident priority. The target resolution and response time for each Incident or Service Request depends on its Priority. Priority is determined by the Urgency and the Impact of the Incident or Service Request.

The response shall always include:

1. Acknowledge receipt of incident reporting.
2. Assess and evaluate Urgency as detailed in [Table 2](#).
3. Assess and evaluate Impact as detailed in [Table 3](#).
4. Commence implementing resolution actions with the timelines and modalities indicated below for each resulting priority.

Resolution shall always include:

1. Clear identification of incident.
2. Clear identification of incident causes.
3. Submission of resolution plan with clear activities and timelines.
4. Submission of request for procurement of any component's replacement.
5. Initiation of resolution plan activities.

The below tables and definitions describe the service agreed on targets and expected response time. The Priority defined in



Table 4 results in a combination of Urgency and Impact. As depicted in Table 2, Urgency is defined as a measure of how long it will be until the incident has a significant impact on the business.

Table 2 - Urgency level definition

Urgency	Description
<b>Critical</b>	Event underway, it cannot be stopped or changed.
<b>High</b>	Event underway, time to resolution to be kept to a minimum.
<b>Medium</b>	Event scheduled or to occur, but enough time remains to respond without impacting the event.
<b>Low</b>	Event can be postponed or is far enough away in time to allow response without loss of productivity.

Impact, detailed in Table 3, is defined as a measure of the effect of an incident and how the service levels will be affected.

Table 3 - Impact Level Definition

Impact	Scope	Business	Operations
<b>Extensive Widespread</b>	80% to 100% Generation is lost. Incapacity to correctly feed the load from direct generation.	The event has extensive financial implications, the longer the issue takes to be resolved.	Interferes with core business functions, loss or potential loss of electricity supply.
<b>Significant Large</b>	Affects a significant part of the system. More than 50% to 80% power loss.	Some financial impact and few business units are impacted.	Interferes with few core businesses functions and potential loss of mission critical data.
<b>Moderate Limited</b>	Affects a minor part of the system. less than 50% power loss.	No financial impact but potential loss later if unresolved.	Interferes with non-core business functions and no loss on mission critical data.
<b>Minor Localized</b>	Less than 10% or no power.	No financial impact and no potential loss or economic implications.	Interferes with non-major business activities and no loss on mission critical data.

Once Urgency and Impact are evaluated, the Priority is determined with the corresponding Response and Resolution Time.



Table 4 - Priority definition and target response time

Impact	Urgency	Resulting Priority	Response Time Target and mandatory action <sup>1</sup>	Resolution Time Target
1-Extensive Widespread	1-Critical	<b>Critical</b>	2 hours - On site presence is required	48 hours
2-Significant Large	1-Critical	<b>Critical</b>	2 hours - On site presence is required	48 hours
1-Extensive Widespread	2-High	<b>Critical</b>	2 hours - On site presence is required	48 hours
3-Moderate Limited	1-Critical	<b>High</b>	12 hours - On site presence is required	72 hours
4-Minor Localized	1-Critical	<b>High</b>	12 hours - On site presence is required	72 hours
2-Significant Large	2-High	<b>High</b>	12 hours - On site presence is required	72 hours
1-Extensive Widespread	3-Medium	<b>High</b>	12 hours - On site presence is required	72 hours
3-Moderate Limited	2-High	<b>High</b>	12 hours - On site presence is required	72 hours
4-Minor Localized	2-High	<b>Medium</b>	24 hours - On site presence is required	6 days
2-Significant Large	3-Medium	<b>Medium</b>	24 hours - On site presence is required	6 days
3-Moderate Limited	3-Medium	<b>Medium</b>	24 hours - On site presence is required	6 days
4-Minor Localized	3-Medium	<b>Medium</b>	24 hours - On site presence is required	6 days
1-Extensive Widespread	4-Low	<b>Low</b>	48 hours	10 days
2-Significant Large	4-Low	<b>Low</b>	48 hours	10 days
3-Moderate Limited	4-Low	<b>Low</b>	48 hours	10 days
4-Minor Localized	4-Low	<b>Low</b>	48 hours	10 days

<sup>1</sup> Response time specified taking into consideration regular working hours schedule

### 3.3 Site Visit

Necessary site information, including photos, has been provided. However, for the preparation and submission of your offer, you shall engage your local partner or defined representative to conduct a Site Visit (without cost to UNDP). The data collected on the site assessment visit and the data included in this document shall be considered for the offer preparation and submission.

The Site Visit is scheduled for **Thursday, 6 October 2022, at 2pm local time**. The Site Visit can be conducted either by the vendor's staff, the local partner, or a third representative. Conducting a site visit is **compulsory** for the offer to be valid.

The UNDP focal contact in Vientiane's UN House is **Korakot Tanseri**. Please note that it is necessary to arrange the site visit in advance. As such, the vendors must inform its local partner accordingly.

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**Please confirm** your intention to undertake Site Visit(s) (without cost to UNDP) **by Monday, 3 October 2022 COB (Copenhagen Time)** by sending an email to: [itm.green.energy@undp.org](mailto:itm.green.energy@undp.org); [surith.sengsavang@undp.org](mailto:surith.sengsavang@undp.org); and [korakot.tanseri@undp.org](mailto:korakot.tanseri@undp.org). Kindly **provide in the email the following information** for UNDP CO and UNDP PU/ITM to make the necessary arrangements for assessment.





Confirmation of site visit on 06/10/2022 at 2:00 pm Laos time	
Name of company/local partner undertaking site visit	
Name of visitor, ID and contact details	
Please refer to the address stated in this RfQ:	UN House Lao People's Democratic Republic Lane Xang Avenue P.O. Box 345 Vientiane, Lao PDR GPS Coordinates: 17.9692835, 102.6178686

### 3.4 Bidders Conference

The **bidders' conference** aims to provide an open exchange between UNDP ITM and vendors, communicate the RFQ process to vendors, answer questions about the RFQ and ultimately ensure that prospective vendors have a clear understanding of the requirements. The conference will be conducted with interested vendors over a video conference, and the vendors' participation is mandatory for bidding.

The bidders' conference is scheduled on the **11 October 2022, at 2 PM local time**.

**Please confirm** your participation **by Monday, 3 October 2022 COB** by sending an email to: [itm.green.energy@undp.org](mailto:itm.green.energy@undp.org); [surith.sengsavang@undp.org](mailto:surith.sengsavang@undp.org); and [korakot.tanseri@undp.org](mailto:korakot.tanseri@undp.org).

### 3.5 Technical Requirements

Compliance with or deviations from the specification shall be clearly stated by the vendor in the below sections (3.5.1 - 3.5.8) and submitted as part of the offer (*Please refer to Appendix I*). The vendor shall apply good engineering practices and follow the applicable standards in the solar PV system's design. In addition, the vendor shall include technical and performance specifications of the equipment that will be used in the project.

The system's electricity supply is expected to operate according to the follow logic/priorities shown in [Figure 8](#), also further specified in section 3.5.6.1.



Figure 8 - System's operation logic



### 3.5.1 PV Modules

Table 5 - PV Modules Technical Requirements

<b>3.5.1.1</b>	<b>PV Capacity</b>	Total PV capacity of <b>40 kWp</b>
<b>3.5.1.2</b>	<b>Module Specifications</b>	<p>Solar PV Panels shall follow these technical and performance specifications:</p> <ul style="list-style-type: none"> <li>i. Mono- or polycrystalline silicon; CIGS thin film modules are also acceptable.</li> <li>ii. PV Panels with enough number of cells and energy efficiency ensuring the system offered has the capacity requested</li> <li>iii. Tolerance better than -0/+5%</li> <li>iv. Maximum weigh per module 28 kg (&gt;28kg modules may be accepted as long as the total weigh of the structure does not compromise the integrity of the roof)</li> <li>v. Frameless modules are not allowed</li> <li>vi. Double insulation module with cables and connectors</li> <li>vii. Junction box with accessible bypass diodes</li> <li>viii. Anti-reflective glass cover</li> <li>ix. Modules must be PID (potential induced degradation) proof, or have passed the IEC 62804 standard test</li> </ul>
<b>3.5.1.3</b>	<b>Standards</b>	<ul style="list-style-type: none"> <li>i. Compliant with IEC 61215 (edition 2) or equivalent</li> <li>ii. Shall be qualified and be classified by class according to IEC 61730 or equivalent</li> </ul>
<b>3.5.1.4</b>	<b>Module Efficiency</b>	Minimum shall be 18%.
<b>3.5.1.5</b>	<b>Limited Power Warranty</b>	The modules shall be subject to a 10-year limited product warranty or longer. The performance warranty shall ensure that the modules will produce at least 90% of their nominal power after 10 years and 80% of the nominal power after 20 years.
<b>3.5.1.6</b>	<b>Tilt</b>	Shall be optimized for local condition and used technology.
<b>3.5.1.7</b>	<b>Labelling</b>	<p>The bidder shall provide the following information at the project completion:</p> <ul style="list-style-type: none"> <li>i. Manufacturer, brand; model and serial number</li> <li>ii. Rated power; Efficiency</li> <li>iii. Color temperature</li> <li>iv. Clear indication of the connecting inlets and outlets</li> <li>v. Warranty and Safety warning</li> </ul>



### 3.5.2 PV Modules mounting

Table 6 - PV modules mounting technical requirements

3.5.2.1	<b>Features</b>	<p>In this regard, vendors are requested to provide complete appropriate solution including supply of materials, civil works etc. as part of the UN House Laos Solar PV Expansion Project.</p> <p>The PV modules can be directly mounted on the pitched parts of one of the buildings in the UN House premises. Otherwise, the tilt angle and azimuth of the modules are to be optimized to the production in relation to the needs and the local conditions.</p> <p>Shadowing of the PV modules from trees, buildings or any other obstacles should be minimized over the whole day and there shall be no shadows in a period of <math>\pm 4</math> h w.r.t. solar noon.</p> <p>Bidders are requested to provide the solar field layout drawings of their solution coupled to a calculation of the required area (size) for Solar PV Modules in the offered system, as well as provide energy production forecast based on the orientation, tilt, and shadowing effects for Solar PV Modules.</p> <p>Any changes to the preliminary design of the mounting structure may be provided after the detailed site survey and the final design shall be approved by UNDP.</p>
3.5.2.2	<b>Mounting Structure</b>	<p>As the proposed solution consists of a rooftop mounting structure, the following shall apply:</p> <ol style="list-style-type: none"> <li>The mounting structure shall not compromise the integrity of the roof, and any damages that may occur because of the installation shall be responsibility of the vendor.</li> <li>Roof mounted structures shall be designed and customized to withstand local weather and climate, structural loads such as solar panels, wind loads, seismic loads (dependent on location), etc.</li> <li>The roof mounted structure shall be installed following local and/or international regulations, and it shall not include ballasts and other components that may add unnecessary load on the roof. The proposed solution shall minimize the weight on the structure. In case ballasts are the only feasible solution, detailed reasoning behind shall be provided, along with mitigation measures to ensure roof integrity.</li> <li>The structural design, when applicable, shall be designed and signed by a licensed engineer. The detailed drawings shall be provided, indicating total dimensions of the structure.</li> <li>The mounting structure and overall solution shall be aesthetically pleasing, use local materials (if possible) that adhere to quality standards and materials that have low embodied energy.</li> </ol>



		<ul style="list-style-type: none"> <li>vi. Easy access to solar panels on top of the roof is required for regular cleaning and maintenance of the solar panels.</li> <li>vii. The mounting structure design and installation shall adhere to local standards and / or the International Building Code (IBC).</li> <li>viii. The BoM considered for the structure shall be included in the technical drawings.</li> </ul>
<b>3.5.2.3</b>	<b>Lifespan</b>	Mounting structure should last at least the lifespan of project (25+ years).
<b>3.5.2.4</b>	<b>Standards</b>	<p>The design of the PV mounting structure/array should follow the guidelines specified in JIS C 8955:2011, AS/NZS 1170.2:2011 or equivalent. UNDP reserves the right to crosscheck the features.</p> <p>The design and installation should respect and meet the recommendations specified by the solar panels' installation guideline.</p>

### 3.5.3 Power electronics

Table 7 - Power electronics technical requirements

<b>3.5.3.1</b>	<b>Features</b>	The system must include a smart inverter to control the solar PV output. Additionally, the power electronic should include protection and power quality devices that counter problems like power back flow to the generator due to solar production.
<b>3.5.3.2</b>	<b>Inverter Specifications</b>	<p>Solar PV inverters with integrated MPPT are acceptable.</p> <p>Their design should be based on the requirements specified below:</p> <p><u>Solar inverters with:</u></p> <ul style="list-style-type: none"> <li>i. Inclusive of at least 2 maximum power point tracker (MPPT) compatible with the PV modules' layout and total voltage rating, maximizing the PV production.</li> <li>ii. The inverter shall be compatible with the PV module's layout, accounting for possible local temperature variations.</li> <li>iii. Inverter EU efficiency: min 95% (on-grid).</li> </ul>
<b>3.5.3.3</b>	<b>General Specifications</b>	<ul style="list-style-type: none"> <li>i. Operating Temperature: 0-50°C</li> <li>ii. 3-phase output 400V, 50 Hz.</li> <li>iii. It is preferable to have 3 independent inverters to make the 3-phase output. However, other suitable configurations are also acceptable.</li> </ul>
<b>3.5.3.4</b>	<b>Standards</b>	<p>Regarding quality assurance, power electronics must follow these certifications, or equivalent ones (if equivalent, specify in the Appendix table, Section 5). Proof of compliance should be presented along with the technical offer, as previously specified.</p> <ul style="list-style-type: none"> <li>i. Design: <b>IEC 62093</b> or equivalent</li> </ul>



		<ul style="list-style-type: none"> <li>ii. CE-conformity <b>LVD 2014/35/EC</b>, including at least the following harmonized standards: <ul style="list-style-type: none"> <li>a. Safety for converters: <b>EN 62109-1 and EN 62109-2</b> jointly, or EN 60335-1 (in case of small power electronics), or equivalent</li> </ul> </li> <li>iii. CE-conformity <b>EMC 2014/30/EU</b>, including at least the following harmonized standards: <ul style="list-style-type: none"> <li>a. <b>EN-IEC 61000-3-3</b> or <b>EN-IEC 61000-3-11</b></li> <li>b. <b>EN-IEC 61000-3-2</b> or <b>IEC 61000-3-12</b></li> </ul> </li> <li>iv. EMC conformity Emissions limits: Either <b>EN 61000-6-3, 61000-6-4, or EN 55014-1</b> (according to size of equipment and application)</li> <li>v. EMC conformity Immunity limits: Either <b>EN 61000-6-1, 61000-6-2 or EN 55014-2</b> (according to size of equipment and application)</li> </ul> <p>(if any equivalent standard, specify in the Appendix table, Section 5)</p>
<b>3.5.3.5</b>	<b>Safety</b>	<ul style="list-style-type: none"> <li>i. Provide protection against overload and reverse polarity</li> <li>ii. IP protection class 54 or better</li> </ul>
<b>3.5.3.6</b>	<b>Warranties</b>	The expected operating lifetime of the inverter shall be of at least 10 years and the warranty period of 5 years.

### 3.5.4 Technical Room

Table 8 - Technical room requirements

<b>3.5.4.1</b>	<b>Specifications</b>	<p>An existing room on site can accommodate the new system equipment and serve as a technical room</p> <p>This solution is to include optimal and controlled environment to enhance the lifespan and functionality of the offered PV components inclusive of appropriate safety features, cooling system, etc. System design should <u>consider and incorporate energy requirements</u> for internal environment control system and ensure that its specific energy requirements do not reduce requested PV solution capacity.</p> <p>Equipment should be protected with the corresponding IP rating according to where they are installed.</p> <p>It shall remain the bidders' responsibility to guarantee that any civil works or interventions on an existing structure for the power electronics installation (such as drilling in existing wall for inverter fixation, or cabling connections) will not compromise the integrity of the structure. Any damage to the existing structure that may occur as a result of this installation shall be responsibility of the vendor.</p>
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3.5.4.2	Features	<p>The technical room shall include these features (in case not available in existing room, these shall be included in the offer):</p> <ul style="list-style-type: none"> <li>i. Smoke detection and alarm</li> <li>ii. Fire extinguisher</li> <li>iii. Climate control and protective device</li> <li>iv. Conditions: Continental, Tropical and Desert Environments</li> <li>v. Operating Temperature: Desert/Tropical (-10°C/+50°C)</li> <li>vi. Internal temperature shall be regulated for optimal performance of equipment</li> <li>vii. If applicable, concrete base: provide specifications and/or requirements for the cement/concrete base for placement of container. Related civil works to be undertaken by the local office</li> <li>viii. Ensure that the product conforms to appropriate and applicable European, American, Japanese or Australian standards with regards to: Safety for Electrical Appliance, Electrical Standards, Building Standards, Container Internal Environment, General Ventilation and Cooling Standards for such facility,</li> </ul> <p><u>Offer to clearly reflect cost of this element (technical room) including overall system cost improvement and/or increment related to this option.</u></p>
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### 3.5.5 Online monitoring system

Table 9 - Monitoring requirements

3.5.5.1	Monitoring and Management overview	<p>Internet connectivity will be available at the site.</p> <p>A local and online monitoring system shall be a user-friendly dashboard that shows <b>real-time</b> power consumption, indicating which sources are used to provide the required power (solar PV, and grid). The monitoring portal shall display the following information in <b>real-time</b>:</p> <ul style="list-style-type: none"> <li>i. Power output of solar PV system (kW).</li> <li>ii. Site electricity consumption - AC loads (kW).</li> <li>iii. Grid status (on/off) and import/export power (kW).</li> <li>iv. Alarms and configuration records</li> </ul> <p>In addition, the monitoring portal should hold the information about</p> <ul style="list-style-type: none"> <li>v. List of installed equipment (solar PV system, inverter).</li> <li>vi. Fault diagnostics</li> <li>vii. Earnings/Savings from the solar PV system in terms of energy (kWh), money (\$), and emissions (kgCO<sub>2eq</sub>).</li> </ul> <p>The information in the portal shall be presented in English.</p>
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<b>3.5.5.2</b>	<b>Historic monitoring data requirements</b>	<p>An online monitoring system shall be provided to track the system operation and performance for at least the last 3 years. It must include the following parameters on (at least) an <b>hourly</b> basis:</p> <ul style="list-style-type: none"> <li>i. Solar PV production (kWh).</li> <li>ii. Site electricity consumption - AC loads (kWh).</li> <li>iii. Energy imported from the grid (kWh).</li> <li>iv. Energy exported to the grid (kWh).</li> </ul> <p>The monitoring system should also include the configuration and alert records.</p>
<b>3.5.5.3</b>	<b>Standards</b>	It is an advantage for the monitoring system to follow the guidelines specified by IEC 61724 -1.

### 3.5.6 Smart power management

Table 10 - Smart power management requirements

<b>3.5.6.1</b>	<b>System's operation logic</b>	<p>The solar energy solution shall include Smart Power Management that allows the working system to supply electricity according to the following logic/priorities:</p> <p>1<sup>st</sup>: Solar PV 2<sup>nd</sup>: Electricity grid</p>
<b>3.5.6.2</b>	<b>Details</b>	<p>The Smart Power Management should be able to provide:</p> <ul style="list-style-type: none"> <li>i. Connection with local building electrical distribution panel.</li> <li>ii. Integration all power sources and load to work as one system, as long as all components are functional.</li> <li>iii. Intelligent monitoring and control of all power sources.</li> <li>iv. Dynamic intelligent management for overall PV system/grid (energy supply solution).</li> <li>v. Setup and activation of Internet-based (online) monitoring of Solar PV system for Performance/Availability/Status/etc.</li> <li>vi. Integration of Solar PV + Grid to operate in an integrated, intelligent, and automated manner with regards to energy supply for the Country Office.</li> <li>vii. Protection against power back flow to the generator due to solar production. The generators must be protected from reverse current</li> </ul>
<b>3.5.6.3</b>	<b>Changeover switch</b>	A changeover switch shall be included to be able to bypass PV.
<b>3.5.6.4</b>	<b>Power requirements</b>	The system should not vary the power factor of the load. It shall not vary the reactive power intake from the grid and it shall not increase the peak consumption from the grid.





### 3.5.7 Wiring and safety

Table 11 - Wiring and safety requirements

<b>3.5.7.1</b>	<b>Details</b>	<ul style="list-style-type: none"> <li>i. Cables needs to be sized according to the required local applicable standards, or otherwise to EU applied standards. Appropriate sizing of cable lengths and dimensions shall respect a maximum of 2% voltage loss at nominal load.</li> <li>ii. Cables installed outdoors must be able to handle high UV radiation, high temperatures, and must be weather resistant. Alternatively, they can be installed in cable trays that ensure they are protected them from the elements.</li> <li>iii. Overcurrent protection for the strings, PV, generator, and inverter shall be included.</li> <li>iv. Overvoltage surge and lightning protection on the AC and the DC side is required</li> <li>v. Protection against electric shock on the AC and DC side is also required</li> <li>vi. Diesel generator shall be protected from back feeding.</li> </ul>
<b>3.5.7.2</b>	<b>Grounding</b>	<ul style="list-style-type: none"> <li>i. All components of the system must be properly grounded.</li> <li>ii. All work must be carried in conformance to international and local codes and electricity standards.</li> <li>iii. The devices must be installed in accordance with the grounding device manufacturer's specified instructions.</li> </ul>
<b>3.5.7.3</b>	<b>Firefighter's switch</b>	Solar arrays shall be equipped with a remotely controlled DC disconnect switch.

### 3.5.8 Warranty of the system

Table 12 - Warranty requirements

<b>3.5.8.1</b>	<b>Details</b>	<p>Warranty certification/documentation for the Solar PV Energy System Main Components including summary overview of warranty arrangements (technical and logistical) shall be included in the system documentation.</p> <p>An overview of available warranty extension options for main components shall be provided.</p> <p>Any cost associated with warranty replacements during the warranty period will be borne by the supplier.</p> <p>Any cost associated with the maintenance and technical support for the energy system during maintenance subscription will be borne by the supplier.</p>
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<b>3.5.8.2</b>	<b>Length</b>	The warranty for the complete system shall be at least 18 months from date of commissioning. This means that, for 18 months after the commissioning, the vendor is responsible for resolving any functionality issues with the complete system, without any financial liability on UNDP.
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### 3.6 Tasks and Responsibilities

The overall tasks and responsibilities of the provider are indicated below in Table 13.

Table 13 - Mandatory tasks and Responsibilities

<b>3.6.1.1</b>	<b>Risk Assessment, Avoidance and Mitigation Plan</b>	<p>A mandatory risk assessment must be conducted and presented along with the technical offer, including as minimum features:</p> <ul style="list-style-type: none"> <li>i. All potential risks that the project might incur, in each step of the project.</li> <li>ii. The probability of incurrence and severity of the identified risks (e.g.: risk matrix).</li> <li>iii. The risk tolerance for the identified risks.</li> <li>iv. Proactive and reactive responses for risks surpassing the defined threshold of severity and/or probability.</li> <li>v. A mitigation plan for the risks identified as most severe or likely to happen (e.g., in case the final timeline is not respected due to external factors).</li> </ul> <p>This risk assessment must include all major phases of the project, i.e., procurement, shipment and transportation of goods, installation of the system, training of the end-users and monitoring of the active system.</p>
<b>3.6.1.2</b>	<b>Shipment of material</b>	<p>Shipment if to be provided for all the components of the system, following all procedures and documentation specified in this document.</p> <p>It is recommended to perform check and verification of the good functioning of the System Solution, and all the equipment involved before shipping the container (ideally 2 weeks before shipment).</p> <p>A pre-shipping inspection should be planned in case UNDP chooses to inspect the equipment and products before shipment.</p>
<b>3.6.1.3</b>	<b>Installation of the Solution</b>	<ul style="list-style-type: none"> <li>i. <u>Civil Works and Site Preparation</u>: implementation and/or technical guidance shall be provided by the vendor.</li> <li>ii. The safety of all components remains part of vendor's responsibility during civil works and installation phase, up until commissioning and official hand-over of the system.</li> <li>iii. Earth and lightning protection.</li> <li>iv. All necessary components of the system must be properly grounded</li> <li>v. Anti-theft protection of the whole system.</li> <li>vi. Solar PV Energy System mounting and installation.</li> <li>vii. The <u>engagement and involvement of local or regional partner</u> in order to enhance solar PV system deployment and after-sales services (if applicable).</li> </ul> <p>The installation should follow the guidelines of IEC 63049.</p>
<b>3.6.1.4</b>	<b>Commissioning, UAT and Training</b>	<b>Training</b>



		<ul style="list-style-type: none"> <li>i. Solar PV Energy System training must be provided to UN representative(s) by vendor.</li> <li>ii. The content of the training must also include topics such as: <ul style="list-style-type: none"> <li>a. Smart use of appliances to avoid misuse of equipment</li> <li>b. Energy efficiency</li> <li>c. Awareness on energy consumption and cost of electricity</li> </ul> </li> <li>iii. Solar PV Energy System Essentials (Basics) Maintenance and Troubleshooting Guide must be provided to UN Representatives in English to ensure level 1 troubleshooting can be carried on by the focal point on-site.</li> </ul> <p><b>User Acceptance Testing</b></p> <ul style="list-style-type: none"> <li>i. The UAT shall be developed in collaboration with ITM UNDP, following a template and guidelines that will be provided by ITM UNDP further in the process.</li> <li>ii. User Inspection will be performed during commissioning by ITM and the CO Focal point.</li> </ul> <p><b>Commissioning</b></p> <ul style="list-style-type: none"> <li>i. Complete the UNDP Commissioning check list.</li> <li>ii. As-built diagrams must be provided.</li> <li>iii. If there have been any changes to the technical documentation, the updated documents should also be provided.</li> <li>iv. A representative from the supplier's own staff/team must be present on-site during commissioning of the system.</li> </ul>
3.6.1.5	<b>Stabilization of the System</b>	<ul style="list-style-type: none"> <li>i. The awarded vendor must remain at the disposal of the beneficiary for at least six months (stabilization period) after handover/commissioning to assist in answering any technical or other related questions.</li> <li>ii. The maintenance agreement starts after stabilization period of 6 months</li> </ul>
3.6.1.6	<b>Maintenance of the system</b>	<ul style="list-style-type: none"> <li>i. Mandatory after-sales services of including: <ul style="list-style-type: none"> <li>a. Maintenance (preventive and corrective)</li> <li>b. Technical support (onsite and/or remote)</li> <li>c. Continuous availability of the online monitoring system</li> </ul> </li> <li>ii. The engagement and involvement of local or regional partner is mandatory for the Solar PV Energy System installation, commissioning, and after-sales services.</li> <li>iii. Vendor technical support and/or helpdesk contact information and procedures of local including escalation procedures.</li> <li>iv. Solar PV Energy System implementation and after-sales technical support is required, inclusive of appropriate escalation measures.</li> <li>v. Solar PV Energy System maintenance is required, inclusive of appropriate escalation measures.</li> <li>vi. Preventive maintenance shall include: <ul style="list-style-type: none"> <li>a. Periodic cleaning of the panels to guarantee maximum efficiency (minimum twice a year).</li> </ul> </li> </ul>



		<ul style="list-style-type: none"> <li>b. Technical room visual inspection and cleaning.</li> <li>c. General system checks and verifications (assessment of the structure status; assessment of the technical room status; cable connections check and securing...).</li> <li>d. Preventive maintenance shall be done in compliance to UNDP's template checklist.</li> </ul> <p>vii. Corrective Maintenance shall include:</p> <ul style="list-style-type: none"> <li>a. System troubleshooting in case of loss of production.</li> <li>b. Parameters adjustment and small changes in operational logic.</li> </ul> <p>Maintenance should be performed following the guidelines of IEC 62446-2.</p>
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### 3.7 Timelines

#### 3.7.1 Tasks and deliverables

The overall deliverables and their respective deadline after Purchase Order (PO) signature are indicated below in [Table 14](#). The tasks are to be performed within the proposed timeline. An overview of the general timeline including all deliverables can be found below this section, in [Figure 9](#).

Table 14 - Tasks and responsibilities timeline

No	Tasks and Deliverables	Deadline
3.7.1.1	<b>Signature of the contract</b>	PO
3.7.1.2	<b>Site Survey Report</b>	PO + 3 weeks
	Overview site details for a through survey.	
3.7.1.3	<b>Final Technical Design</b>	PO + 3-4 weeks
	Single line diagram with endorsement letter from manufacturer	
3.7.1.4	<b>Pre-assembled technical solution tested and ready to be shipped</b>	PO + 3 months
3.7.1.5	<b>Transportation and delivery</b>	PO + 5 months
3.7.1.6	<b>Installation of the Solution</b>	PO + 6 months
	Solar Energy System mounting and installation.	
3.7.1.7	<b>Commissioning, UAT, Training</b>	PO + 6 months and 1 week
	Complete UNDP Commissioning check list. User Acceptance Testing (UAT). Solar Energy System training to UN country office representative(s).	
3.7.1.8	<b>Stabilization of the system</b>	UAT + 6 months
	The maintenance agreement will start after the stabilization period of six months.	
3.7.1.9	<b>Maintenance of the system</b>	UAT + 42 months
	After-sales services including maintenance (preventive and corrective). Technical support (onsite and/or remote) including continues online monitoring.	



### 3.7.2 Documentation

After award of contract and formalization of purchase order (PO), the supplier shall deliver all the documents listed in Table 15 by e-mail to UNDP ITM ([itm.green.energy@undp.org](mailto:itm.green.energy@undp.org)) and copy UNDP CO focal point ([korakot.tanseri@undp.org](mailto:korakot.tanseri@undp.org)). An overview of the general timeline including all documentation can be found below this section, in Figure 9.

Table 15 - Documents after award of contract

No	Document	Description	Deadline for delivery
3.7.2.1	<b>Project Plan Report</b>	Complete report specifying all the steps that will be carried out to perform the project (from Site Survey to After sales services) with the corresponding timeline and who will be responsible of each step (vendor, local partner or both).	PO + 1 week
3.7.2.2	<b>Site survey Report</b>	<ul style="list-style-type: none"> <li>i. Overview of the sites' details</li> <li>ii. Solar PV Module installation location details (assessment, measurements; photos, etc.).</li> <li>iii. Consideration and assessment for suitable Solar PV Modules mounting system</li> <li>iv. Technical room information and final proposal, including any necessary civil works to existing structure (ensuring that any necessary interventions such as drilling in existing wall for inverter fixation, or cabling connections will not compromise the integrity of the structure)</li> <li>v. Diesel Generator location details</li> <li>vi. Electric distribution panel and wiring overview details (measurements; photos etc.).</li> <li>vii. Assessment and documentation of any shading objects, including photos.</li> <li>viii. Gather current energy consumption profile provided by the client (local grid and/or diesel generator, estimate overview of daily use patterns, appliances and load profile).</li> <li>ix. Assessment and confirmation of the grid quality.</li> <li>x. Assessment and confirmation of connectivity availability.</li> <li>xi. Specific civil work requirements</li> </ul>	PO + 3 weeks
3.7.2.3	<b>Design report including system design drawings</b>	<ul style="list-style-type: none"> <li>i. Site specific Solar PV Solution inclusive of appropriate sizing and optimization of related components e.g., Solar PV Modules; inverter(s) inclusive of surge load capacity.</li> <li>ii. Appropriate sizing of cable lengths and dimensions for maximum 2% voltage loss at nominal load.</li> </ul>	PO + 3-4 weeks



		<ul style="list-style-type: none"> <li>iii. Energy system components and wiring diagram for proposed solution. (Diagrammatical representation of the technical solution).</li> <li>iv. Offer including Bill of Material (BoM) and technical datasheets for the main components.</li> <li>v. Project delivery plan (including complete summary overview of entire project).</li> <li>vi. Endorsement letter certifying/proving the design from the (inverter and monitoring solution) manufacturer.</li> <li>vii. ISO9001 and ISO14001 certificates for manufacturers of main components (inverters and panels), if necessary.</li> <li>viii. Confirmation of the suitability of the solution (considering a detailed assessment of the loads).</li> <li>ix. Draft of checklists/procedures that supplier will follow for UAT and commissioning.</li> </ul> <p><b>Note: The design must be approved by ITM before proceeding, shipment must not be initiated before design has been approved.</b></p>	
3.7.2.4	<b>Bill of materials</b>	Complete list of materials grouped in assemblies	2 weeks before shipment of materials
3.7.2.5	<b>Shipping documents</b>	<ul style="list-style-type: none"> <li>i. Invoice</li> <li>ii. Packing list</li> <li>iii. Bill of lading</li> <li>iv. Insurance</li> </ul>	ASAP after dispatch, minimum 3 weeks before arrival at destination port
3.7.2.6	<b>Warranty documents</b>	<p>Warranty certification/documentation for the Solar Energy System Main Components, including summary overview of warranty arrangements (technical and logistical).</p> <ul style="list-style-type: none"> <li>i. Overview of available warranty extension options for main components.</li> <li>ii. Cost associated with warranty replacements during the warranty period will be borne by the supplier.</li> <li>iii. Cost associated with the maintenance and technical support for the installed system during maintenance subscription will be borne by the supplier.</li> </ul>	<p>If not already sent with original offer:</p> <p>After dispatch, minimum 3 weeks before arrival at destination port</p>
3.7.2.7	<b>Testing procedure</b>	List of tests that will be carried out and respective pass/fail criteria	Latest 4 weeks before testing
3.7.2.8	<b>Installation and commissioning report</b>	<ul style="list-style-type: none"> <li>i. Solar Energy System Commissioning Report.</li> <li>ii. Installation and commissioning activities, as-built drawings</li> </ul>	Max. 4 weeks after testing





<b>3.7.2.9</b>	<b>User acceptance testing report and proof of performance to UNDP</b>	Results of the individual tests and system performance test as outlined in the testing procedure; sign off by vendor, UNDP ITM and system user; any deviations and pending tasks need to be recorded.	1 week after testing
<b>3.7.2.10</b>	<b>Training manual/guide</b>	<ul style="list-style-type: none"> <li>i. On-Site Solar Energy System Training Guide.</li> <li>ii. Provide manuals</li> <li>iii. Include training videos</li> </ul>	With training
<b>3.7.2.11</b>	<b>O&amp;M Manual and troubleshooting guide</b>	<ul style="list-style-type: none"> <li>i. Solar Energy System Maintenance and Troubleshooting Essentials Guide for Country Office (day-to-day operations).</li> <li>ii. Description of correct operation and maintenance of the system. Troubleshooting in case of errors.</li> <li>iii. Preventive and corrective maintenance logs.</li> </ul>	With training
<b>3.7.2.12</b>	<b>O&amp;M schedule</b>	Schedule of preventive maintenance activities	With training
<b>3.7.2.13</b>	<b>After sales service agreement</b>	Agreement between UNDP, vendor, and system user, defining the scope of the included maintenance (corrective and preventive) and technical support (on-site and remote).	With commissioning
<b>3.7.2.14</b>	<b>Maintenance reports</b>	Solar Energy System Regular Maintenance Technical Report(s).	1 week after maintenance visit
<b>3.7.2.15</b>	<b>Photo and video documentation</b>	<p>Documentation of system installation, commissioning, and testing, such as:</p> <ul style="list-style-type: none"> <li>i. Civil works during installation</li> <li>ii. Training of local staff</li> <li>iii. Overview of installed system</li> <li>iv. Solar panels location</li> </ul>	During installation, training, commissioning, and testing

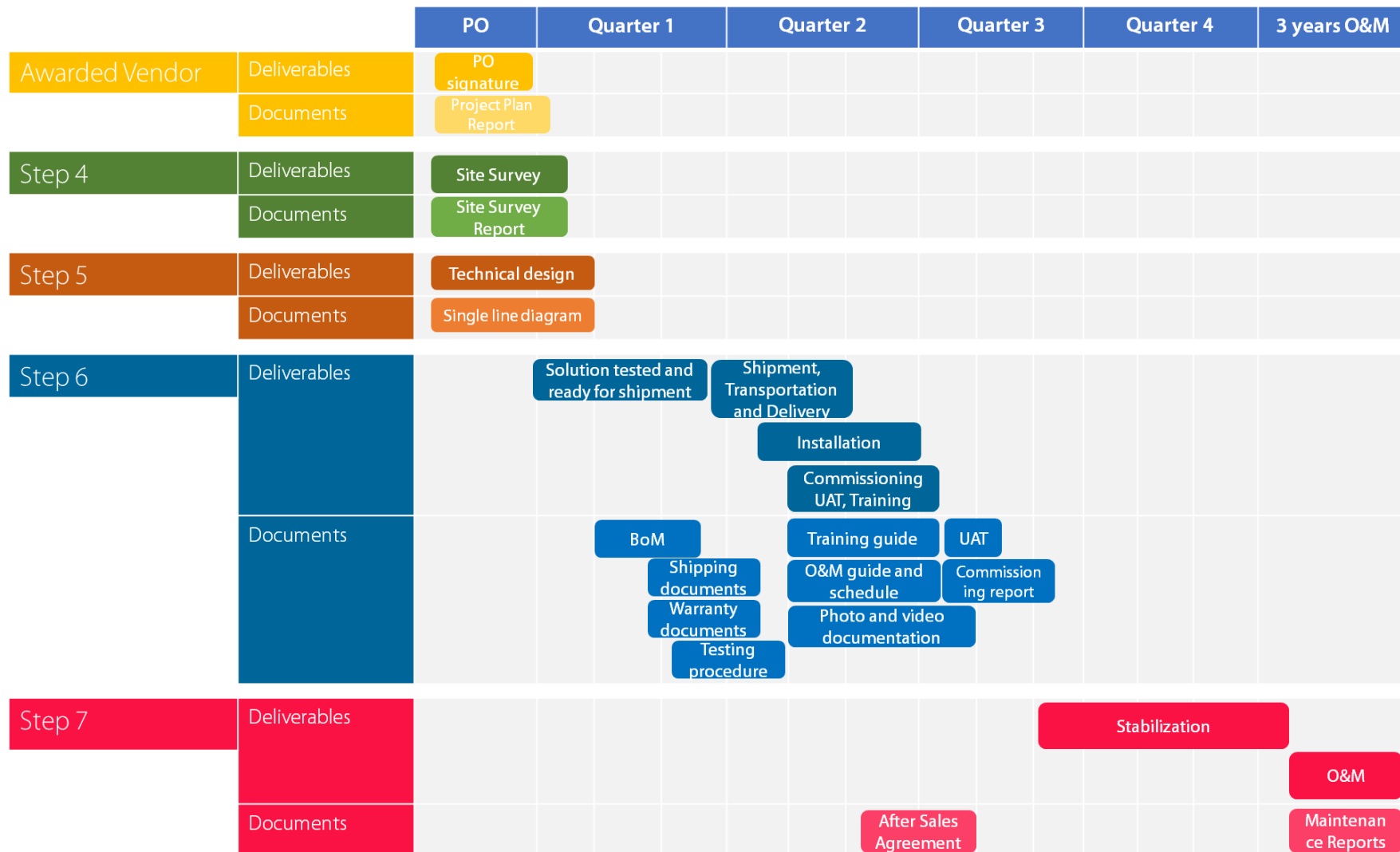


Figure 9 - Documents and Deliverables Timeline



## 4. Communications Management Plan

This section sets the communication framework for the life of the solar PV installation process. The overall desirable outcome is to keep all parties well informed in a timely fashion to avoid disruption and possible misaligned expectations.

	Communication Activity	Description	Frequency	Format/Channel	Deliverable	Responsible	Accountable	Consulted	Informed
1	Publishing RfQ	Final ToR & RfQ	As needed	e-mail	Final RFQ	PU, GET	PU	Vendors	CO
2	Site Visit Registration	Submission of list of attendees (including IDs).	As scheduled	e-mail	List of bidders	Vendors	Vendors	CO	PU, GET
3	Site Visit	Initial visit by bidders	As scheduled	e-mail	List of bidders and list of questions and answers	CO, GET	CO	Vendors	PU
4	Bidders Conference Registration	Submission of list of attendees	As scheduled	e-mail	List of bidders	Vendors	Vendors	PU, GET	CO
5	Bidders Conference	Online conference	As scheduled	e-mail, videoconference	Compiled clarification list	PU, GET	PU	Vendors	CO
6	Clarifications	Responses & questions	As needed before deadline	e-mail	List of questions and answers	PU, GET	PU	CO	Vendors
7	Receipt of bids	Update on progress	Weekly	Meeting	Status update	PU	PU	GET	CO
8	Evaluation	Technical & financial	After submission	e-mail	Final assessment results	PU, GET	GET		CO
9	Winner Announcement	Outcome notification	After evaluation	e-mail	Informational message, PO	PU	GET	Vendors	CO
10	Installation Plan	GET shares installation plan template to all stakeholders	As needed	SharePoint	Installation Plan	Vendor, CO	Vendor, CO	GET	GET, PU
11	Kickoff Meeting	Meeting of stakeholders	Once before project start	videoconference	Minutes of the meeting	GET	GET	Vendor, CO	PU, CO
12	Site survey	Coordination of vendor visit	After project offer	e-mail	Site Survey Report	Vendor	Vendor	CO, GET	PU
13	Final System Design	Confirmation of detail	As needed	e-mail, phone	Design, letter from manufacturers	Vendor	Vendor	GET	CO, PU
14	Shipping	Shipment of goods	As per provided timeline	e-mail	Invoice, Packing list, Bill of lading, Insurance	Vendor	Vendor	CO, GET	CO, GET
15	Customs clearance	Clearance of good at the CO	As needed	In person, e-mail	Clearance confirmation	CO	CO	Vendor	GET
16	Installation	General	As needed	e-mail, phone	General questions and change requests	Vendor, GET	Vendor	CO	PU
17	Onsite Assessment	Assessment of all aspects of project	End of each installation	e-mail, In person		GET, Vendor	GET	Vendor	CO, PU
18	Invoice Payment	Receipting and disbursement	As per agreed plan	e-mail, phone	Invoice, payment confirmation	GET	GET	Vendor	PU, CO
20	Commissioning	Schedule for training, UAT, etc.	End of each installation	e-mail	Signed UAT, checklist, etc.	Vendor, GET	Vendor	CO	PU
21	System Inauguration					CO, GET	CO	-	-
22	System Maintenance	Bi-annual and general support	As needed	e-mail, phone	Maintenance report	GET, Vendor	Vendor	CO	-



**Installation phase:** - Please note that during the installation phase, it is requested that all stakeholders are included in all email exchanges. The GET provides assistance in the general project management, nevertheless direct communication between the Vendor and the CO is advised. In case of delayed response time or in case of arisen problems, GET will step in to enhance communication flow.

#### 4.1 Project Team Contact Details

Name	Designation	E-mail	Phone #
Korakot Tanseri	End user	<a href="mailto:korakot.tanseri@undp.org">korakot.tanseri@undp.org</a>	+8562059713920
ITM GET (GET)	Project Manager	<a href="mailto:itm.green.energy@undp.org">itm.green.energy@undp.org</a>	+45 45 33 61 14
Procurement Unit	Contract Manager	<a href="mailto:surith.sengsavang@undp.org">surith.sengsavang@undp.org</a>	+85621267777
Awarded Vendor	Solution provider	Vendor's email TBA	TBA

#### 4.2 Communications Conduct:

**Meetings:** - Ad-hoc project meetings will be convened whenever there is need for in-depth discussions that cannot be achieved through e-mail or telephone communication. A record of the meeting proceedings will be kept, particularly action points and agreed decisions.

**Email:** - E-mail communication is considered an official record in UNDP, and this applies for solar PV installation projects as well. Most issues and information with clear cut intents will be communicated through e-mail to the relevant parties. To keep all informed and for audit trail purposes, all parties should be copied as suitable, and the same thread used as much as possible. All circumstances that may impact on delivery timelines should be proactively communicated by the concerned party to allow for timely resolution.

**Informal Communications:** - For successful and timely project implement, informal communication is a necessary ingredient especially in solar PV projects. Given the nature of the projects, interaction between the parties, informal communication will form a sizable chunk of overall communication in this project. However, caution needs to be exercised to avoid negative consequences at a later stage. All communication that commits either part/stakeholder should be formally documented and communicated accordingly.



5. Appendix I: Compliance Response Form		Understood	Understood with reservations	Comments	
<b>1 Introduction</b>					
1.1	Sustainable Development Goals	<input type="checkbox"/>	<input type="checkbox"/>		
1.2	Smart UN Facilities	<input type="checkbox"/>	<input type="checkbox"/>		
1.3	7-Step Green Energy Process	<input type="checkbox"/>	<input type="checkbox"/>		
<b>2 Project Description</b>					
2.1	Project Objectives	<input type="checkbox"/>	<input type="checkbox"/>		
2.2	Project High Level Requirements	<input type="checkbox"/>	<input type="checkbox"/>		
2.3	Site Description	<input type="checkbox"/>	<input type="checkbox"/>		
0	Weather on Site	<input type="checkbox"/>	<input type="checkbox"/>		
2.5	Potential Location of PV Panels and the Technical Room	<input type="checkbox"/>	<input type="checkbox"/>		
2.6	Estimated Load Consumption	<input type="checkbox"/>	<input type="checkbox"/>		
2.7	Connectivity	<input type="checkbox"/>	<input type="checkbox"/>		
2.8	Grid Quality	<input type="checkbox"/>	<input type="checkbox"/>		
2.9	Existing Solar Installation	<input type="checkbox"/>	<input type="checkbox"/>		
2.10	Generator	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3 Statement of Work</b>					
3.1	Local Partner	<input type="checkbox"/>	<input type="checkbox"/>		
3.2	After-sales services and response time	<input type="checkbox"/>	<input type="checkbox"/>		
3.3	Site Visit	<input type="checkbox"/>	<input type="checkbox"/>		
3.4	Bidders Conference	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5 Technical Requirements</b>		<b>Compliant</b>	<b>Deviations</b>	<b>Comments</b>	<b>Reference</b>
<b>3.5.1 PV Modules</b>					
3.5.1.1	PV Capacity	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.1.2	Module Specifications	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.1.3	Standards	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.1.4	Module Efficiency	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.1.5	Limited Power Warranty	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.1.6	Tilt	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.1.7	Labelling	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5.2 PV Modules mounting</b>					
3.5.2.1	Features	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.2.2	Mounting Structure	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.2.3	Lifespan	<input type="checkbox"/>	<input type="checkbox"/>		



3.5.2.4	Standards	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5.3 Power electronics</b>		<b>Compliant</b>	<b>Deviations</b>	<b>Comments</b>	<b>Reference</b>
3.5.3.1	Features	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.3.2	Inverter Specifications	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.3.3	General Specifications	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.3.4	Standards	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.3.5	Safety	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.3.6	Warranties	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5.4 Technical</b>					
3.5.4.1	Specifications	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.4.2	Features	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5.5 Technical Monitoring System</b>					
3.5.5.1	Monitoring and Management Overview	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.5.2	List of hourly basis parameters	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.5.3	Standards	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5.6 Smart power management</b>					
3.5.6.1	System's operation logic	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.6.2	Details	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.6.3E error! Refere nce source not found.	Changeover Switch	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.6.4	Reactive power requirements	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3.5.7 Wiring and safety</b>					
3.5.7.1	Details	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.7.2	Grounding	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.7.3E error! Refere nce source not found.	Firefighter's switch	<input type="checkbox"/>	<input type="checkbox"/>		



3.5.8 Warranty of the system					
3.5.8.1	Details	<input type="checkbox"/>	<input type="checkbox"/>		
3.5.8.2	Length				
3.6 Tasks and Responsibilities		Compliant	Deviations	Comments	Reference
3.6.1.1	Risk Assessment, Avoidance and Mitigation Plan	<input type="checkbox"/>	<input type="checkbox"/>		
3.6.1.2	Shipment of material	<input type="checkbox"/>	<input type="checkbox"/>		
3.6.1.3	Installation of the Solution	<input type="checkbox"/>	<input type="checkbox"/>		
3.6.1.4	Commissioning, UAT and Training	<input type="checkbox"/>	<input type="checkbox"/>		
3.6.1.5	Stabilization of the System	<input type="checkbox"/>	<input type="checkbox"/>		
3.6.1.6	Maintenance of the system	<input type="checkbox"/>	<input type="checkbox"/>		
3.7 Timelines and Deliverables					
3.7.1.1	Signature of the contract	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.2	Site Survey	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.3	Final Technical Design	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.4	Pre-assembled technical solution tested and ready to be shipped	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.5	Transportation	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.6	Installation of the Solution	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.7	Commissioning, UAT, Training	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.8	Stabilization of the system	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.1.9	Maintenance of the system	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2 Documentation					
3.7.2.1	Project Plan Report	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.2	Site survey Report	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.3	Design report including system design drawings	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.4	Bill of materials	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.5	Shipping documents	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.6	Warranty documents	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.7	Testing procedure	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.8	Installation and commissioning report	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.9	User acceptance testing report and proof of performance to UNDP	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.10	Training manual/guide	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.11	O&M Manual and troubleshooting guide	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.12	O&M schedule	<input type="checkbox"/>	<input type="checkbox"/>		





3.7.2.13	<b>After sales service agreement including maintenance (corrective and preventive) and technical support (on-site and remote)</b>	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.14	<b>Maintenance reports</b>	<input type="checkbox"/>	<input type="checkbox"/>		
3.7.2.15	<b>Photo and video documentation</b>	<input type="checkbox"/>	<input type="checkbox"/>		

# Who we are

## UNDP ITM/SIS

### Our Vision

Creating Smart Facilities to build local capacity and inspire a movement.

### Our Mission

To support and guide Country Offices in leveraging technology for efficient delivery on the organization's mandate.

**The Information and Technology Management unit is the leader in digital transformation, so UNDP can be agile and effective in its global delivery.**

UNDP ITM is headquartered in New York and UN City Copenhagen Denmark, a smart facility which hosts 9 UN agencies and is built with a high focus on sustainability. Our combined efforts provide standardized practices for UNDP country offices to achieve the Sustainable Development Goals and incite other local and international entities to follow our lead.

To illustrate our work, in the wake of the 2014 West Africa Ebola outbreak, country offices in Guinea, Sierra Leone and Liberia could not rely on the grid to meet their energy requirements and diesel shortages restricted access to a sufficient power supply. In order to address this, UNDP ITM leveraged its experience in implementing smart facilities to roll out solar solutions in the affected countries.

Following this outbreak, UNDP ITM has aided the installation of solar panel systems in over 13 countries worldwide.

We look forward to implementing the Smart Facilities concept even further.



**United Nations Development Programme**

Information & Technology Management  
Smart Infrastructure Services

UN City  
Marmovej 51,  
2100 Copenhagen  
Denmark

[www.undp.org](http://www.undp.org)

## ANNEX 2: QUOTATION SUBMISSION FORM

*Bidders are requested to complete this form, including the Company Profile and Bidder's Declaration, sign it and return it as part of their quotation along with Annex 3: Technical and Financial Offer. The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.*

Name of Bidder:	Click or tap here to enter text.	
RFQ reference:	Click or tap here to enter text.	Date: Click or tap to enter a date.

### Company Profile

Item Description	Detail
Legal name of bidder or Lead entity for JVs	Click or tap here to enter text.
Legal Address, City, Country	Click or tap here to enter text.
Website	Click or tap here to enter text.
Year of Registration	Click or tap here to enter text.
Legal structure	Choose an item.
Are you a UNGM registered vendor?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, insert UNGM Vendor Number
Quality Assurance Certification (e.g. ISO 9000 or Equivalent) (If yes, provide a Copy of the valid Certificate):	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does your Company hold any accreditation such as ISO 14001 or ISO 14064 or equivalent related to the environment? (If yes, provide a Copy of the valid Certificate):	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does your Company have a written Statement of its Environmental Policy? (If yes, provide a Copy)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does your organization demonstrate significant commitment to sustainability through some other means, for example internal company policy documents on women empowerment, renewable energies or membership of trade institutions promoting	<input type="checkbox"/> Yes <input type="checkbox"/> No

such issues (If yes, provide a Copy)	
Is your company a member of the UN Global Compact	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bank Information	Bank Name: Click or tap here to enter text. Bank Address: Click or tap here to enter text. IBAN: Click or tap here to enter text. SWIFT/BIC: Click or tap here to enter text. Account Currency: Click or tap here to enter text. Bank Account Number: Click or tap here to enter text.
<b>Previous relevant experience: 3 contracts</b>	
<b>Name of previous contracts</b>	<b>Client &amp; Reference Contact Details including e-mail</b> <b>Contract Value</b> <b>Period of activity</b> <b>Types of activities undertaken</b>

#### Bidder's Declaration

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	<b>Requirements and Terms and Conditions:</b> I/We have read and fully understand the RFQ, including the RFQ Information and Data, Schedule of Requirements, the General Conditions of Contract, and any Special Conditions of Contract. I/we confirm that the Bidder agrees to be bound by them.
<input type="checkbox"/>	<input type="checkbox"/>	I/We confirm that the Bidder has the necessary capacity, capability, and necessary licenses to fully meet or exceed the Requirements and will be available to deliver throughout the relevant Contract period.
<input type="checkbox"/>	<input type="checkbox"/>	<b>Ethics:</b> In submitting this Quote I/we warrant that the bidder: has not entered into any improper, illegal, collusive or anti-competitive arrangements with any Competitor; has not directly or indirectly approached any representative of the Buyer (other than the Point of Contact) to lobby or solicit information in relation to the RFQ ;has not attempted to influence, or provide any form of personal inducement, reward or benefit to any representative of the Buyer.
<input type="checkbox"/>	<input type="checkbox"/>	I/We confirm to undertake not to engage in proscribed practices, , or any other unethical practice, with the UN or any other party, and to conduct business in a manner that averts any financial, operational, reputational or other undue risk to the UN and we have read the United Nations Supplier Code of Conduct : <a href="https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct">https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct</a> and acknowledge that it provides the minimum standards expected of suppliers to the UN.
<input type="checkbox"/>	<input type="checkbox"/>	<b>Conflict of interest:</b> I/We warrant that the bidder has no actual, potential, or perceived Conflict of Interest in submitting this Quote or entering a Contract to deliver the Requirements. Where a Conflict of Interest arises during the RFQ process the bidder will report it immediately to the Procuring Organisation's Point of Contact.

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	<b>Prohibitions, Sanctions:</b> I/We hereby declare that our firm, its affiliates or subsidiaries or employees, including any JV/Consortium members or subcontractors or suppliers for any part of the contract is not under procurement prohibition by the United Nations, including but not limited to prohibitions derived from the Compendium of United Nations Security Council Sanctions Lists and have not been suspended, debarred, sanctioned or otherwise identified as ineligible by any UN Organization or the World Bank Group or any other international Organization.
<input type="checkbox"/>	<input type="checkbox"/>	<b>Bankruptcy:</b> I/We have not declared bankruptcy, are not involved in bankruptcy or receivership proceedings, and there is no judgment or pending legal action against them that could impair their operations in the foreseeable future.
<input type="checkbox"/>	<input type="checkbox"/>	<b>Offer Validity Period:</b> I/We confirm that this Quote, including the price, remains open for acceptance for the Offer Validity.
<input type="checkbox"/>	<input type="checkbox"/>	I/We understand and recognize that you are not bound to accept any Quotation you receive, and we certify that the goods offered in our Quotation are new and unused.
<input type="checkbox"/>	<input type="checkbox"/>	By signing this declaration, the signatory below represents, warrants and agrees that he/she has been authorised by the Organization/s to make this declaration on its/their behalf.

Signature: \_\_\_\_\_

Name: Click or tap here to enter text.

Title: Click or tap here to enter text.

Date: Click or tap to enter a date.

### ANNEX 3: TECHNICAL AND FINANCIAL OFFER – GOODS AND SERVICES

Bidders are requested to complete this form, sign it and return it as part of their bid along with Annex 2: Quotation Submission Form. The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.

Name of Bidder:	Click or tap here to enter text.	
RFQ reference:	Click or tap here to enter text.	Date: Click or tap to enter a date.

Currency of the Quotation: USD					
INCOTERMS: DPU					
Item No	Description	UOM	Qty	Unit price	Total price
1.	Solar Panels for 40 kWp				
2.	Design, Sizing and Documentation				
3.	Site Preparation and Civil Works				
4.	Roof Mounting Structure				
5.	Installation, Initial PV System Training, UAT and Commissioning				
6.	Integration with existing local office electric distribution and wiring.				
7.	Freight DPU cost to Vientiane, Laos				
8.	Inverters and Smart Power Management Unit/Assembly				
9.	Technical room features (if applicable)				
10.	Lightning and Surge Protection				
11.	Ancillaries and cables				
12.	<b>Maintenance Cost for the expansion<sup>4</sup></b>				
13.	<b>Maintenance Cost for the current system<sup>5</sup></b>				

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<sup>4</sup> Biannual maintenance by the local partner for the 40 kWp system expansion (annual cost, lasting for 3 years); after-sales services including maintenance (preventative and corrective) and technical support (on-site and/or remote) including continuous online system and performance monitoring.

<sup>5</sup> Biannual maintenance by the local partner for the existing 72 kWp solar system (annual cost, lasting for 3 years); maintenance (preventative and corrective) and technical support (on-site and/or remote) including continuous online system and performance monitoring.



14.	<b>Extra 1:</b> Integration of both existing and expansion system to the same monitoring portal				
Total Price					
Transportation Price					
Insurance Price					
Installation Price					
Training Price					
Other Charges (specify)					
<b>Total Final and All-inclusive Price (Without extra features)</b>					
<b>Total Final and All-inclusive Price (With extra features)</b>					

### Compliance with Requirements

	You Responses		
	Yes, we will comply	No, we cannot comply	If you cannot comply, pls. indicate counter - offer
Minimum Technical Specifications	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Delivery Term (INCOTERMS)	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Delivery Lead Time	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Warranty and After-Sales Requirements	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Validity of Quotation	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Payment terms	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Other requirements <i>[pls. specify]</i>	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.

### Other Information:

Estimated weight/volume/dimension of the Consignment:	Click or tap here to enter text.
Country/ies of Origin: <i>(if export licence required this must be submitted if awarded the contract)</i>	Click or tap here to enter text.

I, the undersigned, certify that I am duly authorized to sign this quotation and bind the company below in event that the quotation is accepted.

<i>Exact name and address of company</i>	Authorized Signature: _____
Company Name Click or tap here to enter text.	_____
Address: Click or tap here to enter text.	Date: Click or tap here to enter text.

Click or tap here to enter text.	<b>Name:</b> Click or tap here to enter text.
<b>Phone No.:</b> Click or tap here to enter text.	<b>Functional Title of Authorised Signatory:</b> Click or tap here to enter text.
<b>Email Address:</b> Click or tap here to enter text.	<b>Email Address:</b> Click or tap here to enter text.