



## **REQUEST FOR PROPOSALS (RFP) TEMPLATE**

**Onsite Rooftop Solar Photovoltaic Systems  
for Turnkey Purchase**

**for**

**Manufacturing Companies in Vietnam**

## About

The Clean Energy Investment Accelerator (CEIA) is an innovative public-private partnership initiative designed to drive deployment of clean energy solutions for large consumers in key emerging markets across the globe. The CEIA is jointly led by Allotrope Partners, World Resources Institute, and the U.S. National Renewable Energy Laboratory. The CEIA is supported by a range of public, private, and philanthropic partners, including the U.S. Department of State, P4G, and others.

Along with other CEIA resources and tools ([www.cleanenergyinvest.org/resources](http://www.cleanenergyinvest.org/resources)), this RFP Template and related attachments are meant to enable the replication and scaling of clean energy projects in commercial and industrial sectors in Vietnam and other emerging markets. This is a working document informed by CEIA experiences to date and will be updated over time to capture additional lessons learned.

This RFP Template and the attachments are designed to serve as a starting point for energy users that are aggregating on-site commercial or industrial solar projects into a project pool on behalf of one or more buyer companies across multiple locations.

The CEIA team welcomes feedback on this RFP template as we continue to update our materials. Please provide written comments to [info@cleanenergyinvest.org](mailto:info@cleanenergyinvest.org).

## Instructions

This document serves as an RFP template for manufacturing companies that intend to procure a solar photovoltaic (“PV”) system through a turnkey purchase. A separate template is available for companies that are looking to procure solar energy through a power purchase agreement (“PPA”) model. This RFP template can be customized to suit the needs of the companies. The customizable elements are highlighted in yellow. Hyperlinks to forms, submissions, and site information may be customized by right clicking on the hyperlink and updating the address field.

# REQUEST FOR PROPOSALS

## FOR

### **X MW of Rooftop Solar Photovoltaic Systems for Procurement via a Turnkey Purchase**

Issued by:	[Company Name]
Issued on:	[Date]
Responses due by:	[Date]
Contact:	[email]   [phone number]

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## Invitation to Propose

DATE OF ISSUE:	[Date]
RFP NO.	[RFP No.]
PROJECT:	X MW Rooftop PV System for Turnkey Purchase at [location]

Dear Bidder,

Through this Request for Proposals (“RFP”), [company name] (“Buyer”) is soliciting proposals from qualified EPC companies (“Bidders”) to design, deliver, install, and temporarily operate and maintain a [project capacity] MW on-site rooftop-mounted PV electricity generation system(s) (“RPV”) through a turnkey purchase for its facility/(ies) in [name of location], Vietnam.

The table below indicates the facilities for which the Buyer is seeking the PV installations.

**Table 1: Facility locations**

#	Facility name and location	Site Address	GPS coordinates
1			
2			

The Buyer seeks to:

- Install an RPV system on a turnkey basis of estimated capacity [project size in MW];
- Maximize utilization of solar electricity for on-site consumption; and
- Have the RPV system(s) installed and operational no later than [Date].

Key terms and conditions include:

- The Bidder designs, permits, delivers, installs, and commissions the RPV system before [Date];
- The Bidder takes responsibility for the operation and maintenance (“O&M”) of the system for a period of three years from the Commercial Operation Date (“COD”);
- The Bidder is responsible for complying with all the necessary permits and regulations that may be in force in the jurisdiction of the project; and
- The Bidder ensures the use of appropriate components and material as per specifications and passes on / extends any original equipment manufacturer warranties to the Buyer.

# 1 Background

[Buyer's name] ("Buyer") is seeking proposals from highly qualified solar developers for the design, engineering, procurement of materials, construction ("EPC"), installation and three-year maintenance of an on-site RPV system ("Project").

A preliminary evaluation of the sites suggests there is sufficient potential for RPV, based on each site's available area for installation, usage patterns, insolation, financial factors, and facility owner's interest in utilizing renewable energy ("RE"). To be considered, a proposal must include:

- a price clearly articulated purchase price in VND;
- all expected benefits (such as subsidies, incentives) being considered as a part of the purchase price;
- Annual minimum kWh performance guarantees for the first three years after commissioning;
- equipment warranties and guarantees; and
- a detailed O&M plan for the first three years (scope of Bidder) and a plan for the subsequent years, including decommissioning of the system at the end of life (scope of Buyer).

The estimated aggregated system size is **approximately [XX] MW**.

In response to this RFP, each Bidder that chooses to participate should prepare, complete and submit a:

1. **Bid Submission Letter** (see [Appendix A](#));
2. **Proposal Summary:** Include Bidder Qualifications and Experience, a summary of Technical Proposal and Financial Proposal, and Additional Attributes of the proposal;
3. **Proposal Data Collection Template:** With bids for **all** sites (see spreadsheet template [here](#));
4. **Technical Proposal:** Include all technical details of the Project (see [Appendix B](#));
5. **Financial Proposal:** Include all financial details of the Project (see [Section 4](#)); and
6. **Proof of corporate licenses / list of subcontractors** (if any)
- 7.

Failure to complete and submit any of the above may disqualify a bidding company.

Proposals will be evaluated based on company experience, quality of designs, and pricing of the offerings. **All proposal submissions must be submitted no later than 11:59pm [time zone designation] on [Date]**. All bids will be considered firm and final and good for at least 90 days after the RFP close date.





## 2 Bid Submission Process and Conditions

The following is a tentative RFP process timetable. Timing is subject to change at the Buyer's discretion:

[Date 1]	<b>RFP Issued</b> ("T" date)
[Date 2]	Bidders submit an Intent to Bid notification email (I+ 1 week)
[Date 3]	Bidders confirm site visit attendance (I + 2-3 weeks)
[Date 4]	Site visits by Bidders (I + 4-5 weeks)
[Date 5]	Deadline for Bidders' question submittal (I + 6 weeks)
[Date 6]	Answers released. Online question & answer forum (I + 7 weeks)
[Date 7]	<b>Deadline for Submittal of Proposals</b> (I + 9 weeks ("D" date))
[Date 8]	Proposal evaluations / interviews (D + 2-5 weeks)
[Date 9]	Select and notify successful Bidders (D + 5-7 weeks)
[Date 10]	Parties convene and begin contract negotiations

### 2.1 Site Visits

All RFP respondents are encouraged to participate in site visits. Data gathered during the site evaluation by Bidders is used to ensure that there will be no change orders or unexpected costs once a project has been awarded. Bids submitted by firms that have not conducted site evaluations may be scored lower or discarded. A list of dates and times for on-site technical evaluations is listed below.

Strict safety and COVID-19 precautions must be adhered to and are the responsibility of participants.

Bidders participating in the site visits must send an email to [point-of-contact email address] to confirm their planned attendance, including: (1) a list of names of the firm's representative(s) performing the site evaluation, and (2) a copy of the representative's government-issued identification, no later than [Date and Time].

**Table 2: Site Visit Locations and Dates**

Company Name	Address	Date/Time
		DD/MM/2022 2:00 – 4:00pm

## 2.2 Requests for Information and Questions

Bidders may submit, via [email address] questions and requests for information regarding this RFP **no later than [Date]**. Questions will be addressed, and all responses will be issued, to all Bidders simultaneously. Any attempt by a Bidder to contact any other persons at the Buyer regarding this RFP may result in disqualification of the Bidder.

## 2.3 Online question & answer forum

The Buyer will host an online question and answer forum on the date listed above to review site characteristics, imagery, data, and other information. Bidders interested in attending must contact [email address] with the SUBJECT heading “Online question & answer forum” **no later than [Date]**. Bidders do not need to attend this forum for their proposal to receive equal consideration.

## 2.4 RFP Due Date

Bidders shall submit proposals to the Buyer, by uploading their materials via this [link to either 1) online site or cloud-based shared folder for bid submission or 2) insert an email address], **no later than [Date]**. Proposals shall be in an electronic format.

## 2.5 Proposal Interviews

After bids have been submitted and evaluated, interviews with selected Bidders shall be conducted. The purpose of these interviews is to confirm the information provided in proposals submitted by the Bidder(s), and to allow the Bidder(s) to respond to the questions from Buyers. Upon completion of interviews and proposal evaluations, the Buyers may issue a Bidder an **Intent to Award** and enter bilateral contract negotiations.

## 2.6 Award

Any contract(s) for this Project may be awarded to the qualified Bidder(s) who is able to effectively negotiate terms for the Project that provide the “best value” to the Buyer as determined solely by the Buyer. The Buyer reserves the right to reject any or all proposals or any part of a proposal and to otherwise determine which, in their sole judgment, best meets their needs.

Please note, this document and the RFP process do not constitute a guarantee by the Buyer to purchase any system or enter binding negotiations or contracts with any firms that respond to this RFP. Any, and all costs associated with a firm providing a bid in response to this RFP are the sole responsibility of the bidding company. Bidders submitting responses to this RFP do so with the understanding that the Buyer does not guarantee the award of any contract or work. The

Buyer reserves the right, in their sole and absolute discretion, to abolish, refresh, amend, or extend the scope or limitations of this Project.

### 3 RFP Submission Requirements

The last date for submitting all the documents online is [date, 11:59 PM, time zone designator]. Bids received after this date and time shall be disqualified. Bidders must provide the following proposal information in response to the RFP.

1. **Bid Submission Letter** (see [Appendix A](#));
2. **Proposal Summary**: Include Bidder Qualifications and Experience, a summary of Technical Proposal and Financial Proposal, and Additional Attributes of the proposal;
3. **Proposal Data Collection Template**: With bids for **all** sites (see spreadsheet template [here](#));
4. **Technical Proposal**: Include all technical details of the Project including but not limited to system design details (such as PVSyst reports, generation summary and single line diagrams), detailed specifications of equipment, workplan, etc. (see [Appendix B](#));
5. **Financial Proposal**: Include all financial details of the Project e.g. price dynamics, payment terms, incentives (if any), additional costs and any other financial considerations (see [Section 4 Proposal Terms](#)); and
6. **Proof of Corporate Licenses / List of Subcontractors** (if any)

#### 3.1 Bid Submission Letter

Please see [Appendix A](#) for the **Bid Submission Letter** template. Bidders must complete and submit the signed letter together with other requested proposal information.

#### 3.2 Proposal Summary

Please provide a document (must be in PDF format) that includes Bidder Qualifications and Experience, a summary of Technical Proposal and Financial Proposal, and Additional Attributes of the proposal.

#### Bidder Qualifications and Experience

- Description of company's history and relevant experience with similar projects in Vietnam and elsewhere;
- List of key project team personnel and a short biography for each; and
- Supporting documents showing financial stability and ability to execute the Project including but not limited to financial statements and calculated key financial numbers e.g. Net worth, Equity balance, Average annual turnover (the last 2 years), Earnings before interest, taxes, depreciation ("EBITDA") and Debt Service Coverage Ratio ("DSCR").

### **A summary of the Technical Proposal**

- Key technical details e.g. proposed site-specific PV system designs, key equipment, system size, energy production and performance guarantee

### **A summary of the Financial Proposal**

- Key financial details e.g. pricing, terms, and other expenses

### **Additional Attributes**

Additionally, bidders are encouraged to submit the following information. Furnishing such information may positively impact the outcome of the evaluation of their proposal.

- Data and description on their management team's gender equity or other priority indicators to demonstrate their firm's commitment to fair and equitable employment practices.
- An estimate of how many full-time equivalent ("FTE") jobs their bid would create, breaking out both short-term jobs (e.g., for physical system installation) and long-term (e.g., for O&M) jobs.
- Estimates of the project's total local economic benefit, along with a short explanation for their calculation. To conduct these calculations, the Bidder can utilize the National Renewable Energy Laboratory ("NREL")'s International Jobs & Economic Development Impacts ("I-JEDI") Model (available at <https://www.i-jedi.org>). If using I-JEDI, please include a full output of the I-JEDI program.
- Articulation of the Bidder's human rights due diligence processes to identify, prevent, mitigate, and account for how each addresses the impacts of its activities on the human rights of individuals directly or indirectly affected by their supply chains, including the prospect of forced-labor in the manufacturing of PV panels, consistent with the [2011 United Nations Guiding Principles on Business and Human Rights](#).
- Explanation of any key dynamics of the proposal that incorporates features of sector innovation such as new types of equipment or designs.

### **3.3 Proposal Data Collection Template**

Bidders must complete the **Proposal Data Collection Template** (see spreadsheet template [here](#)). Please complete all Turnkey-relevant tabs (Bidder Info, Turnkey Design & Rates, and Reference Projects). This spreadsheet is mandatory. All pricing and terms in the **Proposal Data Collection Template** must comply with the requirements listed in the **Scope of Work and Conditions** (see [Appendix B](#)). When completed, save the file with your company name included in the title and submit it with the rest of the RFP submission documents.

### **3.4 Technical Proposal**

Bidders must provide all technical details of the Project including but not limited to system design details (such as PVSyst reports, generation summary and single line diagrams), detailed specifications of equipment, workplan, etc. that fulfill the **Scope of Work and Conditions** (see [Appendix B](#))

### **3.5 Financial Proposal**

Bidders must provide all financial details of the Project e.g. price dynamics, payment terms, incentives (if any), additional costs and any other financial considerations. (see [Section 4 Proposal Terms](#))

### **3.6 Proof of Corporate Licenses / List of Subcontractors**

Bidding firms are asked to provide proof of adequate licensing in their submission documentation with this RFP. Those that do not may be disqualified. Only Bidders qualified to work in Vietnam and with a Civil Contractor License and/or Electrical Contractor License recognized as sufficient for conducting such business by the Government of Vietnam may be considered. Bidders that do not possess and provide proof of required licenses must include subcontractor information documenting such Licenses.

## **4 Proposal Terms**

The terms enumerated below are in addition to the technical terms listed in [Appendix B Scope of Work and Conditions](#).

### **4.1 Turnkey Proposal Terms**

Below is a summary of key financial components all proposals must include to be considered. The **Scope of Work and Conditions** in [Appendix B](#) describes the mandatory technical terms in greater detail.

- Clearly articulated total purchase price in VND.
- Clearly articulated total size of the system in kilowatts (kW)
- No additional O&M costs for the first **three** years after commissioning.
- Annual minimum kWh performance guarantees for the first three years after commissioning.
- Roof warranty for the first three years after commissioning.

### **4.2 No Feed-in Tariff (FIT) in Vietnam**

Currently, there is no policy mechanism whereby excess energy generated by the RTS plant can be exported onto the grid. Bidders should take this into account for system size optimization.

### **4.3 Guaranteed environmental attributes**

The Bidder shall forgo any claims to environmental attributes that may be generated from the Project under Vietnamese or international law throughout the lifetime of the project. These attributes include but are not limited to renewable energy certificates (RECs), carbon credits and other carbon offset mechanisms.

## **5 Proposed System Designs**

General provisions follow.

**5.1 Compliance**

The proposed PV systems must abide by all electrical, construction, safety, environmental and other laws governing Vietnam, as well as the requirements for permitting and interconnection established by authorities and utilities having jurisdiction.

**5.2 Further details**

Please see [Appendix B Scope of Work and Conditions](#). for further details on design, safety, and additional requirements.

**6 Project Sites Description**

Complete details on the sites, including building diagrams, single line electrical diagrams, and kWh usage and electricity price data will only be available via a shared drive folder to the Bidders’ contacts specified as a part of the Intent to Bid notification email.

Table 3 below is only a high-level summary of key data for the site(s). It provides the average monthly and hourly daytime demand estimates for each. Only a portion of the “Total Area” listed is likely to be suitable for a solar installation. If Bidders submit designs that are outside of the estimated “System Size Range”, they should be accompanied by drawings. Bids should attempt to cover as much of each site’s electricity usage as possible while providing positive economic returns for the Buyer within the constraints of current FIT and/or net-billing policies.

**Table 3. Summary of Installation Sites' Key Data**

Company Name	Location	Average Monthly Consumption [kWh/month]	Average hourly daytime consumption 10am – 5pm [kWh/hour]	Total Roof Area (m <sup>2</sup> )	System Size Range
[Buyer]	Site 1				
[Buyer]	Site 2				

**Disclaimer**

The Buyer has endeavored to ensure the information included in the above table, this RFP document, and the Proposal Data Collection Template is accurate and complete, but errors and omissions may have inadvertently occurred. The Buyer does not make any representations with respect to the site(s), including its suitability. The Bidders shall take full and sole responsibility for conducting any necessary due diligence in assessing the site(s) and its conditions to develop accurate proposals. The Bidders are encouraged to participate in the site visits to formulate accurate installable potential area, system sizes, and cost figures.

## 7 Evaluation of Submittals

Any Bid that is missing any requirement set forth in Section 3 may be disqualified. Additionally, the following criteria will be among those to factor into the selection process:

### 7.1 Competitive pricing

Bids will be scrutinized to assure that prices are highly competitive and are consistent with market conditions. The Buyers retain the sole discretion to determine issues of compliance.

### 7.2 Decision makers

The RFP evaluation is for the purpose of determining which Bidders are deemed responsible, qualified, and capable of performing the proposed work, and to determine which combination of technical and financial proposals offers the best value to the Buyer. Each Proposal will be subject to a detailed evaluation by the Buyer and/or external parties appointed by the companies. Evaluations will be based upon the submitted documents and any other information available. The Buyer retains the sole discretion to determine issues of compliance and to determine whether the Bidder is responsive and best qualified.

### 7.3 Prerequisite minimum qualifications

Proposals will be initially evaluated to determine which Bidders are deemed minimally qualified to perform the work based on technical capability and financial capacity. Only proposals from Bidders deemed to be minimally qualified will be included for further consideration. The Buyer has a right to reject proposals from any Bidders that does not meet the following prerequisite qualifications:

#### **Technical Capability**

1. The Bidder and its relevant team staff must possess all licenses and permits required by laws and regulations to perform the work under this RFP.
2. The Bidder must have experience performing relevant work similar in size and scope; locally or internationally.
3. The Bidder must have staff or partners capable of performing the work being proposed under this RFP.

#### **Financial Capacity**

1. The Bidder or its subsidiary shall be a registered company in Vietnam.
2. The Bidder shall submit the company's financial reports for the last two years. If the Bidder is new to Vietnam's market, it can submit similar financial reports from a relevant market in the region.
3. The Bidder must demonstrate the ability to acquire sufficient financing to fund the project.

## **7.4 Comprehensive Bid evaluation**

Proposals from Bidders deemed to be qualified will be evaluated by the Buyer based on several factors including, but not limited to the following:

### **Qualifications & Experience (25%)**

1. Strength of qualifications and experience of proposing firms and key personnel;
2. Strength of project references, customer satisfaction, completion of projects equivalent to those included in this RFP, and success in maintaining project budgets and schedules;
3. Financial stability and proof of funding for these projects with proven track record; and
4. Experience in the Vietnamese market.

### **Technical Proposal (25%)**

1. Preliminary system design is appropriate for site needs, accounts for site conditions, and is optimized to take advantage of the site conditions;
2. Projected energy production is realistic and appropriate for each facility;
3. Module, inverter, racking, and monitoring components are high quality, available, and have a strong track record and warranty coverage and reflect the Buyer's component specifications as per [Appendix B Scope of Work and Conditions](#);
4. Detailed plans on Engineering, Procurement and Construction ("EPC"), testing/commissioning, O&M, and decommissioning; and
5. Performance guarantee

### **Project Costs (40%)**

1. Total Turnkey Costs including O&M
2. Additional costs stipulated in the proposal or anticipated by the reviewer

### **Proposal Attributes (10%)**

1. Addresses requirements and preferences stated in the RFP
2. Includes documentation about local workforce preferences, job-creation estimates, gender equity overviews, supply chain human rights, etc.;
3. Incorporates innovation into the technology, design, and installation as part of the bid;
4. Demonstrates experience working with commercial or industrial projects; and
5. Proposal is clear, organized, detailed, professional, and complete.



## List of Attachments and Digital Files

1. Bid Submission Letter (see [Appendix A](#))
2. Proposal Data Collection Template (see spreadsheet template [here](#))
3. Link to cloud-based shared folder with building and electrical data and additional information for each site: [[Link here to shared folder with Buyer's data](#)]
4. Link to cloud-based shared folder for submissions: [[Link here to folder for Bidders' submissions](#)]

## Appendix A: Bid Submission Letter

[To be presented on Bidder's letterhead]

Date: \_\_\_\_\_

[Buyer]

[Location], Vietnam

To [Buyer Name]:

The undersigned (hereafter referred to as the Bidder) hereby furnishes the requested proposal information for the [RFP #] in accordance with the Scope of Work and Conditions and other procurement requirements specified in the RFP.

The undersigned has read and understands the proposal requirements and is familiar with and knowledgeable of the local conditions where the work is to be performed. The Bidder has read the RFP Instructions and the submission requirements and confirms that all the requirements of the proposal are submitted accordingly, unless otherwise specified by the Bidder. The undersigned understands and accepts the terms of the proposal requirements.

In addition to this Bid Submission Letter, this proposal includes the following:

1. Proposal Summary (containing Bidder Qualifications and Experience, a summary of Technical Proposal and Financial Proposal, and Additional Attributes of the proposal) - in PDF format;
2. Proposal Data Collection Template - in Excel format; ;
3. Technical Proposal;
4. Financial Proposal; and
5. Proof of Corporate Licenses / List of Subcontractors - in PDF format.

The undersigned agrees that this proposal shall remain firm and irrevocable within **ninety (90) calendar days** from the proposal submission date.

\_\_\_\_\_  
Signed

Date

## Appendix B: Scope of Work and Conditions

### B.1 Overview

The successful Bidder shall perform all professional planning, design, and EPC services for this project as necessary to install and operate & maintain the system for **three** years. The systems will be installed on the rooftops of the Buyers' facilities in [**names of individual site(s)**] in **Vietnam** ("site(s)"). The Bidder shall take all actions necessary to satisfy all applicable local, provincial, and national regulations and requirements, including but not limited to safety, environmental, and utility requirements.

The designs of the solar systems should consider the Buyer's electrical demand and load patterns, project cost, proposed installation sites, available solar resources, existing site conditions, proposed future site improvements, and other relevant factors.

The successful Bidder will be responsible for designing, engineering, procuring, constructing, insuring during installation, installing, testing, commissioning, operating, monitoring, maintaining the system for **three** years. The scope of services shall also include, but not be limited to securing: all permits, approvals, and interconnection rights from governing agencies; all labor; taxes; services; and equipment necessary to install fully operational PV systems. The Bidder is encouraged to provide plans for the sustainable disposition of end-of-contract equipment and materials.

The systems must conform to all relevant rules, regulations, and guidelines of the Ministry of Industry and Trade, including, but not limited to:

- **Law No. 28/2004/QH11** - The Electricity Law. (December 03, 2004);
- **Law No. 24/2012/QH13** - Law on amending and supplementing several articles of the Electricity Law. (November 20, 2012);
- **Law No. 50/2014/QH13** - Law on Construction. (June 18, 2014);
- **Law No. 67/2014/QH13** - Law on Investment. (November 26, 2014);
- **Law No. 77/2015/QH13** - Law on Organization of Local Administration (June 19, 2015);
- **Resolution No. 115/NQ-CP** - Resolution of the Government on special mechanisms and policies to support Ninh Thuan province in socioeconomic development and settlement of business and people's life in the period 2018-2023 (August 31, 2018);
- **Decision No. 13/2020/QĐ-TTg** - Decision on mechanisms to promote the development of solar power projects in Viet Nam (April 06, 2020);
- **Law No. 71/2020/QH14** - "New" Law on Investment (June 17, 2020);
- And any other related specific laws, policies, or regulations required by relevant Vietnamese government bodies.

Additionally, all systems must comply with the technical requirements of EVN and its relevant local subsidiary power companies.

The online link provided to the Bidders contains site-specific information that provide context and may aid Bidders in the development of their proposals. Bidders are responsible for requesting any additional information they deem necessary to fully respond to the RFP.

## **B.2 PV Equipment Requirements**

The following performance criteria shall be met for the proposed systems:

- PV modules will be Tier I bankable modules; there is no preference among monocrystalline, polycrystalline, or thin-film type modules.
- All PV modules must be procured from the same brand manufacturer and be of the same wattage rating and model. Solar cell efficiencies of more than 16% or module efficiency of more than 15% are required for any systems permitted to export power as part of the FIT, as pursuant to Decision No. 13/2020/QD-TTg. Higher efficiency equipment is preferred.
- The STC-rated power value shall be entered into PVWatts (<http://pvwatts.nrel.gov/>) or a similar tool using the nearest weather file to determine estimated energy delivery in kWh AC. A default value for system losses of 14% shall be used unless another value can be justified.
- All proposed/implemented PV array locations shall be designed to be shade-free from 9AM until 3PM (solar time). Bidders shall provide documentation of shading calculations for exterior extents for each proposed array. These calculations may be modified for shading obstructions that will be removed and mitigated as part of the project. Two examples of acceptable documentation include: (1) sun path diagrams for exterior array locations, or (2) *SunEye™* measurements.
- The PV systems shall comply with all applicable codes including those of Vietnam's government, the International Electric Code ("IEC") or an equivalent standard, and all applicable EVN requirements and for interconnection and the solar FIT.
- Major electrical equipment such as inverters, transformers, and switchgear shall be installed in code-compliant enclosures. Components shall be located indoors in areas identified in consultation with the Buyer in ventilated (not air-conditioned) utility rooms in compliance with codes and where space allows. If located outdoors, equipment shall be in enclosures appropriate for the conditions and code-compliant and protected from direct exposure to the elements (sun, rain) and debris such as leaves or dirt.
- Necessary equipment to connect the main distribution boards to the transformers shall be included within the scope of the Bidder.
- Procurement and installation of the combiner boxes and inverters shall be from a top-tier supplier that provides technical support. Equipment will include mounting and cabinets and will preferably be SCADA compatible.
- All PV hardware and rack components shall be made of corrosion resistant material such as stainless steel, aluminum, or hot-dipped galvanized steel.
- The systems shall utilize only copper wire (not aluminum) unless the Buyer, EVN, and authority having jurisdiction agree to other materials. Cabling will be DC-rated, UV, and heat resistant, and preferably locally sourced. Wire shall not lie exposed directly on roof surface or floors. Due to potential damage from rodents and future digging, power cables shall not be buried directly without conduit.
- Mounting and racking equipment must have a lifetime to match the contract length and must have a TÜV Rheinland certificate or equivalent.

The Bidder's proposal must provide the following as part of a professional yield calculation for the proposed system:

- System size (kW DC)
- Array slope/tilt and magnetic azimuth
- Documentation of shading calculations for any expected shaded areas of the PV array
- Guaranteed energy delivery per year (kWh/year)
- Guaranteed energy delivery throughout contract lifetime (kWh)

### ***B.3 System Design Requirements***

The PV systems shall be limited to the area that has been identified as available for that purpose in consultation with the Buyers. The systems should be designed to provide power that coincides with the demand characteristics of the facility. The Bidders are ultimately responsible for performing their own field investigations and determination of optimal PV system design.

Bidders should optimize system sizing to take into account that there is currently no capacity to sell to the grid via a net metering mechanism.

- 1. Detailed Premises Information:** The Bidders shall ensure that the proposed PV project is compatible with all aspects of the building. This includes, but is not limited to electrical codes and standards, structural codes and standards, roof warranty (if applicable), lightning and fire protection, as well as security and other building operations. The PV arrays and balance of system components (inverters, combiners, switchgear, conduit) including racking, mounting equipment, and power conductors shall not interfere with roof drains, expansion joints, air intakes, existing electrical and mechanical equipment, existing antennas, lightning protection systems, or any other building equipment.

The Bidders must assess the structural integrity of the roof and determine the most appropriate design for the PV mounting system to maintain structural integrity and meet applicable codes and standards. If the Bidder determines that the roof requires major alteration or repair, the successful Bidder and Buyer will negotiate to make alterations / repairs or to omit installation on areas that require major alteration or repair. The successful Bidder shall be responsible for alterations or repairs, and of all damage to the roof during construction.

- 2. Electrical Modifications and Interconnections:** The successful Bidder shall be responsible for the electrical design, including voltage and phase configuration, inverter-side low voltage boards, and the point of interconnection to the building electrical distribution system. The successful Bidder is also responsible for proper circuit sizing, overcurrent protection, and coordination with existing over-current and voltage regulation schemes, including lightning protection, beyond the point of interconnection.

The successful Bidder will be responsible for interconnection of the PV system with the building electrical distribution system and the grid's local electric distribution system. This includes performing all design work, coordinating with the Buyer, the local distribution company, and EVN as necessary, and providing all necessary equipment.

The successful Bidder shall coordinate with EVN to ensure that the project satisfies all EVN criteria and requirements for interconnection of the project to the EVN electric distribution system. This includes coordinating all negotiations, meeting with EVN, performing power system studies and design reviews, and participating in any needed interaction between EVN and the Buyer. The successful Bidder will be responsible for preparing required submissions for obtaining the written approval from EVN as necessary.

The successful Bidder shall coordinate with over-current protection schemes including coordination relays, fuses, etc. The PV system shall enable the protection system to operate as intended under grid fault conditions. The successful Bidder shall manage interconnection and startup of the project in coordination with the Buyer, local distribution company, and EVN.

3. **Monitoring:** Monitoring of system performance shall be integrated into the existing facility's automated management system (if applicable); optionally, the Bidder may separately propose a dedicated software system connected to the hardware. Monitoring equipment shall:
  - A. be compatible with software of the relevant component suppliers;
  - B. provide a data acquisition and display system that allows the operator to monitor, analyze, and display historical and live solar electricity generation data;
  - C. enable the Buyer unrestricted access to that data.

The regularly collected data should reflect, but not be limited to, the following:

- A. System performance;
- B. System availability;
- C. Average and accumulated output;
- D. Excess energy sold to the grid via the FIT (if applicable);
- E. Capacity factor; and
- F. Environmental conditions (solar irradiance, ambient air temperature, etc.).

The monitoring system for environmental conditions may be from remote sensing (high resolution, site-specific satellite data) and may be subscription-based instead of on-site measurements.

For any connection to the Buyer's intranet and/or internet networks, the successful Bidder shall ascertain and comply with all cyber security requirements prior to operation.

4. **Codes, Standards, and Regulations:** The successful Bidder and its partners and subcontractors must comply with applicable codes, standards, and requirements as accepted by local, provincial, and national authorities having jurisdiction for equipment, building, electrical, interconnection, mechanical, fire, seismic, and wind uplift considerations. In addition, the Bidder is exclusively responsible for obtaining and maintaining all required government permits, licenses, approvals, and/or variances,

current or future. It is the responsibility of the Bidder to know the laws and regulations to which the construction, and operation, of the PV system is subject.

Only products that are listed, tested, identified, or labeled UL, FM, ET (or equivalently certified) shall be used as components in the project. Non-listed products are only permitted for use as project components when a comparable usable listed component does not exist. Non-listed products proposed for use as components must be identified as such in all submittals. Bidders may be asked to provide evidence that the proposed technology and equipment would meet or exceed all currently applicable and proposed safety and interconnection standards in Vietnam.

5. **Construction, Commissioning and Test Period:** The Bidder must provide an initial project construction schedule as part of its proposal, providing details of work phases clearly marked with starting and finishing dates. The Buyer reserves the right to terminate the project due to significant or unreasonable delays. Criteria for penalty, remedy period, and termination clauses will be negotiated between Buyer and the successful Bidder.

Prior to the installation of the system, the successful Bidder will verify inspection of the roof and its structure to ensure they are in a condition appropriate for safe installation. The Bidder is responsible for any structural reinforcements necessary.

During construction, the successful Bidder will be responsible for management of all delivered materials. A temporary storage location will be provided for the duration of the work period.

The successful Bidder will perform commissioning and acceptance testing of the system prior to beginning operations. During the start-up the Bidder shall observe and verify each system performance test. Required commissioning and acceptance test services include: visual inspection, array testing, and whole-system performance testing.

The successful Bidder shall provide training and a training plan for designated Buyer personnel on the equipment that they might encounter and in operations related to the PV system that they might need to perform in emergency situations.

6. **O&M:** The successful Bidder will be responsible for all aspects of operating and maintaining the PV system to meet the delivery requirements of the contract, including continued compliance with applicable code requirements and safety *for a period of three years*. A detailed O&M plan shall be submitted to the Buyer for O&M beyond the three year period and until the end-of-life of the Project.

The successful Bidder shall inspect the system on appropriate intervals but not less than twice-per-year and perform preventive maintenance to ensure the PV system is intact, safe and functioning properly. Preventive maintenance work includes periodic equipment inspections, cleaning, replacement of filters, test, calibrations, and other preventive maintenance tasks. Such tasks include those specified by the original equipment manufacturer to ensure that the system and its components operate as intended. The successful Bidder will also perform emergency maintenance and repair work necessary: (1) to correct any existing or imminent failure, (2) to protect the safety or health of the facility occupants, or (3) to prevent adverse impacts on property.

The successful Bidder shall maintain adequate and necessary records of inspections and maintenance, which will be made available to the Buyer throughout the duration of the contract

- 7. Performance Guarantee:** The Bidder must provide a performance guarantee for three years past the commissioning date. The Bidder must compensate for the shortfall in the case that the performance guarantee is not met. The compensation shall be calculated as per the formula:

*Compensation in VND =*

*Annual Shortfall in Generation kWh \* Average Grid Price for that year in VND/kWh*

NOTE: The average grid price in any year may be obtained from the regulated tariff rate card of the utility.

- 8. Health and Safety:** The successful Bidder shall comply with all applicable laws pertaining to the health and safety of persons and property, including handling and storage of hazardous materials, disposal of hazardous wastes and substances, and disposal of construction waste. The Buyer believes that safety is paramount, and a commitment to safety must be demonstrated by the Bidder including plans to manage its subcontractors. The successful Bidder must support the development of fire and safety plans, and provide safety training to personnel on the site, including impacted Buyer's employees, partners, and sub-contractors covering all relevant system activities throughout the various project phases.

The Bidder's personnel and subcontractors working within the site premises must strictly adhere to the applicable safety and security rules and procedures.

All equipment components must be listed or recognized by an appropriate safety testing laboratory and meet existing facility structural and fire safety requirements.

Compliance with Environmental Regulations: The Bidder shall comply with applicable local, provincial, and national environmental regulations, including but not limited to development of relevant environmental studies and mitigation plans, and management of hazardous materials, noise pollution, and stormwater.

- 9. Insurance and Warranties:** The Bidder must take extra care during the installation period to ensure safety and security of the site, their personnel, and their customers. The Bidder shall take an insurance policy covering all risks and liabilities, including Third Party Liability, during the installation period and O&M period, to cover any damages to the Buyer's property and facilities or any delay or losses of the Buyer's business operations that may occur. The Bidder shall provide documentation of such a policy before commencing the installation.

The Bidder shall include a roof warranty (e.g., where penetrations are made) covering parts and labor.

- 10. Renewable Energy Credits ("RECs") and other Incentives:** The Buyer retains all rights to all RECs and other environmental attributes of the generated electricity, including the ability to retire credits, as allowed by Vietnamese law.