REQUEST FOR QUOTATION (RFQ)
(Services)

	DATE: 30-Nov-2022
UNDP Timor-Leste Procurement Services Unit, **UNDP – Timor-Leste**	**REFERENCE:** **UNDP/TLS/RFQ/2022/009** UNDP (UN House) Timor-Leste CO Provision of O&M service for Solar Grid-Tied System

Dear Sir / Madam:

We kindly request you to submit your offer for the provision of O&M services for the **Grid-Tied Solar System installed in the UN House Timor-Leste** as detailed in Annex 1 (TORs) of this RFQ.

Please take note of the following important deadlines (**based on Timor Leste time**):

1. Confirmation of participation in Site Visit: 06-Dec-2022
2. Site Visit: 09-Dec-2022 – time to be advised
3. Request for Clarification: **06-Dec-2022**
4. Offer Submission: **15-Dec-2022** before 04:00 PM Timor Leste Time

and via ☒*e-mail:*

United Nations Development Programme
bids.tp@undp.org

It shall remain your responsibility to ensure that your offer will reach the address above on or before the deadline. Offers that are received by UNDP after the deadline indicated above, for whatever reason, shall not be considered for evaluation. If you are submitting your offer by email, kindly ensure that they are signed and in the .pdf format, and free from any virus or corrupted files.

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

Project Title:	UN House Timor-Leste - Provision of O&M service for Solar System	
Delivery Terms [INCOTERMS 2020] *(Pls. link this to price schedule, Annex 1 – Section **Error! Reference source not found.**)*	☒**DAP**	
Customs clearance [1], if needed, shall be done by:	☒UNDP	
Exact Address/es of Delivery Location/s (identify all, if multiple)	United Nations Development Programme Country: Timor-Leste City: Dili Address: UN House, Caicoli Street GPS Coordinates: -8.56079, 125.57384	
Delivery Schedule	☒Required	
Mode of Transport	☐ AIR	☒LAND
	☒SEA	☐OTHER
Currency of Quotation	☒United States Dollars	
Value Added Tax on Price Quotation	☒ Must be exclusive of VAT and other applicable indirect taxes	
After-sales services required	Please ref to TORs	
Deadline for Request for Clarification	**COB (TLS time): 06-Dec-2022**	
Deadline for the Submission of Quotation	**COB (TLS time): 15-Dec-2022 before 04:00 PM**	
All documentations, including catalogues, instructions and operating manuals, shall be in this language	☒ English	
Mandatory requirements for bid submission	1. Site visit	
Period of Validity of Quotes starting the Submission Date	☒ 120 days	

[1] *Must be linked to INCO Terms chosen.*

	In exceptional circumstances, UNDP may request the Vendor to extend the validity of the Quotation beyond what has been initially indicated in this RFQ. The Proposal shall then confirm the extension in writing, without any modification whatsoever on the Quotation.
Documents to be submitted	THE FOLLOWING SHALL BE INCLUDED IN THE BID SUBMISSION: **1) TECHNICAL OFFER.** Bidders are required to provide the following as part of the technical offer, presenting 10 separate attachments: a. Service scope and detailed list of activities to be executed in the provision of the Operations and maintenance service. b. Comprehensive details for procedures to be carried out during periodic inspection. c. Detailed escalation procedures and plan of action in case of system troubleshooting and clear definition of roles and responsibilities; d. Service targets and service measurements procedure including expected response and resolution time for the most typical issues; e. Bidder's Statement Regarding Deviations/Non-Compliance (as per template provided in Appendix I in the ToR); f. A detailed company profile including documentary evidence of similar services performed; g. CVs of the project focal point/focal points; h. Details on freight, logistics and installation plan in terms of timelines, delivery time and production time if applicable; i. Proposed work plan and approach criteria in relation to the requirements in the terms of reference (TORs); j. Risk assessment and Mitigation plan; **2) FINANCIAL OFFER.** a. Price and Delivery Schedule Form: Fully completed and duly authorized (see Annex 1, Section **Error! Reference source not found.**). b. 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.
Payment Terms	Total Acquisition

	☒ Upon complete delivery of the service every 6 months after the delivery of preventive maintenance checklist and report
Evaluation Criteria	☒Technical responsiveness/Full compliance to requirements and lowest price ☒Full acceptance of the UNDP Contract General Terms and Conditions ☒Full compliance to delivery of documentation in the required format
UNDP will award to:	☒ One and only one supplier
Type of Contract to be Signed	☒ Purchase Order
Conditions for Release of Payment - Acquisition	Delivery of annual reporting on system performances and delivery of 2 maintenance report per year Full compliance with RFQ requirements and of the agreed service targets
Annexes to this RFQ	☒ Terms of Reference (Annex 1) ☒ System original documentation (Annex 1: Section 2.3) ☒ System component datasheets and as built electrical plans (Annex 1: Section **Error! Reference source not found.**) ☒ UN Official Holidays (Annex 1)
Contact Person for Inquiries (Written inquiries only)[2]	Email: ulderico.zemachado@undp.org and copy itm.green.energy.team@undp.org Any delay in UNDP's response shall be not used as a reason for extending the deadline for submission, unless UNDP determines that such an extension is necessary and communicates a new deadline to the Proposers.

Services offered shall be reviewed based on completeness and compliance of the quotation/proposal with the minimum specifications described above and any other annexes providing details of UNDP requirements.

The quotation/proposal that complies with all the specifications, requirements and offers the lowest price, as well as all other evaluation criteria indicated, shall be selected. Any offer that does not meet the requirements shall be rejected.

[2] *This contact person and address is officially designated by UNDP. If inquiries are sent to other person/s or address/es, even if they are UNDP staff, UNDP shall have no obligation to respond nor can UNDP confirm that the query was received.*

Any discrepancy between the unit price and the total price (obtained by multiplying the unit price and quantity) shall be re-computed by UNDP. The unit price shall prevail, and the total price shall be corrected. If the supplier does not accept the final price based on UNDP's re-computation and correction of errors, its quotation will be rejected.

At any time during the validity of the quotation, no price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted by UNDP after it has received the quotation. 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.

Any Purchase Order that will be issued as a result of this RFQ shall be subject to the General Terms and Conditions attached hereto. The mere act of submission of a quotation implies that the vendor accepts without question the General Terms and Conditions of UNDP.

UNDP is not bound to accept any quotation, nor award a contract/Purchase Order, nor 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.

Please be advised that UNDP's vendor protest procedure is intended to afford an opportunity to appeal for persons or firms not awarded a purchase order or contract in a competitive procurement process. In the event that you believe you have not been fairly treated; you can find detailed information about vendor protest procedures in the following link: https://www.undp.org/procurement/business/protest-and-sanctions

UNDP encourages every prospective Vendor 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.

UNDP implements a zero tolerance on fraud and other proscribed practices and is committed to identifying and addressing all such acts and practices against UNDP, as well as third parties involved in UNDP activities. UNDP expects its suppliers to adhere to the UN Supplier Code of Conduct found in this link : https://www.un.org/Depts/ptd/sites/www.un.org.Depts.ptd/files/files/attachment/page/pdf/unscc/conduct_english.pdf

Thank you and we look forward to receiving your quotation.

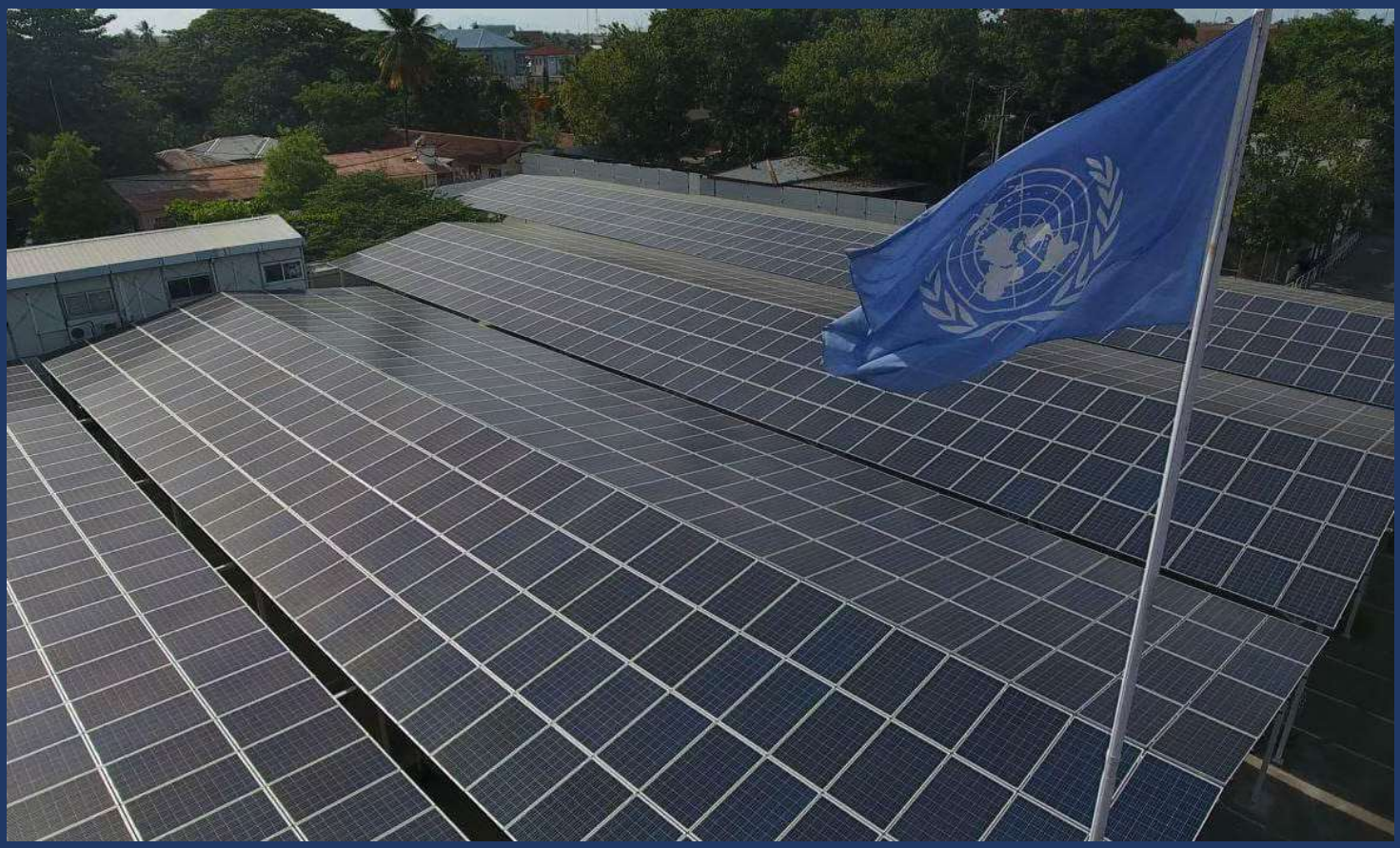
Sincerely yours,

UNDP Timor-Leste

United Nations Development Programme
Office of Information Management & Technology
Country Office ICT Advisory Services

Empowered lives.
Resilient nations.

UN House Timor-Leste



Annex 1 - Terms of Reference:

Operations and Maintenance service for Solar PV System at the UN House Timor-Leste

Solar PV Capacity (kWp)	Renewable Fraction (%)	CO_2 Emissions Reductions (tons/year)
300	40%	83

About

Prepared 15/09/2022 by Tanmoy Das
Last Update15/09/2022:

ITM Green Energy Team.

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

◄ **Front Cover:** Solar PV system at UN House Timor-Leste

Terms of Reference: Solar PV System

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Acronyms

AI - Artificial Intelligence
COB - Close of Business
GHG - Green House Gas
HQ - Head Quarters
ICT - Information and Communications Technology
IoT - Internet of Things
O&M - Operation and Maintenance
OIMT - Office of Information Management and Technology
PCMM - Power Consumption Measuring and Monitoring
PSU - Procurement Services 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: Provision of services for the Operation and Maintenance of the Solar Grid Tied PV System

UN House Timor-Leste

Scope of the Document

The Terms of Reference (TOR) sets the requirements to facilitate the provision of services to secure the correct and uninterrupted operations of the solar grid tied PV system installed in **UN House Timor-Leste.** The scope of the service is to provide preventive and corrective maintenance. An overall high-quality service is expected, as it is fundamental for the UN House to ensure high system availability at sustainable costs.

Structure of the Document

The ToR include the following components:

1. Introduction;
2. Service Description and available documentation ;
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 in Timor-Leste**, in cooperation with the UNDP's Information Technology and Management (ITM) Green Energy Team, has been operating a solar PV installation in their premises for the last 5 years. The deployed system is an On-grid system with a **PV capacity of 300 kWp**.

The system has operated smoothly for almost 6 years now, providing approximatively **330,000 kWh/year** to the UN House. The Solar PV system guaranteed a renewable fraction of approximately **42%,** reducing the UN House's CO_2 emissions by **80 tonsCO_{2eq}/year.**

1.1 Sustainable Development Goals

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

Substantial progress has been achieved in making UNDP "greener," more resilient operations both at Head Quarters and in many Country Offices (CO) 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 CO – out of a total of 167 - have installed or are installing photovoltaic systems to reduce Green House Gas (GHG) emissions and enhance office energy security.

Figure 1. Sustainable Development Goals (SDGs)

Recently UNDP adopted a 'Climate Neutrality and Sustainability Plan for Global UNDP Operations' committing UNDP to reduce GHG emissions by 10% over 5 years and achieving climate neutrality for global operations starting effective 2014 [3].

1.2 Smart UN Facilities

The concept of Smart UN Facilities revolves around using data insights and interconnected technologies to transform UN Country Offices and related facilities into "smart" premises; in effect, local capacity to carry out the UN's goals is augmented.

[3] UNDP - Greening the Blue Initiative (http://www.greeningtheblue.org/what-the-un-is-doing/unitednationsdevelopment-programme-undp)

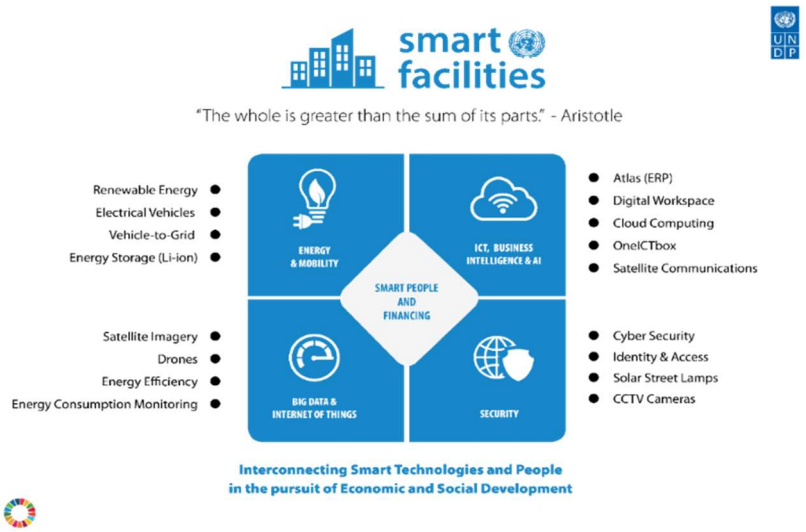


Figure 2. Smart UN Facility Framework

This 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), autonomous vehicles.
2. Smart cities – utilization of sensors for data collection, insights, analysis, and subsequent enhancement of services.

In view of the benefits, it leads to make the first step in transitioning into a low-carbon and digital organization through smart integration of various equipment. As it is depicted below, Error! Reference source not found. shows the main technologies that set and establish the Smart UN Facilities including:

1. Energy & Mobility
2. ICT, Business Intelligence & AI
3. Big Data & Internet of Things
4. Security

1.3 Seven Step Green Energy Process

Use of the United Nations Development Group (UNDG) recommended 7-Step process will be adopted for the project. The approach is a holistic end-to-end process with preliminary assessment of project practicability and the post-installation operation & maintenance. This is depicted in Error! Reference source not found. and elaborated in the subsequent text.

Figure 3. 7 Step Green Energy solution process

Step 1: -Assessment using IoT

a) The CO installs IoT devices, such as the Power Consumption Measuring and Monitoring Device (PCMM).

b) ITM will monitor the quality of the grid and the genset. The solution proposed for the Solar Hybrid System should be compatible with the monitoring system.

c) The office is required to complete the Preliminary Site Survey form which will provide information on the physical structure and more details on electrical installations.

d) If the previous options are not applicable, a technical mission from a qualified engineer can be used to complete this step.

Step 2: Business Case

a) This step serves to provide essential information and data for decision-making. With the information gathered during Step 1, ITM compiles a load profile of the energy consumption. This enables an analysis that results in the draft of a business case, presenting a potential green energy solution for the CO.

Step 3: Procurement and Site Preparation

a) Compilation and publication of solicitation documents will be carried out in accordance with UNDP rules as applied by PSU in such projects

b) Evaluation of bids/proposals will be carried out jointly between ITM, CO, PSU, and a government representative/ CO focal point

Step 4: Site-survey – vendor

a) The awarded vendor carries out an on- site survey to exhaustively take into consideration all aspects that can adversely affect the implementation of the project, and information for the final costing of the project including required materials/equipment and time frames.

b) The vendor acts as implementer, working closely with focal point at the CO, when necessary, and ITM exercising 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, taking into consideration findings from the site survey in the previous step.

b) As part of technical oversight, ITM must endorse the final design before actual installation starts. Submission of the ***final design*** certified by the manufacturer 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, to allow 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 documentation of the system.

e) This step involves carrying out User Acceptance Testing (UAT) in which all parties play a role. This test is to be developed in collaboration with ITM.

f) A ***signed checklist*** confirming full compliance with all requirements marks the end of the step, giving way to O&M.

Step 7: Operation and Maintenance

a) Regular ***bi-annual maintenance*** by the supplier and regular monitoring from UNDP.

b) After the first 3 years of operation covered by the initial contract the service is renewed for the remaining project lifetime.

Communication and Publicity

Parallel to the 7-step process of green energy solution, ITM Communications Team and the Communications Country Office 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. System description and service requirements

2.1 Project Objectives

The main goal of the operation and maintenance service is to ensure the correct and uninterrupted operations of the solar Grid-tied PV system in order to guarantee the profitability of UN assets. ITM requires **high quality** of the service as the system serves as a show case at a national and international scale, proving the long-term durability, reliability and profitability of solar installations. The following section(s) provides minimum requirements and guidelines for the service to be provided. However, improvements on the minimum requirements to guarantee adequate system performances are highly encouraged.

2.2 Service High Level Requirements

This service seeks to ensure the continuous operations of the solar installation to guarantee stable energy supply for the UNDP premises. The installed solar Grid-tied PV system has an installed PV capacity of **300 kWp**, with a total solar inverter capacity of 280 kVA (14 units of 20 kVA). Along with the solar system, the national Grid is available, with 2 backup diesel generators for emergency purposes. Due to the nature of the installation, the diesel generators' maintenance and other related services are out of the scope of this RFQ. A system expansion is currently being planned for the future, so whenever performing the work the vendor should keep in mind this possibility from the electrical side.

The requirement is for the vendor to provide a comprehensive offer for the provision of the operation and maintenance (O&M) services, both predictive and corrective, for the **Solar PV installation for an overall duration of 1 year.** High level requirements for the service are as follows:

1. System support and troubleshooting;
2. Ensure continued system connectivity for remote monitoring and data collection;
3. Corrective maintenance visit if requested;
4. 2 predictive maintenance visits per year, including cleaning of panels and general system inspections;
5. Identification of potential improvements and system optimization strategies;
6. Support in replacement of defective components.;
7. Availability of recognized maintenance certifications for the specific inverter make and model will be considered as a strong advantage
8. Ensure all solar PV inverters and other monitoring devices online status are restored.

The On-grid Solar PV system is expected to keep performances in line with or above the performance of the first 6 years of operations. In particular, the main parameter monitored will be:

1. Solar system yearly generation [kWh];
2. Solar system performance ratio
3. Overall, Renewable fraction [%] provided no changes on the load;
4. Overall system up-time [h] and system availability [%];
5. System mean time to failure [h];

The measurements taken from the UNDP Green Energy Team during the past years of operations will serve as a benchmark to measure the quality of the service. Periodical reduction of 1-2% per year will be considered as acceptable for parameter number 1. Benchmarking parameter will be reassessed in case of changes in system configurations.

It is essential that the Solar PV system operates in a robust and continuous manner with regards to energy supply for the CO. The weather in Dili does not have significant variations and the length of the day does not vary substantially over the course of the year. However, earthquakes, strong winds, and cyclones could occur, hence, it is important that periodical checks on the overall system structure stability and status are performed. These shall be taken into account when scheduling the periodic visits. The signed contract will be renewed on an annual basis from UNDP depending on satisfactory performance by the supplier. These will be evaluated trough a UNDP questionnaire on the supplier performances and trough the comparison of the system operations against the benchmark values in line with the terms presented in paragraph 3.3

2.3 Description of the Site and of the installed system

The UN House Timor-Leste is located at: Caicoli Street, Dili, Timor-Leste at the following GPS Coordinates: **"-8.56079, 125.57384**".

The energy system covers the load of the office building. Aerial pictures of the installations can be seen below in **Figure 4**:

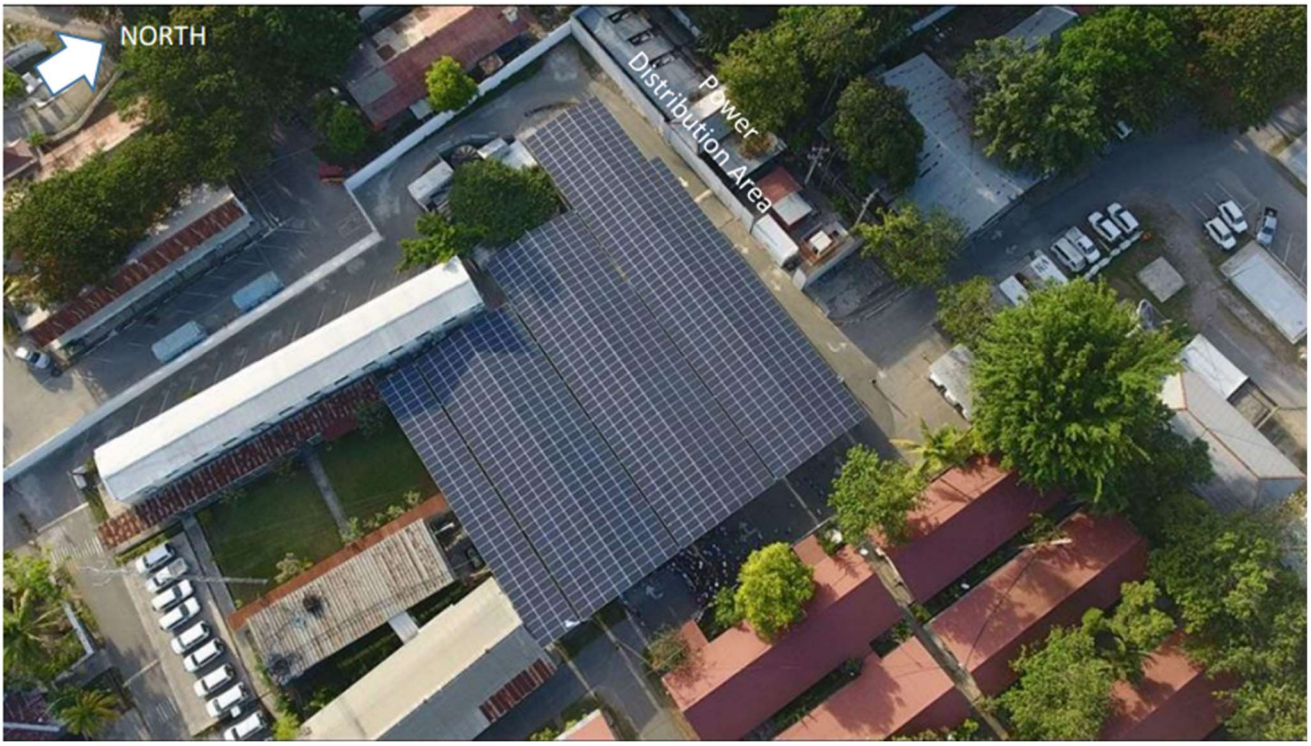


Figure 4. Aerial view of the UNDP premise

The system was commissioned in November 2016 and has now been in operation for almost 6 years. During this period, the system has been well maintained and monitored by both the original system supplier, UNDP Green Energy Team in Copenhagen and the UN House Timor-Leste.

2.3.1 Current system status

Out of the 14 PV inverters, only 13 are functional and uploading data on the monitoring portal. Inverter number 1 has malfunctioned, and it does not record any data. Troubleshooting procedure is underway and its internal board is currently being replaced. The inverter status can be seen in **Figure 5**.

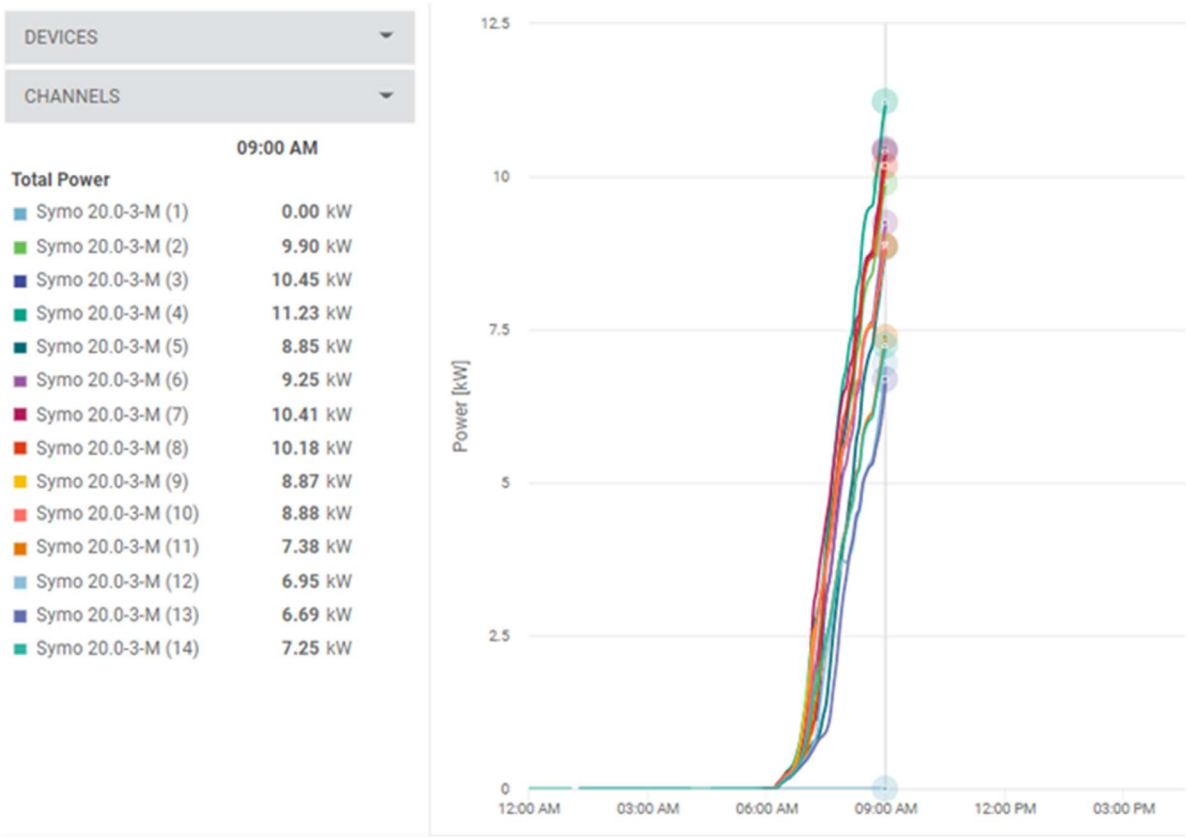


Figure 5. Current inverter status

Furthermore, on the Fronius monitoring portal, the data related to the facility's energy consumption are not uploaded anymore since December 2019. Therefore, the first action would be to reinsure all solar PV inverters are active and recording data on the monitoring portal, and secondly, to troubleshoot the system and/or monitoring portal in order to restore the energy consumption data onto the monitoring platform.

2.3.2 Location of PV Panels and solar field layout

The Solar PV Panels are located within in the premises of the UN house, as a carpark structure. The detailed distribution layout of the facility including solar PV panels interconnections, inverters, and other power sources can be seen at **Figure 6**, structural layout in **Figure 7**, and the carpark view in **Figure 8**.

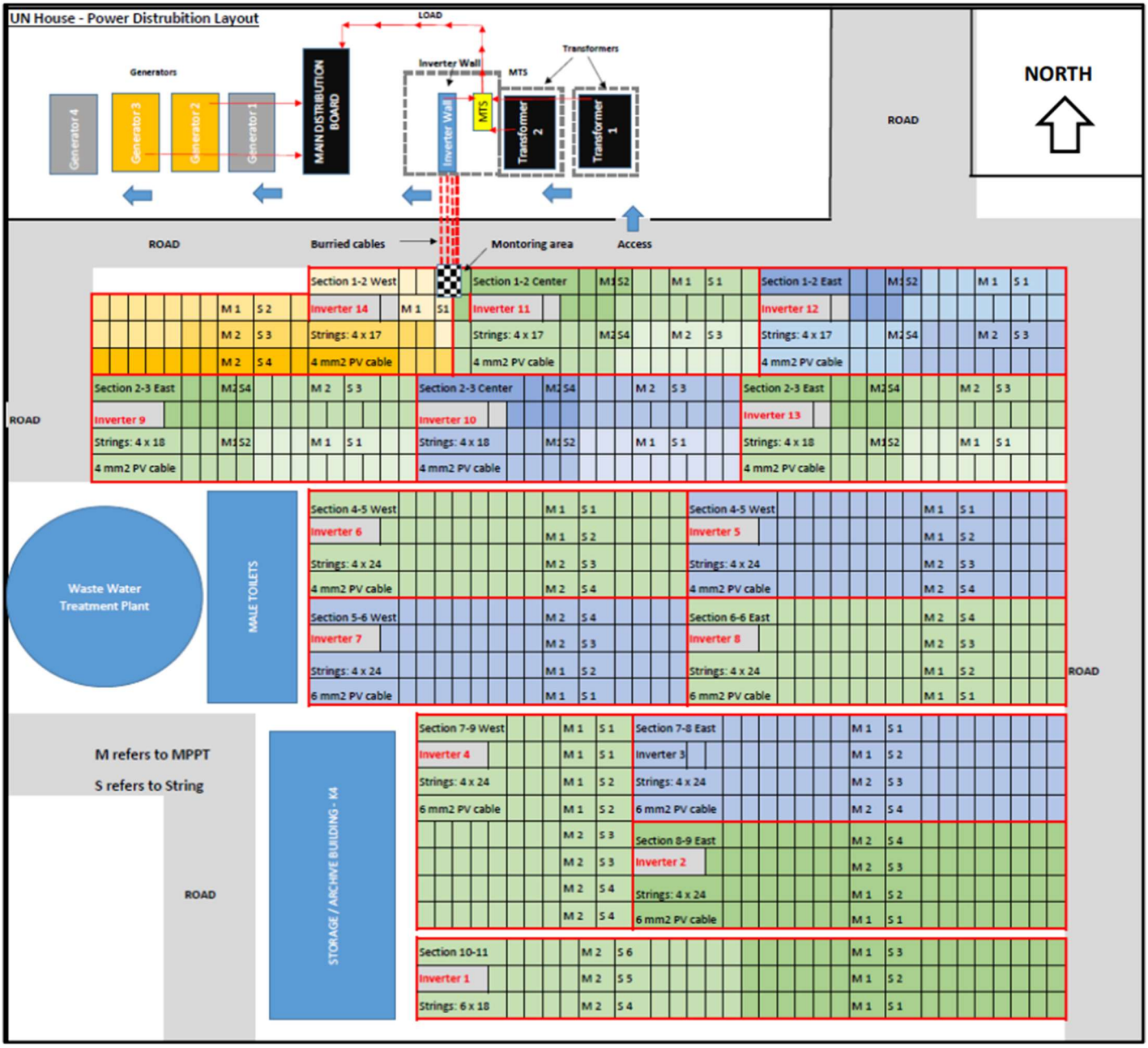


Figure 6. UN House power distribution set up including solar panel disposition.

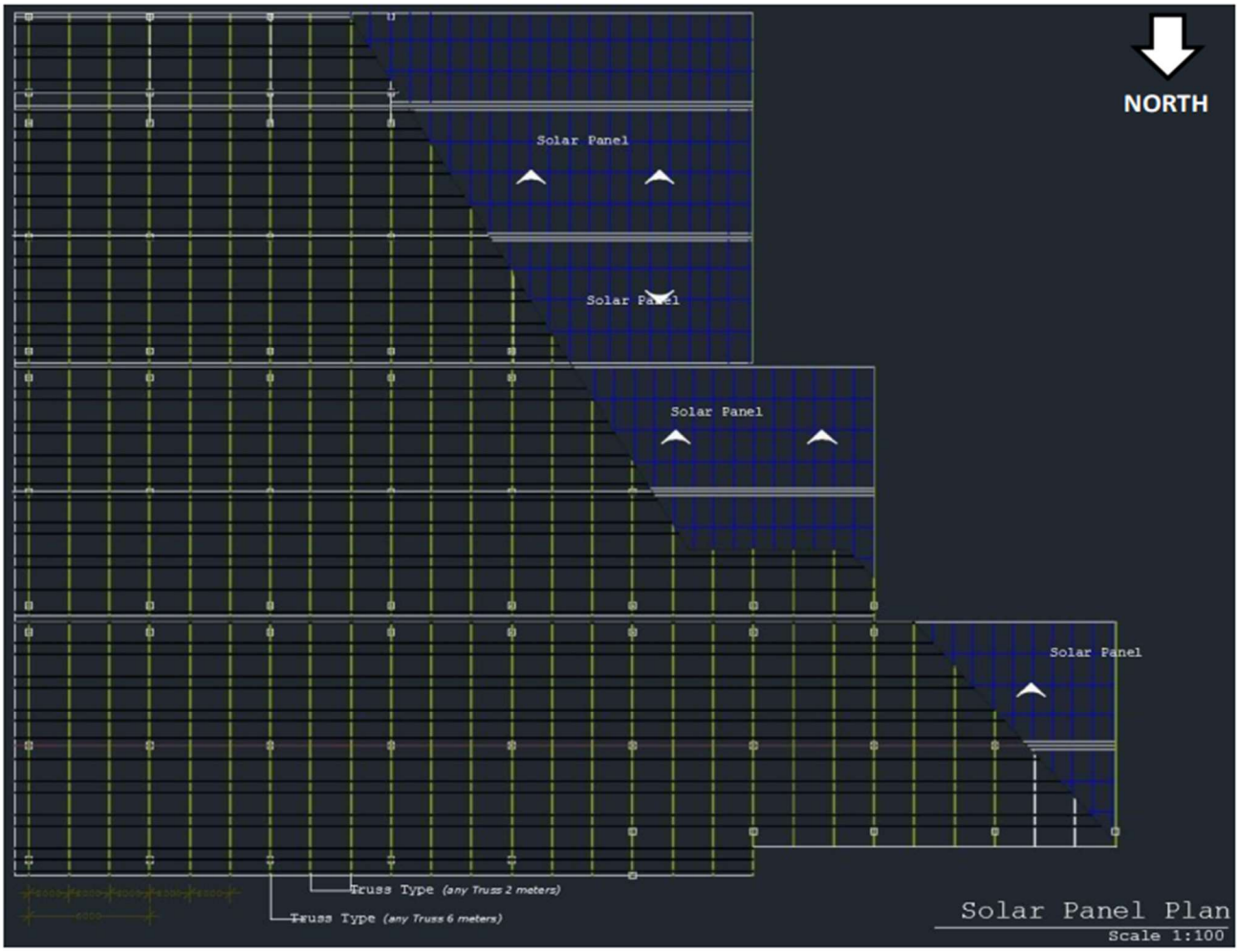


Figure 7: Structural layout of the solar PV panels

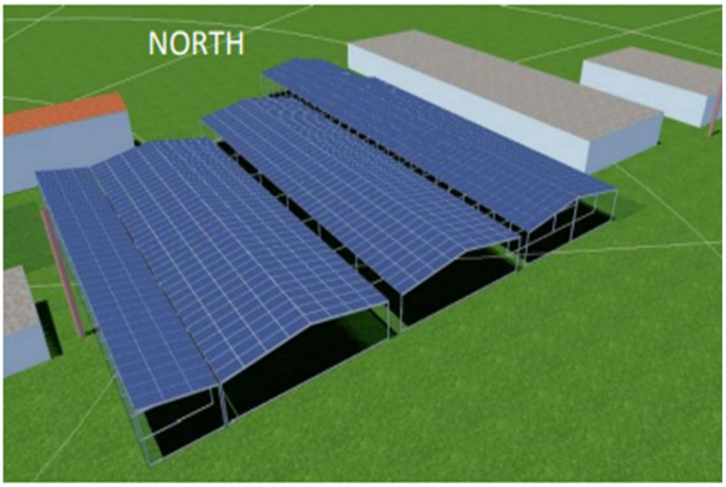


Figure 8: Solar Carpark view

2.3.3 As built system diagrams

The Solar field is composed of **1152 panels of 260 Wp** divided into **multiple strings** (Kindy refer to **Figure 6**). The panels are connected in strings between 17-24 panels. The structure was implemented for panels to face East and West with a tilt of **15 degrees**. Strings are collected into 14 solar inverters of 20kVA each (**Fronius Symo)**.

The national grid provides electricity to the facility via two transformers. Both connected to a single Manual Transfer Switch (MTS) for manual selection of which transformer should provide grid supply for the main distribution board. Since grid back feeding was not allowed during the solar PV system installation, a Smart Meter was installed at the MTS, to constantly measures consumption and transmit a signal to the Master Inverter (no 1) to balance the total solar system power production, hence ensure to match consumption in real-time. Kindly refer to **Figure 9**.

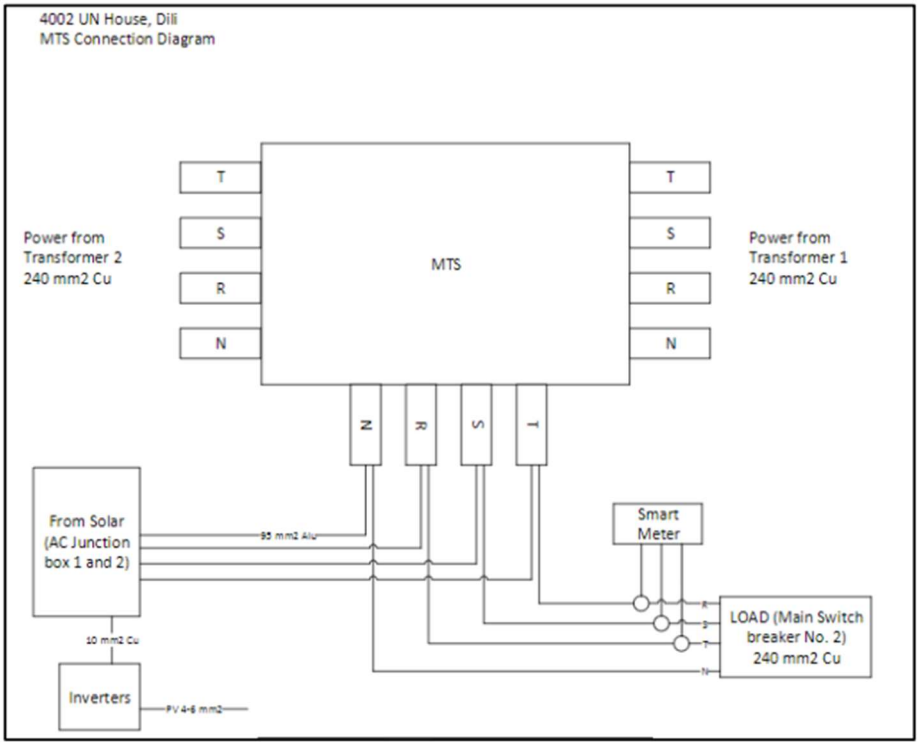


Figure 9: Grid and solar PV inverter interconnection

Detailed datasheets of the main system components are available in annex 1. SLD and other details will be made available to the winning bidder.

2.3.4 As built technical location – inverter wall layout

The 14 inverters (**3-phase Fronius Symo 20kVA each**) of the solar PV system are all installed outside under a shelter. The inverters are connected to 2 AC junction boxes at either side of the inverter wall (7 inverters on each junction box), as shown in **Figure 10** below:

Figure 10: Inverter wall

The Master Inverter (no 1) controls the other 13 inverters and comes with **data management** which is connected to the network and transmits solar PV system data along with other related data impacting production (module temperature, solar irradiation, and ambient temperatures), as shown in **Figure 11**.

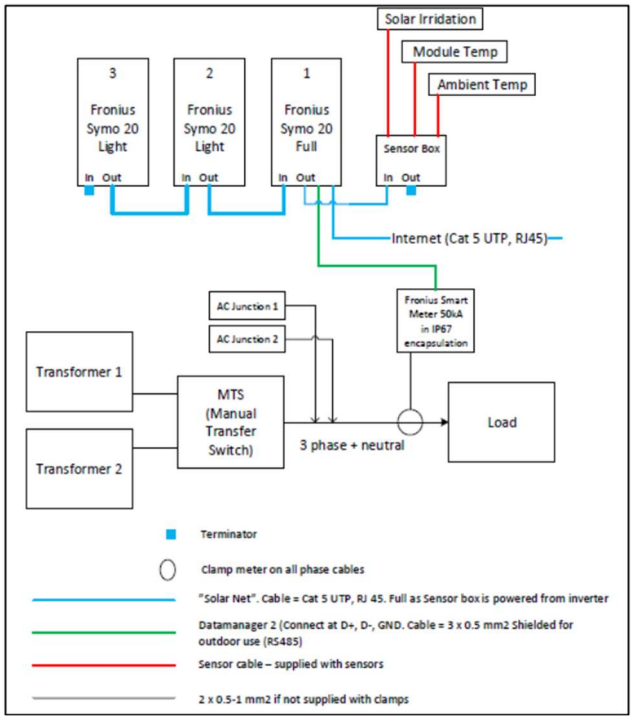


Figure 11: Solar PV System's setup

2.3.5 Load Consumption and solar system generation

The load and solar generation measurements are provided by the online monitoring platform **(Solarweb - Fronius). ** This will remain the main data source to evaluate system performances. The average daily load in the compound is **2,500 kWh/day** and the solar system is providing around **40%** of it. The average daily generation varies around **1,200 kWh/day.**

Average daily (**Figure 12** during weekdays) and yearly load profile (**Figure 13**), with the metrics (**Table 1**).

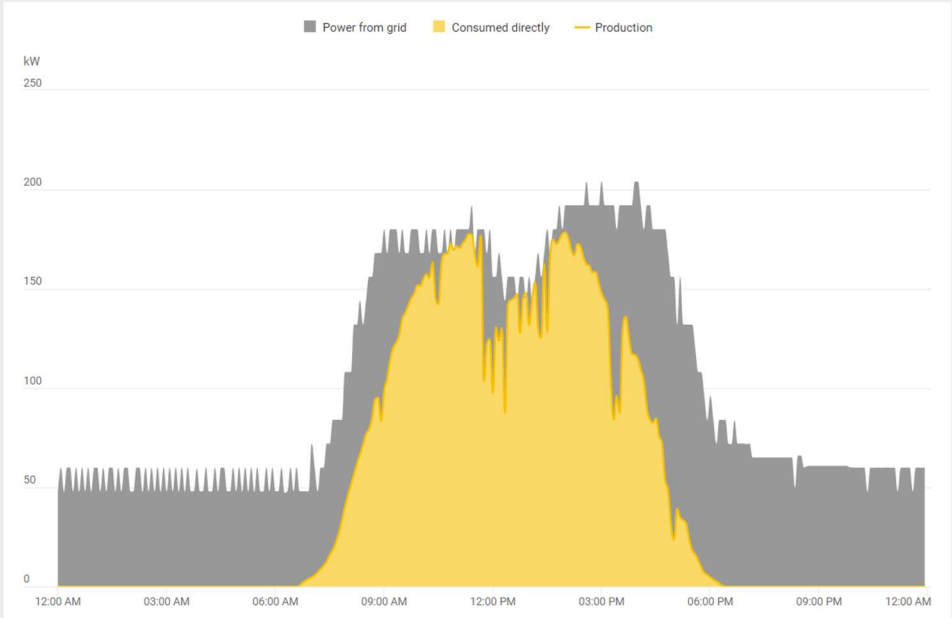


Figure 12. UN House daily load profile during weekdays

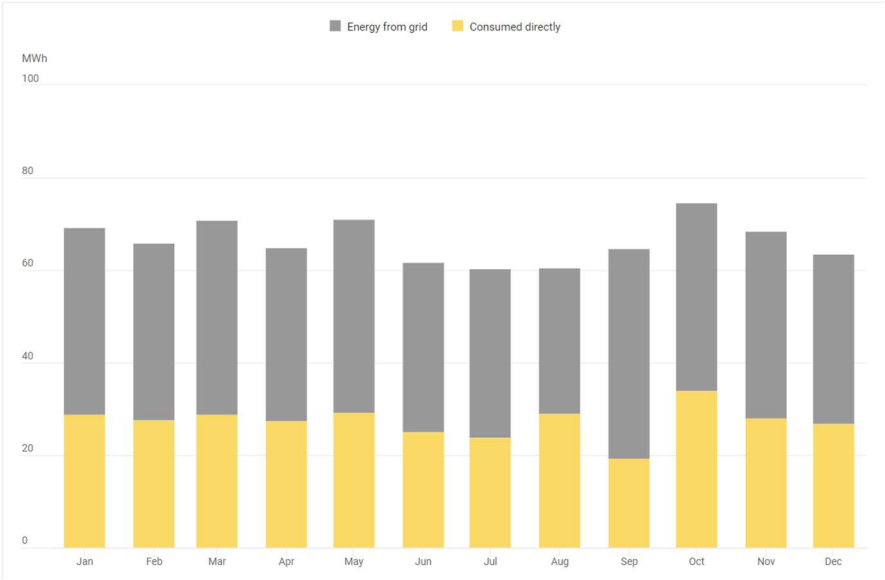


Figure 13: UN House Yearly Load profile

Table 1 - Load and PV generation Metrics

Metric	Baseline
Average Consumption (kWh/day)	2,500
Average PV production(kWh)	1,200

2.3.6 External power sources

It is expected for the solar Grid-tied PV system to keep operating in a smart, integrated manner with the other available power sources. As per the original installation, the system's electricity supply is expected to operate according to the follow logic/priorities shown in Figure 14.

Figure 14.System's operation logic

3. Statement of Work

3.1 Site Visit

Necessary site information, including photos have been provided. However, for preparation and submission of an offer, the vendor will be able to collect additional information during the Site Visit (without cost to UNDP). The data collected on the site assessment visit, together with the data included in this document, are what shall be considered for the offer preparation and submission.

Site Assessment Visit is scheduled for the **28-Nov-2022 (time to be advised)**. The Assessment can be conducted by the vendor's own staff or by authorized personnel. Conducting a site visit is **compulsory** for the offer to be valid.

The UNDP focal contact in Dili, Timor-Leste is **Ulderico Ze Machado**. Please note that it is necessary to arrange the site visit in advance. As such, please inform your local partner (if applicable) accordingly. **Please confirm** your intention to undertake Site Assessment Visit (without cost to UNDP**) by 23-Nov-2022 COB (Copenhagen Time)** by sending an email to: itm.green.energy.team@undp.org and ulderico.zemachado@undp.org. Kindly provide in this email the following information for UNDP CO and UNDP PSU/ITM to make the necessary arrangements for assessment.

Confirmation of site visit in the specified day and 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 Timor-Leste, Caicoli Street, Dili, Timor-Leste

3.2 Requirements

The awarded company shall perform the services stated below sections (3.2.1- 3.2.3). Compliance with or deviations from the specification shall be clearly stated by the vendor in the below and submitted as part of the offer (*Please refer to Appendix I*). It is expected for the awarded service provider to be the exclusive provider of operation and maintenance service for the system and, except in emergency situation, the awarded service provider shall not perform or permit any repair, maintenance or operation activity on or related to the system by another provider without UNDP's prior written consent.

Availability of recognized certification in operating and/or commissioning the specific inverter make and model will be considered as a relevant advantage.

Availability of recognized certification in operating and/or commissioning the specific batteries make and model will be considered as a relevant advantage.

3.2.1 System troubleshooting

As described in paragraph 2.3.1, the system appears to be fully operational, and 13 out of 14 inverters are correctly producing. As mentioned earlier, inverter 1 is currently not functioning and following the troubleshooting procedure stated by the inverter manufacturer, its internal board is currently being replaced. Furthermore, the Fronius portal is no longer reading the energy consumption data from the energy meter installed on the system. It is required for the supplier of the service to ensure that all the inverters are correctly operating and communicating with the monitoring portal and to make sure that all the relevant parameters are correctly logged. The troubleshooting activities are in scope of this ToR. In case extra component are required these will be procured separately from UNDP following the indication of the supplier and it will be the supplier responsibility to install them at no extra cost for UNDP.

3.2.1.1.	Solar system troubleshooting	1. Assess the status of the solar system with particular attention to the issues related to the monitoring portal and the communication of all the inverters 2. Provide BoM of required items to troubleshoot the system 3. Perform the installation of the devices and ensure full functionalities of the monitoring platform
3.2.1.2.	Monitoring platform and plant management overview	A local and online monitoring system shall be a user-friendly dashboard that shows **real-time** power consumption, indicating which sources are used to provide the required power (solar PV, grid and generator). The monitoring portal shall display the following information in **real-time**: 1. Power output (active, reactive, apparent) of solar PV system (kW) and of each inverter individually. 2. Site electricity consumption - AC loads (kW). 3. AC voltage and current for the different inverters 4. DC voltage and current for the different inverters and MPPTs

3.2.2 Preventive maintenance service

At least 2 preventive maintenance visits per year shall be executed to guarantee correct system operations and optimal performances.

The awarded service provider shall perform all necessary preventive maintenance adjustments electrical replacements and cleaning (interior and exterior) and provide the necessary documentation in support. It will be responsibility of the awarded service provider to ensure that all the warranties are preserved and that equipment working conditions are compliant with such warranties. Preventive maintenance will

include correction of loose electrical connections, ground connections and other minor maintenance repair work. Each preventive maintenance visit shall include the following activities.

Table 2 - PV modules mounting technical requirements

3.2.2.1.	Solar field and components	1. Solar Panels cleaning; 2. Vegetation management and wildlife prevention if applicable 3. Solar field visual inspection (wiring, mounting system, junction box, strain relief) 4. I_{mpp} testing on all DC strings, If I_{mpp} testing show unbalanced strings V_{oc} and I_{sc} test should be performed in order to locate the fault. If fault is identified resolution plan shall be provided. 5. Check and tighten eventual loose electrical connections in combiner boxes, switchgears, and inverters. 6. Capacity to execute thermographic inspection of electrical components like combiner boxes and PV system and capacity to check for hotspots and cracks on solar panel will be considered an advantage
3.2.2.2.	Technical Location – Inverter Wall (inverter)	1. Cleaning of the equipment and all the electrical enclosure; 2. Cleaning of the inverters' filters and filters replacement if necessary; 3. Perform preventive maintenance on the inverters as required by the manufacturer's warranty; 4. Cables and connections checking 5. Technical room temperature measurement checks
3.2.2.3.	Technical Location – Inverter Wall (structure integrity)	1. Visual inspection of the room/container overall conditions and integrity 2. Inspection of security infrastructure or equipment (i.e. fences, security cameras…) (if applicable)

3.2.3 Corrective maintenance service

The awarded service provider shall perform basic corrective maintenance services for the system upon request of the CO and/or of the Green Energy Teams and shall be available to respond in case of emergency/hazardous situations. Corrective maintenance shall include the following minimum requirements

Table 3 - Power electronics technical requirements

3.2.3.1.	Emergency response	Rapid intervention in case of emergency/hazardous situation with remote support to the country office identified technical focal point. Full availability to perform on-site direct intervention if required. Minimum response time for these situations shall be 2 hours. Emergency situations include the following: 1. Events that will cause serious impact on system performances, affecting 80% to 100% of system productivity; 2. Events that represent a direct danger for local staff or for local office equipment (i.e. office appliances, critical loads, backup generator)
3.2.3.2.	Corrective maintenance visits	Simple corrective maintenance visits shall be covered. Visit shall include: 1. System parameters adjustment; 2. Simple system optimization that does not require procurement of key components for the system (inverter, solar panels, batteries) or radical changes of system configuration; 3. Response to system's faults to assess and identify the source of issue and provide resolution plan.
3.2.3.3.	Installation/replacement of components	Installation visits to replace or install a component provided by UNDP shall be covered. Commissioning of such component shall be provided

Corrective maintenance will not cover procurement of key components of the system such as PV, inverters, batteries. Corrective maintenance does not require the service provider to have spare components in stock.

3.2.4 Warranty Management

The warranty of the system's components will be managed by UNDP as well as replacement logistics and related costs.

3.3 Benchmarks of system performances

The KPI used to evaluate the service level performances will be the following.

	Solar system generation [kWh]	The benchmark value is 1,000 kWh/day (average) A variation of 10% will be considered acceptable. An annual reduction of 5% will be considered acceptable
	Solar system RE fraction	The benchmark value is **85%**. Variation of the value will be considered acceptable if the average daily load connected to the system will vary more than 5%
	Solar system Up-time	Target value is 85% over the 12 months period; Down time will be considered as loss of more than 80% of system productivity
	Mean time between failure (MTBF)	Target value is 4,380 hours
	Target Response and resolution time	Kindly refer to paragraph 3.3.2 below.

Service performances will be assessed by the Green Energy Team and the CO on a yearly basis and will be subsequently discussed with the service provider on a yearly service performance review meeting.

3.3.2 Target response and resolution time

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 4;
3. Assess and evaluate Impact as detailed in table 5;
4. Commence the implementation of 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 define the service agreed targets and expected response time. Priority is defined as a combination of Urgency and Impact. Urgency is a measure of how long it will be until the incident has a significant impact on the business.

Table 4 - Urgency level definition

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

Impact is a measure of the effect of an incident and how the service levels will be affected.

Table 5 - Impact Level Definition

Impact	Scope	Business	Operations
Extensive Widespread	80% to 100% Generation is lost. Incapacity to correctly feed the load from both direct generation and/or battery storage	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.
Significant Large	Affects significant part of the hybrid system. More than 50% to 80% power loss or battery capacity loss.	Some financial impact and few business units are impacted.	Interferes with few core businesses functions and potential loss of mission critical data.
Moderate Limited	Affects minor part of the hybrid system. less than 50% power loss or battery capacity loss.	No financial impact but potential loss later if unresolved.	Interferes with non-core business functions and no loss on mission critical data.
Minor Localized	Less than 10% or no power or battery capacity loss.	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 6 - Priority definition and target response time

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

4-Minor Localized	4-Low	Low	48 hours	10 days

3.4 Misuse of equipment and responsibilities

The Contractor will be held responsible for any damage caused to the solar system or to any other UNDP equipment during the execution of the service. The supplier will be also held accountable for warranty invalidation caused by incorrect maintenance or misuse of the equipment.

3.5 Security on the workplace

The Contractor shall:

1. Put in place and maintain an appropriate security plan, taking into account the security situation in the country where the services are being provided;
2. Assume all risks and liabilities related to the Contractor's security and ensure at any time the full implementation of the security plan.

UNDP reserves the right to verify whether such plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this contract. Notwithstanding the foregoing, the Contractor shall remain solely responsible for the security of its personnel and for UNDP's property in its custody.

3.6 Timelines

3.6.1 Tasks and deliverables

The overall deliverables and their respective deadline after Purchase Order (PO) signature are indicated below in Table 7. The tasks are to be performed within the proposed timeline. An overview of the general timeline including all deliverables can be found in **Table 7** below:

Table 7 - Tasks and responsibilities timeline

No	Tasks and Deliverables	Deadline
	Signature of the contract	PO
	Deadline to request missing documentation to the CO or the Green Energy team (i.e. SLD, Warranties, As built representations)	PO + 1 weeks
	Preventive maintenance visit report including resolution plan for outstanding issues	Visit + 1 week
	Corrective maintenance visit report including resolution plan for outstanding issues	Visit + 1 week
	Operations report and recommended actions	Yearly service performances review + 1 week

3.7 Contact Details

Name	Designation	E-mail	Phone #
UN House Timor-Leste	End user	ulderico.zemachado@undp.org	+67033112201122
ITM GET (GET)	Project Manager	itm.green.energy.team@undp.org	+45 45 33 61 14
<<Vendor name>> (Service provider)	Solution provider	Vendor's email TBD	TBD

3.8 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.

3.9 Price Schedule A

Table 8 - Price Schedule A

Item	Description	Quantity	Unit Price (USD)	Total Price (USD)
1.	Initial system assessment and troubleshooting (once off service)			
2.	Yearly cost of preventive maintenance service			
3.	Yearly cost of corrective maintenance service			
4.	Documentation and reporting			
5.	Total cost			

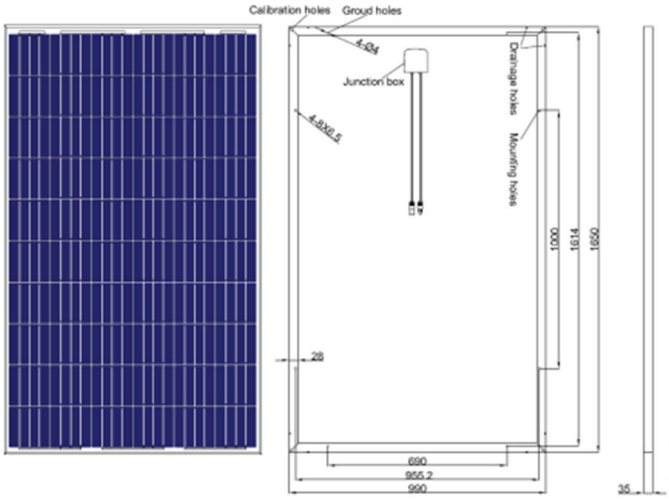
4. Annex 1: System's components datasheets

Include all the datasheets of the system's components (inverter, solar panels, monitoring system….)

a. PV Panels

EGING PV

EG-(SERIES)P60-C



Mechanical Characteristics

Number of cells (pcs)	60
Size of cell (mm)	156*156
Type of cell	Poly
Thickness of glass (mm)	3.2
Type of frame	Anodized aluminum alloy
Junction box	EG-TL-BOX026 (3-diode) IP67
Size of module (mm)	1650*990*35
Weight (kg)	18.6
Cables/connectors	PV1-F,4mm², 900mm, MC4 compatible (Cable 01)

Maximum Ratings

Operating Temperature(℃)	-40~85
Operating Humidity(%)	5~85
Allowable Hail Load	25mm ice-ball with velocity of 23m/s

Packing Configuration

Pieces per pallet	30
Size of packing (mm)	1690*1120*1140
Weight of packing (kg)	618
Pieces per container	840
Size of container	40' HC

Electrical Characteristics

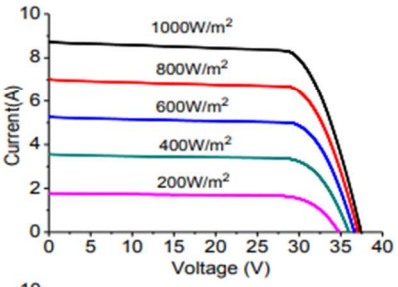
STC		EG-240 P60-C	EG-245 P60-C	EG-250 P60-C	EG-255 P60-C	EG-260 P60-C
Pmax (W)		240	245	250	255	260
Vmp (V)		29.71	29.92	30.20	30.47	30.74
Imp (A)		8.08	8.19	8.28	8.37	8.46
Voc (V)		37.25	37.47	37.72	37.97	38.24
Isc (A)		8.62	8.73	8.81	8.89	8.98
Module efficiency (%)		14.7	15.0	15.3	15.6	15.9
Maximum system voltage (V)		1000				
Fuse Rating current (A)		20				
Power tolerance (%)		0~+3				
Temperature coefficient	Pmax (%/℃)	-（0.43±0.05）				
	Isc (%/℃)	0.04±0.015				
	Voc (%/℃)	-（0.325±0.1）				

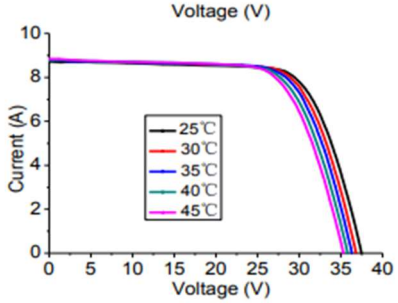
STC: Irradiance 1000W/m², module temperature 25℃, AM=1.5

NOCT	EG-240 P60-C	EG-245 P60-C	EG-250 P60-C	EG-255 P60-C	EG-260 P60-C
Pmax (W)	176.33	180.00	183.67	187.34	191.02
Vmp (V)	27.10	27.29	27.55	27.80	28.04
Imp (A)	6.51	6.60	6.67	6.74	6.82
Voc (V)	34.47	34.67	34.90	35.13	35.38
Isc (A)	6.99	7.07	7.14	7.20	7.28
Power tolerance (%)	±3%				

NOCT: Irradiance 800W/ m², ambient temperature 20℃, wind speed 1m/s

I-V Curves





Specifications in this catalog sheet are subject to technical changes and product innovations. EGing PV reserves the right of final interpretation.

Revised on August 2012 www.egingpv.com

b. Solar PV Inverters

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Fronius

SHIFTING THE LIMITS

FRONIUS SYMO

/ Maximum flexibility for the applications of tomorrow.

/ SnapINverter technology

/ Integrated data communication

/ SuperFlex Design

/ Dynamic Peak Manager

/ Smart Grid Ready

/ Boasting power categories ranging from 3.0 to 20.0 kW, the transformerless Fronius Symo is the three-phase inverter for systems of every size. Owing to the SuperFlex Design, the Fronius Symo is the perfect answer to irregularly shaped or multi-oriented roofs. The standard interface to the internet via WLAN or Ethernet and the ease of integration of third-party components make the Fronius Symo one of the most communicative inverters on the market. Furthermore, the meter interface permits dynamic feed-in management and a clear visualisation of the consumption overview.

TECHNICAL DATA FRONIUS SYMO (3.0-3-S, 3.7-3-S, 4.5-3-S, 3.0-3-M, 3.7-3-M, 4.5-3-M)

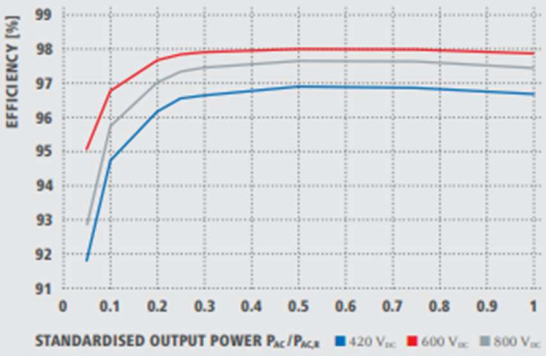
INPUT DATA	SYMO 3.0-3-S	SYMO 3.7-3-S	SYMO 4.5-3-S	SYMO 3.0-3-M	SYMO 3.7-3-M	SYMO 4.5-3-M
Max. input current ($I_{dc\ max\ 1}$ / $I_{dc\ max\ 2}$ [1])	16.0 A / 16.0 A					
Max. array short circuit current (MPP_1/MPP_2 [1])	24.0 A / 24.0 A					
Min. input voltage ($U_{dc\ min}$)	150 V					
Feed-in start voltage ($U_{dc\ start}$)	200 V					
Nominal input voltage ($U_{dc\ r}$)	595 V					
Max. input voltage ($U_{dc\ max}$)	1,000 V					
MPP voltage range ($U_{mpp\ min}$ – $U_{mpp\ max}$)	200 - 800 V	250 - 800 V	300 - 800 V	150 - 800 V		
Number MPP trackers	1			2		
Number of DC connections	3			2+2		

OUTPUT DATA	SYMO 3.0-3-S	SYMO 3.7-3-S	SYMO 4.5-3-S	SYMO 3.0-3-M	SYMO 3.7-3-M	SYMO 4.5-3-M
AC nominal output ($P_{ac,r}$)	3,000 W	3,700 W	4,500 W	3,000 W	3,700 W	4,500 W
Max. output power	3,000 VA	3,700 VA	4,500 VA	3,000 VA	3,700 VA	4,500 VA
AC output current ($I_{ac\ nom}$)	4.3 A	5.3 A	6.5 A	4.3 A	5.3 A	6.5 A
Grid connection (voltage range)	3-NPE 400 V / 230 V or 3-NPE 380 V / 220 V (+20 % / -30 %)					
Frequency (Frequency range)	50 Hz / 60 Hz (45 - 65 Hz)					
Total harmonic distortion	< 3 %					
Power factor ($\cos \varphi_{ac,r}$)	0.70 - 1 ind. / cap.			0.85 - 1 ind. / cap.		

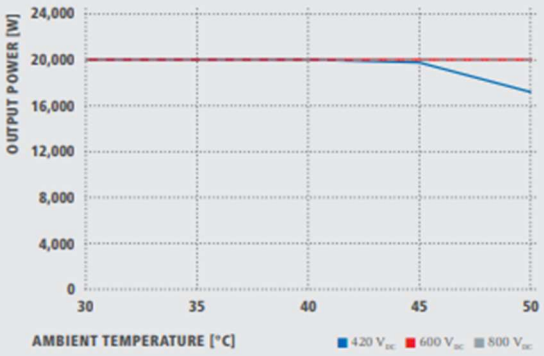
GENERAL DATA	SYMO 3.0-3-S	SYMO 3.7-3-S	SYMO 4.5-3-S	SYMO 3.0-3-M	SYMO 3.7-3-M	SYMO 4.5-3-M
Dimensions (height x width x depth)	645 x 431 x 204 mm					
Weight	16.0 kg			19.9 kg		
Degree of protection	IP 65					
Protection class	I					
Overvoltage category (DC / AC) [2]	2 / 3					
Night time consumption	< 1 W					
Inverter design	Transformerless					
Cooling	Regulated air cooling					
Installation	Indoor and outdoor installation					
Ambient temperature range	-25 - +60 °C					
Permitted humidity	0 - 100 %					
Max. altitude	2,000 m / 3,400 m (unrestricted / restricted voltage range)					
DC connection technology	3x DC+ and 3x DC- screw terminals 2.5 - 16 mm²			4x DC+ and 4x DC- screw terminals 2.5 - 16mm² [3]		
AC connection technology	5-pole AC screw terminals 2.5 - 16 mm²			5-pole AC screw terminals 2.5 - 16mm² [3]		
Certificates and compliance with standards	ÖVE / ÖNORM E 8001-4-712, DIN V VDE 0126-1-1/A1, VDE AR N 4105, IEC 62109-1/-2, IEC 62116, IEC 61727, AS 3100, AS 4777-2, AS 4777-3, CER 06-190, G83/2, UNE 206007-1, SI 4777 [1], CEI 0-21 [1], NRS 097					

[1] This applies to Fronius Symo 3.0-3-M, 3.7-3-M and 4.5-3-M.
[2] According to IEC 62109-1.
[3] 16 mm² without wire end ferrules. Further information regarding the availability of the inverters in your country can be found at **www.fronius.com.**

FRONIUS SYMO 20.0-3-M EFFICIENCY CURVE



FRONIUS SYMO 20.0-3-M TEMPERATURE DERATING



TECHNICAL DATA FRONIUS SYMO (10.0-3-M, 12.5-3-M, 15.0-3-M, 17.5-3-M, 20.0-3-M)

EFFICIENCY	SYMO 10.0-3-M	SYMO 12.5-3-M	SYMO 15.0-3-M	SYMO 17.5-3-M	SYMO 20.0-3-M
Max. efficiency	98.0 %		98.1 %		
European efficiency (ηEU)	97.4%	97.6 %	97.8 %	97.8 %	97.9 %
η at 5 % Pac.r [1]	87.9 / 92.5 / 89.2 %	88.7 / 93.1 / 90.1 %	91.2 / 94.8 / 92.3 %	91.6 / 95.0 / 92.7 %	91.9 / 95.2 / 93.0 %
η at 10 % Pac.r [1]	91.2 / 94.9 / 92.8 %	92.9 / 96.1 / 94.6 %	93.4 / 96.0 / 94.4 %	94.0 / 96.4 / 95.0 %	94.8 / 96.9 / 95.8 %
η at 20 % Pac.r [1]	94.6 / 97.1 / 96.1 %	95.4 / 97.3 / 96.6 %	95.9 / 97.4 / 96.7 %	96.1 / 97.6 / 96.9 %	96.3 / 97.8 / 97.1 %
η at 25 % Pac.r [1]	95.4 / 97.3 / 96.6 %	95.6 / 97.6 / 97.0 %	96.2 / 97.6 / 97.0 %	96.4 / 97.8 / 97.2 %	96.7 / 97.9 / 97.4 %
η at 30 % Pac.r [1]	95.6 / 97.5 / 96.9 %	95.9 / 97.7 / 97.2 %	96.5 / 97.8 / 97.3 %	96.6 / 97.9 / 97.4 %	96.8 / 98.0 / 97.6 %
η at 50 % Pac.r [1]	96.3 / 97.9 / 97.4 %	96.4 / 98.0 / 97.5 %	96.9 / 98.1 / 97.7 %	97.0 / 98.1 / 97.7 %	97.0 / 98.1 / 97.8 %
η at 75 % Pac.r [1]	96.5 / 98.0 / 97.6 %	96.5 / 98.0 / 97.6 %	97.0 / 98.1 / 97.8 %	97.0 / 98.1 / 97.8 %	97.0 / 98.1 / 97.7 %
η at 100 % Pac.r [1]	96.5 / 98.0 / 97.6 %	96.5 / 97.8 / 97.6 %	97.0 / 98.1 / 97.7 %	96.9 / 98.1 / 97.6 %	96.8 / 98.0 / 97.6 %
MPP adaptation efficiency	> 99.9 %				

PROTECTIVE DEVICES	SYMO 10.0-3-M	SYMO 12.5-3-M	SYMO 15.0-3-M	SYMO 17.5-3-M	SYMO 20.0-3-M
DC insulation measurement	Yes				
Overload behaviour	Operating point shift, power limitation				
DC disconnector	Yes				
Reverse polarity protection	Yes				

INTERFACES	SYMO 10.0-3-M	SYMO 12.5-3-M	SYMO 15.0-3-M	SYMO 17.5-3-M	SYMO 20.0-3-M
WLAN / Ethernet LAN	Fronius Solar.web, Modbus TCP SunSpec, Fronius Solar API (JSON)				
6 inputs and 4 digital inputs/outputs	Interface to ripple control receiver				
USB (A socket) [2]	Datalogging, inverter update via USB flash drive				
2x RS422 (RJ45 socket) [2]	Fronius Solar Net				
Signalling output [2]	Energy management (potential-free relay output)				
Datalogger und Webserver	Included				
External input [2]	S0 Meter Interface / Input for overvoltage protection				
RS485	Modbus RTU SunSpec or meter connection				

[1] And at $U_{mpp\ min}$ / $U_{dc.r}$ / $U_{mpp\ max}$ [2] Also available in the light version.

/ Perfect Welding / Solar Energy / Perfect Charging

WE HAVE THREE DIVISIONS AND ONE PASSION: SHIFTING THE LIMITS OF POSSIBILITY.

/ Whether welding technology, photovoltaics or battery charging technology – our goal is clearly defined: to be the innovation leader. With around 3,300 employees worldwide, we shift the limits of what's possible - our record of over 900 granted patents is testimony to this. While others progress step by step, we innovate in leaps and bounds. Just as we've always done. The responsible use of our resources forms the basis of our corporate policy.

Further information about all Fronius products and our global sales partners and representatives can be found at **www.fronius.com**

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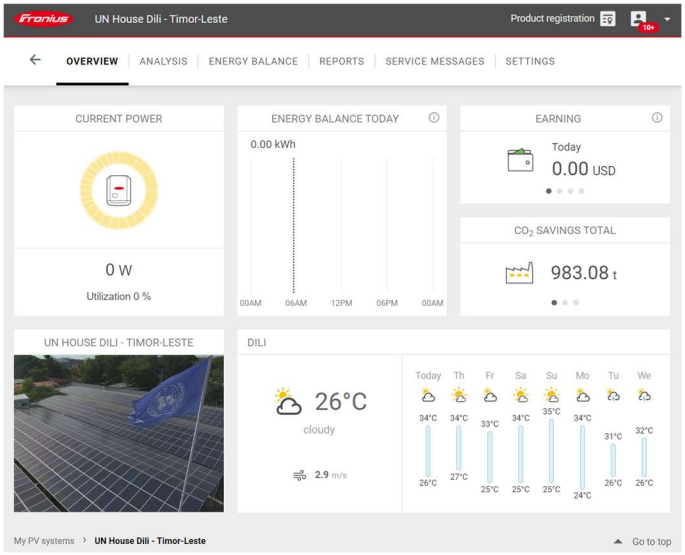
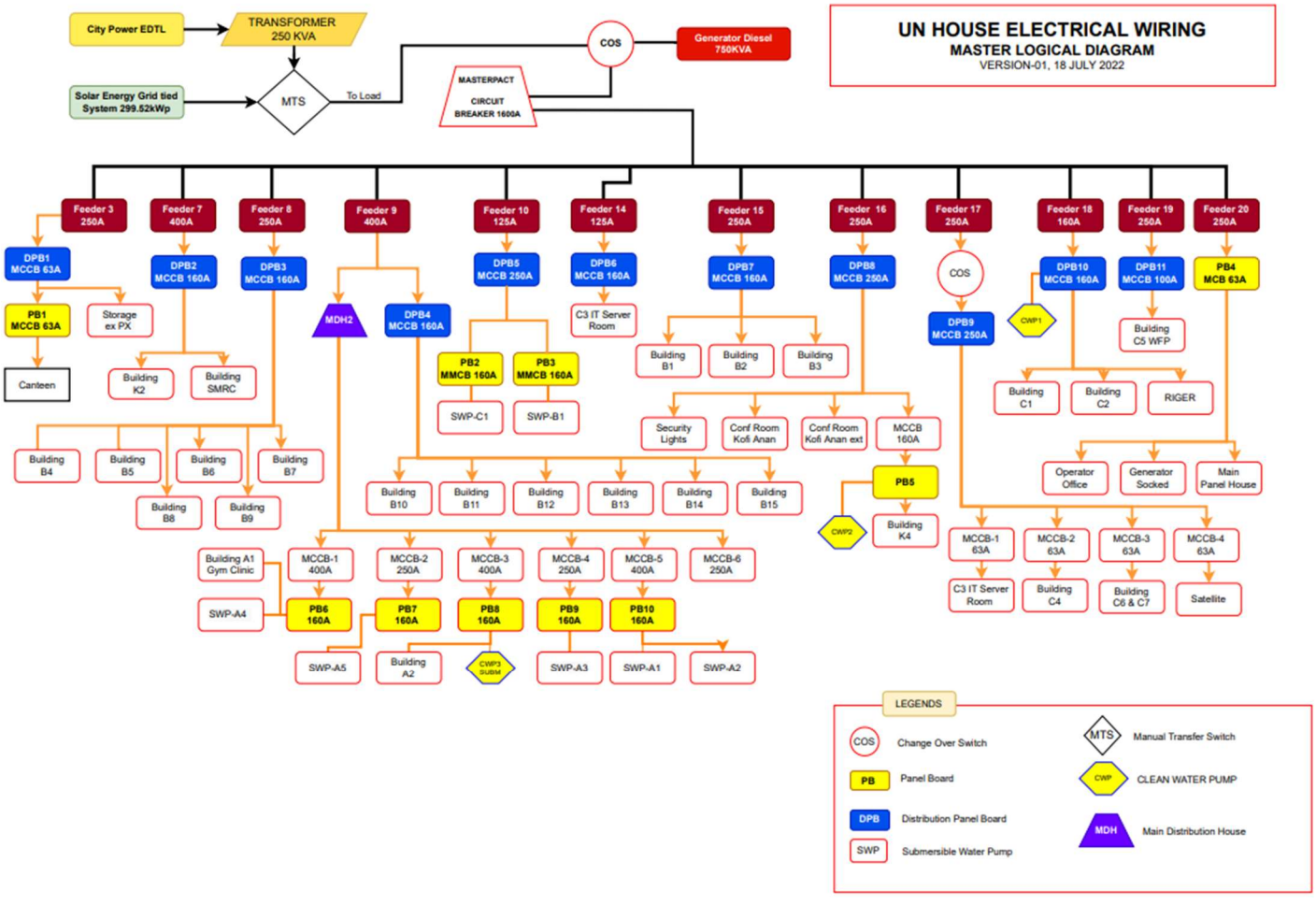
M.06.09.2.EN v16 Sep 2015 au17

smart facilities

c. Monitoring Portal



d. UN House Timor-Leste Electrical Wiring Plans



5. Annex 2: Official UN Holidays calendar

Day	Holiday
28-Nov-2022	Independence Day

6. Appendix I: Compliance Response Form		Understood	Understood with reservations	Comments	
6.1 Introduction					
1	**Introduction**	☐	☐		
1.1	**Sustainable Development Goals**	☐	☐		
1.2**Error! Reference source not found.**	**Smart UN Facilities**	☐	☐		
1.3	**7-Step Green Energy Process**	☐	☐		
6.2 System description and service requirements					
2.1	**Project Objectives**	☐	☐		
2.2	**Service High Level Requirements**	☐	☐		
2.3	**Description of Site and of installed system**	☐	☐		
2.3.1	**Current system Status**	☐	☐		
2.3.2	**Current system status** **Out of the 14 PV** inverters, only 13 are functional and uploading data on the monitoring portal. Inverter number 1 has malfunctioned, and it does not record any data. Troubleshooting procedure is underway and its internal board is currently being replaced. The inverter status can be seen in **Figure 5.**				

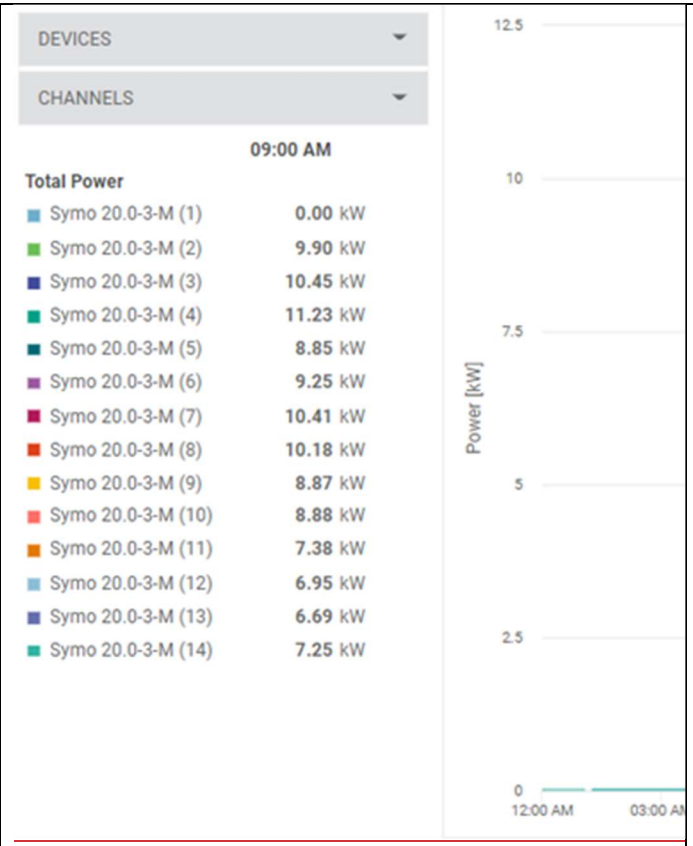


Figure 5. Current inverter status

Furthermore, on the Fronius monitoring portal, the data related to the facility's energy consumption are not uploaded anymore since December 2019. Therefore, the first action would be to reinsure all solar PV inverters are active and recording data on the monitoring portal, and secondly, to

	troubleshoot the system and/or monitoring portal in order to restore the energy consumption data onto the monitoring platform. Location of PV Panels and solar field layout				
2.3.3	**As built system diagrams**	☐	☐		
2.3.4	**As built technical location – inverter wall layout**	☐	☐		
2.3.5	**Load consumption and solar system generations**	☐	☐		
2.3.6	**External power sources**	☐	☐		
3	**Statement of work**	☐	☐		
3.1	**Site visit**	☐	☐		
3.2	**Requirements**	☐	☐		
3.2.1	**System troubleshooting**	☐	☐		
6.3 Requirements		**Compliant**	**Deviations**	**Comments**	**Reference**
3.2.2 Error! Reference source not found. **Maintenance**					
3.2.2.1	**Solar field and components**	☐	☐		
3.2.2.2	**Technical Location – Inverter Wall (inverter)**	☐	☐		
3.2.2.3	**Technical Location – Inverter Wall (Structure Integrity)**	☐	☐		
3.2.3 Error! Reference source not found. **Maintenance**					
3.2.3.1	**Emergency response**	☐	☐		
3.2.3.2	**Corrective maintenance visits**	☐	☐		
3.2.3.3	**Installation/replacement of components**	☐	☐		
3.2.3.4	**Emergency response**	☐	☐		
Error! Reference source not found.	**Warranty management**				
3.3	**Benchmarks of system performances**	☐	☐		
3.4	**Misuse of equipment and responsibilities**	☐	☐		
3.5	**Security on the workplace**	☐	☐		
3.6 Timelines					
3.6.1	**Tasks and deliverables**	☐	☐		
3.7	**Contact details**	☐	☐		
3.8	**Communications Conduct**	☐	☐		
3.9	**Price schedule A**	☐	☐		

Who we are
UNDP ITM/CIAS

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 Technology and Management 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.

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