

# **Solar PV Solutions**

## **GIA Support Process Overview**

## Common Services Packages

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## Common Services Packages

This document was developed in close collaboration with UNDP, Office of Information Systems & Technology, Global ICT Advisory Unit.

### 1. Introduction

The purpose of this document is to provide UNCTs with a process overview if they wish to obtain and install a solar PV solution and use UNDP's Global ICT Advisory Unit (GIA) as a consultant.

Basically there are seven broad steps in the whole process in which GIA plays a role to assist UNCTs with solar PV installations.

### 2. Process Overview

#### 2.1 Self-Assessment & Pre-Site Survey



The more accurate data regarding power consumption and demand, the better the design of the solar power system. In this regard, you should:

- Appropriately scope the solar panel solution for your office by assessing your current energy situation.
  - o If UNDP is participating in the project, please complete the information required in the [Green Energy](#) section of the CO profile under the [ICT Registry](#).
  - o You may have to purchase other important information such as irradiation data from local sources. Consolidated information from the three sources is critical for proper scoping of the solution.
- Fill out the [Preliminary Site Survey Form](#). It includes information such as mounting surfaces, generators, the building electrical panel and wiring, room for battery storage, pictures of the sites, etc.)
- GIA unit will ship you a [Power Consumption Measurement and Monitoring](#) (PCMM) device with simple DIY installation instructions. Once in place, it will measure, monitor and manage your energy via a user-friendly, web-based portal, and will consolidate your consumption patterns data over a given period – which should be at least four weeks.

**Commented [1]:** What if UNDP is not participating? Can other Agencies access these sites?

**Commented [2]:** Do you have examples available?

**Commented [3]:** Three sources? 1. Green Energy under ICT Index; 2. Irradiation data from local source; and 3. ????

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### 2.2 Business Case



- Based on the self-assessment data, PV performance assessment and estimating tools, you are expected to write up a business case that should outline the following :
  - One-time capital investment,
  - Operating costs,
  - Break-even point,
  - Annual savings,
  - CO<sub>2</sub> reduction,
  - Other benefits

### 2.3 Procurement and Cost Proposal



- GIA will actively participate in the procurement process. As a matter of fact, GIA has established corporate multi-vendor LTAs, which are made available to other Agency for piggy-backing.

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### 2.4 Vendor Site Survey



- The selected vendor will conduct a comprehensive engineering assessment of your office onsite.

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### 2.5 Design



- GIA will be actively involved in the design phase through regular update meetings with the vendor and the OMT, to ensure full compliance with the OMT's requirements. At this stage, a full set of technical documentation should be developed for GIA review:
  - Project Plan
  - Design Documents
  - User Acceptance Test (UAT)
  - Operations Manual
  - Maintenance Plan
  - System Monitoring & Reporting Plan

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### 2.6 Installation



- Upon installation, the solar PV solution will be tested over a typical working period, as well as technical rehearsal and final verification. The OMT then takes over the system and puts it in production.

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### 2.7 Operations & Maintenance



- The warranty period will be determined in agreement with the vendor, but should be at least have a 2-year minimum. For optimal system usage, the contract with the vendor should include one year maintenance and web-based monitoring.

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### 3. How UNDP GIA Provides Support<sup>1</sup>

In order to reduce the risks, the project is broken-down into multiple phases handled by UNDP OIST GIA and the contractor.

This will include:

- Logistics
- Site Survey and Assessment
- Design and Cost proposal
- Installation
- Monitoring
- Assistance with Maintenance Support

#### 3.1 Assessment, Per-Site survey and Business Case

Logistics

- a) International transportation, insurance, customs clearance
- b) Organization of local transport

#### 3.2 Site Survey

This should be an on-going collaboration between the vendor and the offices, in the course of these steps;

- a) Formal Site Survey Report (by vendor or appointed vendor partner)
- b) Identify solar panel install location(s)
- c) Identify possible location of battery bank (inside or outdoor in weatherproof enclosure)
- d) Identify best available climatic data to be used in system sizing (at least monthly values of solar irradiance and temperature)
- e) Photo documentation and assessment of any shading objects (by Google earth or local staff)
- f) Review and calculation of consumption profile given by the client (appliances and daily use, including surge loads)
- g) Inspection of roof load bearing capacity in case of roof mounted PV system (by local)
- h) Selection of a suitable mounting system that do not compromise the roof tightness
- i) Energy mix of grid provided electricity in the country
- j) Are Feed-In tariffs available in the country to subsidise solar power generation?

#### 3.3 Design and Cost Proposal

- a) Site specific optimization of PV and battery size (3 days of autonomy if no other specified )
- b) Sizing cable lengths and dimensions for maximum 2% voltage loss at nominal load
- c) Sizing inverter(s) for the necessary surge load capacity
- d) Wiring diagram of the entire installation

#### 3.4 Installation

1. Civil work and Site Preparation

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<sup>1</sup> UNDP Terms of Reference for solar and wind power system suppliers. IK/2014-01-27

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2. Electrical Work
  - a) PV array mounting and cabling with weather proof connectors
  - b) Battery mounting in a ventilated compartment or container. Optional air condition in hot climates and with temperature sensitive battery type.
  - c) Cabling from inverter to new AC switchboard with two outlets (critical and non-critical loads)
  - d) Lightning protection
  - e) Pre-assembling and wiring: mounting of inverters, controllers and the likes done as much as possible in a factory/lab environment
  - f) Configuration for Smart Power Management, including automatic start of generator or load shedding scheme;
  - g) Overvoltage and surge protection
  - h) Option: New electrical switchboard panel 20-600A

### 3.5 Post installation

1. System commissioning
  - a) User acceptance test
  - b) Training
  - c) Commissioning report (measurements and visual inspection)
  - d) Full technical documentation package in English or local language, warranty certificates and contact information
2. System Monitoring
  - a) WEB based monitoring and graphic display of daily PV production, battery SOC and daily consumption, as well as weather/solar monitoring
  - b) Automatic alarm via email/SMS for system malfunction
3. Maintenance and Support
  - a) Continuous management yearly reporting inclusive of guidance on opportunities to further optimize and enhance the system based on actual usage data (considering consumption, generation and solar system).
  - b) Service contract
4. Technical Specifications
  - a) Provide schedule with main components and their technical specifications