



## On-site Solar Procurement Site Screening Checklist User's Guide for Commercial and Industrial Facilities in Vietnam

Solar photovoltaic (PV) costs have reduced dramatically in recent years. As utility electricity tariffs increase in Vietnam, commercial and industrial (C&I) facilities, including manufacturers in the apparel industry, have clear and attractive opportunities to save money by sourcing a portion of their electricity consumption from on-site PV power generation.

This user's guide is not designed to be read on its own but instead is to support the Microsoft Excel file, site screening checklist tool [here](#). Together, the tool and this guide provide key questions for C&I facility owners and operators to consider when exploring on-site PV options. The tool and guide are not intended to be comprehensive resources but as high-level introductions to significant factors that can impact whether a business' facility has the optimal conditions for cost-effective procurement of on-site PV.

If you decide based on this checklist that on-site PV interests your business, the next step would be to conduct a more detailed technical and engineering pre-feasibility assessment. The Clean Energy Investment Accelerator (CEIA) has also created a tool [here](#) for apparel companies to conduct a rudimentary pre-feasibility assessment as well. Should that assessment leave your company interested, CEIA is in the process of creating a set of templates and tools to assist you through the entire request for proposal (RFP) process... check back soon or reach out to [info@cleanenergyinvest.com](mailto:info@cleanenergyinvest.com) for further assistance.

### Additional information for Checklist questions

The following sections match up with their respective sections on the checklist itself. The information below offers a more detailed explanation of some of the checklist questions regarding financing options for on-site PV electricity in Vietnam. The information below also provides a slightly deeper look at on-site PV procurement considerations.

#### I. General Site Information

This is the first section of the Screening Checklist and comprises of general questions about the person using this checklist ("user") and the site the user is evaluating. Collecting this information upfront is intended to help track this site-assessment process within your business. This way, those who later-on receive a completed checklist will know who has collected the data and filled out this form. The information asked are: Site Name, Name of the data collector, their email, contact, and facility address.

#### II. Rooftop PV Installation Knowledge & Goals

This second section encourages you to think about the reasons behind your consideration to procure rooftop PV and what goals you want to achieve with this project. It further asks about your previous experience buying rooftop PV, if any.



### Question 1: What is the primary goal for pursuing renewable energy solutions?

The purpose of this question is to understand your prime motivation to consider this project. The reasons can be economic ones, or broader socio-environment ones. Either way, understanding this helps tailor the business model preferences.

### Question 2: Has your company procured a rooftop PV project in Vietnam before?

The purpose of this question is to understand your previous experience of dealing with solar procurements. This will help us calibrate our support to match your level of in-house expertise.

There are three options that you could use to answer the question: yes, no and not sure. If your answer is not sure, we recommend you talk to your advisor under this program. If the answer is yes, we could tailor the program to specifically draw of or build upon your experience. If the answer is no, this would not limit your ability to adopt rooftop solar PV in any way.

### Question 3: Are you interested in procuring rooftop PV or off-site renewable energy options?

The purpose of this question is to gauge your interest in adopting the type of solar PV (on-site or off-site). We understand that there may be limitations to install a rooftop solar PV system on your roof, or perhaps you consider it too risky. However, there are specific policy constraints for off-site solar procurement, which is yet to be allowed under Vietnam law. Therefore, the only viable option at this moment is procuring energy from an on-site rooftop solar PV system.

### Question 4: What percentage of your total power needs do you want to support through renewables?

The purpose of this question is to understand your energy requirements from solar PV. This could be because of a compelling economic reason or might be due to environment and corporate governance mandates from your company. Either way, understanding this baseline helps us design the size of the system to meet your needs.

### Question 5: When would you like to have the PV system installed by?

The purpose of this question is to understand the urgency (if any) of installing the rooftop solar PV system. Typically, systems take anywhere between 6 months to one year to be commissioned. This also helps project planners align expectations as this may have ramifications for your financial accounting and/or other requirements.

### Question 6: Do you have or willing to acquire, significant experience in energy procurement? Or do you have an in-house energy manager?

This question is linked to question 2, but more specifically looks at your prior experience in energy procurement (and not just solar PV). If the answer is yes, then you must involve your procurement team in this process.



## Question 7: Renewable Energy Certificates

This question helps you understand the current status of Renewable Energy Certificates (RECs) in Vietnam, in case that may impact your interest in procuring rooftop PV.

### About RECs

RECs represent the non-power attributes of renewable energy (RE) generation. Typically, one REC equates to the “green” attributes of 1 megawatt hour (MWh) of power generated from the RE system. RECs can be sold “bundled” together with the power under a power purchase agreement (PPA). Vietnam does not have a nationally sanctioned REC registry or market and there have been limited private REC deals to-date. However, if they corporate energy users to make verifiable claims about their utilization of RE, it is important for such a business procuring RE to be careful to ensure they will retain ownership of the RECs especially if they sign a PPA.

## III. Commercial Viability

This third section helps you consider dynamics that could inform the commercial viability of procuring a rooftop PV system for your facility.

### Question 1: Is long term price certainty of electricity important to you?

One of the positive attributes of rooftop PV is that it can help insulate your company from external price shocks. Whether paying up front for a Turnkey system, or contracting for a PPA, rooftop PV can hedge your input energy costs against price uncertainties over a long period of time. This question aims to help you understand how rooftop PV might assist your company in long-term cashflow planning.

### Question 2: What is your company's most significant challenge in buying renewable energy in Vietnam?

In general, most potential buyers who decide against investing in rooftop PV, do so for a few common reasons. Nonetheless, most of these reasons can be mitigated if the buyer is sufficiently motivated to find the mechanisms to do so.

### Question 3: If your company decides to procure a rooftop PV system, which of the following options is your company most likely to proceed with?

There are two primary models for procuring rooftop PV in Vietnam. You can either pay for the system upfront and own it outright (known as **Turnkey Purchase**), or someone else pays to install the system on your roof, and you can simply buy as much energy from them that you can consume (known as a **Third-Party PPA**). The difference is similar to owning a car versus using a ride hailing app service to meet your mobility needs. Below are general summaries of the two models. Table 1 highlights significant differences between them:

1. Turnkey purchase:
  - Also known as: “Capital Expenditure” (CAPEX) purchase, or “balance sheet financing”.
  - Your company finances and owns the PV system assets.

- Obtaining a corporate loan from a bank may be an option if your company has an existing credit line.
2. Third-party PPA:
- Also known as an OPEX contract, PV-as-a-service, ESCO, or “Build-Own-Operate”.
  - Your company does not own the PV assets. Instead, the PV vendor provides the financing and owns and operates the assets for the lifetime of the contract.
  - PPAs contracts with PV vendors vary in length; typically, 10-25 years.
  - Vendors may offer a “buy back” option where you can purchase the system outright before the end of the PPA. And/or you can have a “Build-Own-Operate-Transfer” (BOOT) PPA clause, allowing you to buy the system at a discount at the end of the contract.


*Table 1. Vietnam Rooftop PV Procurement Models' Key Differences*

Characteristics	Turnkey Purchase	PPA
Financing	On customer's balance sheet	PV developer (or third-party) finances PV system
Operations and Maintenance	Requires separate contract with PV developer or third-party O&M provider	Cost included in PPA price
Equipment warranties	Not guaranteed, but possibly negotiated with PV developer	Cost included in PPA price
Performance Guarantees	Not guaranteed, but possibly negotiated with PV developer	Cost included in PPA price
Permitting & interconnection licenses	Not guaranteed, but possibly negotiated with PV developer	Responsibility of PV company
Insurance included	Not guaranteed, but possibly negotiated with PV developer	Yes
Lowest cost per kWh over PV system lifetime	Yes	No
Potential for Year-1 cash-flow positive	No	Yes

#### Question 4: Does the factory's operational schedule and electricity consumption align with PV production?

This question is an important design criterion that can significantly impact the economic benefits from a rooftop PV system.

A PV system does not generate electricity uniformly throughout the day and across the year. PV generates more power when there is more sun. Thus, if your facility's electricity requirements coincide with times of the day and year with your rooftop's greatest exposure to the sun, then you will likely be able to maximize utilization of PV generation.



On the other hand, if the facility consumes significant power during non-solar hours (for example: between 6 PM to 6 AM), then you won't be able to offset most of the power consumed during this period by PV, no matter how large a PV system you install.

You may consider solar generation to be between 9 AM to 5 PM on a sunny day. You would also have to consider that solar PV generation drops significantly during the monsoon season. Therefore, it would be prudent to think of seasonal variations in your electricity requirements. Understanding your facility's load profiles is a crucial input to determine a PV system's cost-effectiveness.

#### IV. Rooftop PV Site Characteristics

Question 1: What is the facility's total rooftop space (in m<sup>2</sup>) where PV panels can be placed, and not be shaded by trees, buildings, or other obstructions?

This question helps you understand how much roof space would be available for a rooftop PV installation. The size of the system determines how much renewable electricity it can produce, and in turn, how much you can offset, which also determines economic returns and environmental impacts.

At this stage, it might be good to think of roof space you would want to reserve in the future for any other use. For example, is your company considering installing rooftop exhaust infrastructure, a green roof, any solar thermal equipment, or any future vertical building expansion?

Secondly, do you know if there are any high elevation buildings planned for construction in your facility's vicinity (especially to the south of your facility). Such buildings might cast shadows once constructed. Overall, understanding your shadow-free roof area is of critical importance to the long-term performance and cost-effectiveness of a PV system.

Question 2: Is the roof structurally sound?

This question helps us understand if your building's roof can support the additional weight from a PV system. Each module weights anywhere between 22-28 kg. In addition, there is the weight of the steel structures, cables, screws and other ancillary equipment. Make sure to consult your facilities manager, civil engineer and/or architect to ascertain that the roof can indeed accommodate the additional load.


PV systems add up to 4.5 kg per m<sup>2</sup> the dead load of a roof, and up to 20.5 kgs at specific attachment points. If a ballasted system is installed on a flat roof, it may add up to 45 kg per m<sup>2</sup> to the roof's dead load. Your roof should be capable of handling anywhere between 10-15 kg per m<sup>2</sup>.

Question 3: What is the roof's pitch?

The roof's pitch is the angle at which the roof is inclined to the horizontal. This is once again a very important design consideration and influences both the input cost as well as the energy production from the rooftop PV system. Ideally a PV system is inclined at an angle close to the latitude of the facility.

Question 4: Are there rooftop units (Heating, Ventilation, and Air Conditioning (HVAC)) that cause shading?

This question is related to Question 1. Please consider both existing structures and structures that might potentially come up over time. For instance, if you company is considering air conditioning, then the



outdoor units of the air conditioner might be placed on the roof and could create shading for pre-existing panels.

Question 5: Is your roof or part of the building structurally connected to an adjacent building/roof?

This question helps you think about whether any permission might be required from neighboring buildings. This is also the case when there are shared roof rights in some buildings with multiple occupants.

Question 6: Is the roof area free of particulate matter discharge that may produce dust or soiling?

Are you located in a particularly dusty region? Does your facility emit particulate matter? This is important because dust can play a significant role in reducing PV generation. Or it would increase the frequency of cleaning which would drive up O&M costs.

Question 7: What type of installation(s) are you thinking of?

This question is related to question 3 and would help us design the system to suit your needs.

## V. Building and Site Characteristic

Question 1: Does your company own the building?


This question helps you understand the legal authority you have to install PV on the roof and the building. In the event you own the building, then the legal paperwork and permissions required are greatly simplified. In the event your building is leased, then specific contracts and permission may be required for the installation. This would mean additional time and potential costs.

Question 2: Does your factory currently have at least 10+ years lease available?

This question is linked to the previous one and helps us tailor the model (CAPEX or OPEX) to your needs. Typically, one would need to have a building lease at least equal to the duration of the contract with the third party PPA.

Question 3: Does your building possess the following permits in compliance with local building codes?

In the apparel industry, fire-related hazard is a significant risk as it can result in property damage or even fatal accidents. As procurement of rooftop PV is still relatively new in Vietnam, equipment and installation standards are still under development. It is therefore critical for the site owner to understand the risks of a particular fault occurring and the severity of the consequences ensued. Fire risk analysis can be conducted by insurance companies or by the installers and operators of PV systems.



It would be good to involve your facility's health and safety personnel during early stages to ensure proper fire risk analysis and mitigation from PV system installers.

For additional information or to learn more about the Clean Energy Investment Accelerator (CEIA), visit [www.cleanenergyinvest.org](http://www.cleanenergyinvest.org) or contact us at [info@cleanenergyinvest.org](mailto:info@cleanenergyinvest.org).

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