

## Standardized Common Service Package For Solar Photovoltaic Systems

### Background

The 2012 Quadrennial Comprehensive Policy Review (QCPR) of UN operational activities for development, adopted on 21 December 2012 by the General Assembly of UN (Res 67/226), called upon the UN system to improve the management of facilities and operations, by taking into account sustainable development practices, building on existing efforts and promoting cost-effectiveness while maintaining accountability, transparency and improved results-based management to Member States. The Executive Boards of a number of UN agencies, funds and programs also emphasized the importance of harmonizing business operations.

With increased public scrutiny and the call for the UN to demonstrate tangible results regarding efficient, cost-effective, impactful and relevant support at the country level, the United Nations Development Group (UNDG) has established the Business Operations Strategy (BOS) framework to support UN Country Teams (UNCTs) to take a strategic, results oriented approach to planning, management and implementation of harmonized Business Operations at the country level. The BOS is the backbone of the 'Operating as One' pillar of the UNDG Standard Operating Procedures for Delivering as One (DAO), approved by the executive heads of 18 UN agencies with field presence.

Where the BOS is the strategic planning tool for common business operations, the UNDG standardized Common Service packages are the actual building blocks for implementation.

### Common Service Packages

When setting up Common Services at the country level, each UNCT currently develops its own services, often duplicating services that have already been developed by other countries. This duplication significantly increases transaction costs for the design of Common Service at the country level. A major part of these costs can be reduced – in particular those costs that are not determined by local factors.

Additionally, due to the variety of solutions, it is challenging for UNDG, HLCM and HQs to track and monitor trends in Common Services and ensure that country practices inform HLCM and UNDG policy decisions aimed to remove blockages and create an enabling environment for harmonized business operations.

The aim of Common Services package is to reduce transaction costs by avoiding duplication of the development effort of Common Services at the country level, and to enhance quality of services by facilitating access to tested practices in other countries.

The CS package itself is in fact a comprehensive bundle of relevant guidance documents and templates that OMTs can readily use to identify and address a need at the country level, and set up a Common Service for that operational area – either outsourced or in-house.

The CS packages aim to standardize those parts of the set-up and maintenance processes that are not subject to local circumstances, thereby providing UNCTs with a standardized “off-the-shelf” Common Service solution that:

- Eliminates duplication of the development cost of common services
- Reduces operating and transaction cost
- Provides better quality of services

- Improves performance evaluation of services
- Simplifies cost recovery among Agencies
- Enables knowledge sharing and promote good practices across the UN system
- Reinforces Monitoring & Evaluation mechanisms in the context of harmonized business operations

## Service Description: Solar Panels

One of the challenges of UN Agencies continuously face, is having to operate in areas where there may not always be reliable and sufficient electricity supply through conventional electricity networks or grids on a regional or national level.

Ideally, no matter what the power source is (grid, generators, renewable energy), effort should be made to reduce the overall power demand through behaviour and efficiency measures such as energy-saving appliances and efficient lighting for example. These measures can help reduce fuel costs for generators and also the upfront investment costs required for alternative energy to meet the demand. Assuming that these measures have been undertaken or are being explored in parallel, Solar Photovoltaic (PV) systems can provide electricity for commercial and non-commercial uses and offer a number of benefits such as green energy, low operating and maintenance costs, long-term predictability of utility bills, etc. Furthermore, this innovative technology also tackles major obstacles related to power outages and electricity shortage in developing countries.

At present, UN Agencies Country Teams (UNCTs) often address grid issues by using fuel generators. While this may solve the problem of outages, it adds other problems, such as noise and pollution which in turn may reduce staff well-being and efficiency.

In addition to the generator's purchase and maintenance cost, UNCTs will also have to consider more cost factors – i.e. fuel, fuel transport and fuel storage. In crisis situations, shortages in fuel and volatile prices add further on to the complexities of UN operations.

Alternatively, the adoption of solar power can lead to many advantages:

- Less dependency on costly, polluting diesel generators that can be partly replaced by solar panels and batteries
- Significant reduction in total cost of ownership
- Ensured business continuity
- Cost efficient – inexpensive energy supply and low cost of maintenance (no moving parts)
- Increased energy efficiency – clean, quiet and sustainable
- Less susceptible to fuel price fluctuations, transportation and storage costs of diesel.

The potential barriers to adoption of solar power include:

- Limited time anticipated to occupy premises, leaving no time to recover the initial capital investment in the solar PV system
- Challenges in obtaining capital funding up front even when the business case shows that the initial outlay will be recovered in a reasonable period of time
- Availability of support within the country to ensure that the solar system is maintained and continues to function.

This package is relevant to all UNCTs regardless of their location. While potentially the maximum benefits could be achieved where a country team is co-located in a common premise, the guidance is also applicable to individual agencies in their own premises.

The package includes forms, templates and guidance developed by UNDP to assist UNDP offices in implementing solar PV solutions, and has been adapted for use by all UN agencies by the UNDG Business Operations Working Group.

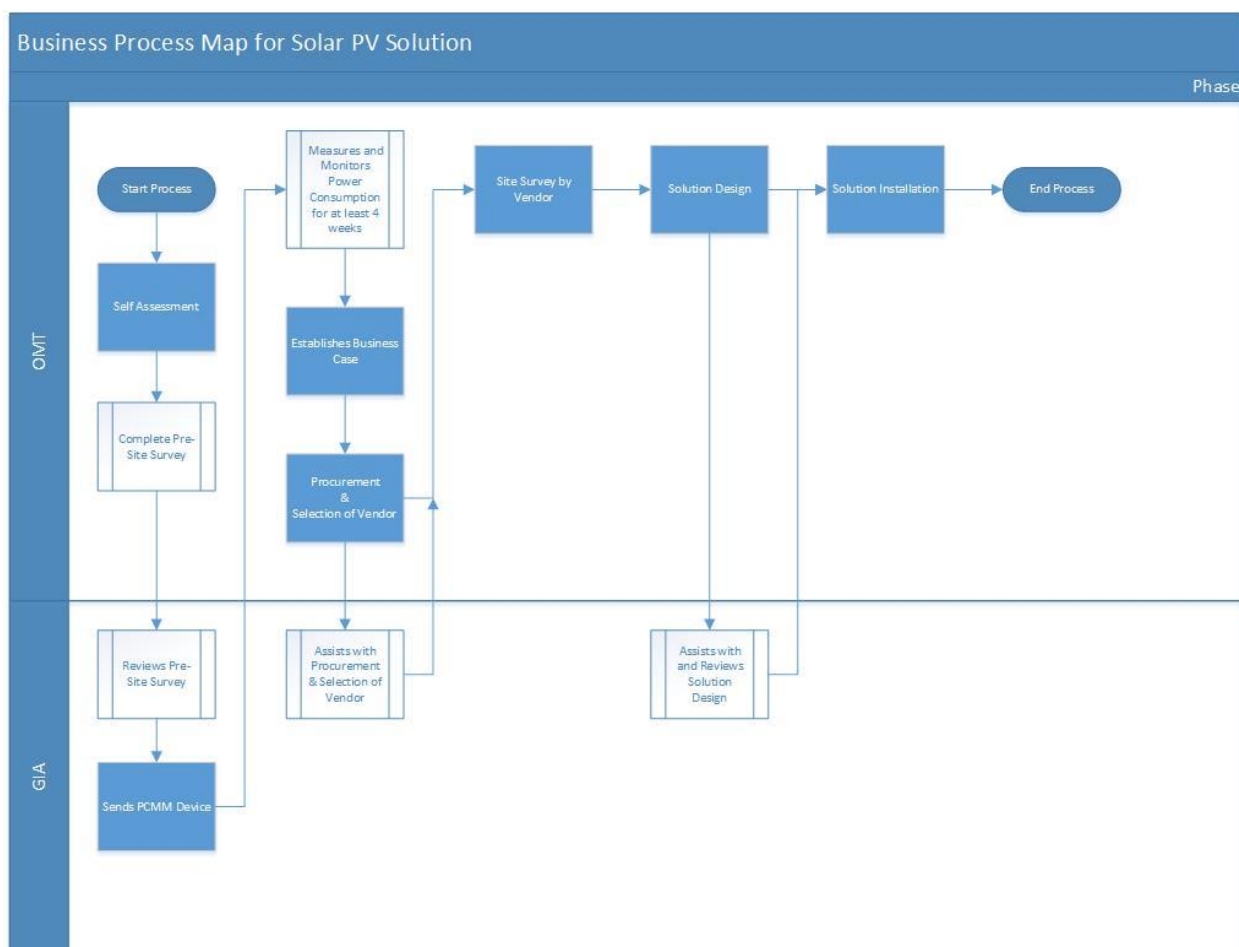
The package includes several success stories of UNDP offices that have implemented solar using the tools in this package (refer to the Annexes)

The package is designed to be used in conjunction with standard LTAs for solar that have been negotiated by UNDP and with assistance from the UNDP on a cost recovery basis. However, UN agencies and country teams may also use the tools in this package on their own -- i.e. without assistance from UNDP and without utilizing the UNDP LTAs. Country teams and agencies may also wish to consider UN WebBuy for potential vendors of solar panels, which also includes technical support from UNOPS either through commitment to purchase through UN WebBuy or on a consultancy basis.

The UNDP unit that is available to provide assistance (and which developed the tools in this package) is the Office of the Global Information Advisor (GIA), located in Copenhagen. For more information on GIA services related cost recovery structures, refer to [gia.green.energy@undp.org](mailto:gia.green.energy@undp.org).

## Business Process

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## Technical Outline

### 1. Self-Assessment & Pre-Site Survey

The first step is obtain an accurate picture of power consumption and demand, as this helps to better design the solar power system. In order to assess your current energy situation, the OMT should:

- Complete the preliminary survey form (Annex 3), which is an assessment of the current energy situation, so as to appropriately scope the solar panel solution for offices. Please note that the Preliminary Site Survey Form also includes information such as mounting surfaces, (roof, wall, ground, parking shade, etc.), pictures of the sites, generator, building electrical panel and wiring, room for batteries, pictures, etc.
- Install and run a Power Consumption Measurement and Monitoring (PCMM) system. Please refer to Annex 4, which includes a sample Request for Quotation with all required specifications. This system will measure, monitor and manage your energy with a user-friendly, web-based portal, and will consolidate your consumption patterns over a given period, usually a minimum four weeks.
- The OMT may decide to use UNDG GIA as their consultant; if so, they should send an email to [gia.green.energy@undp.org](mailto:gia.green.energy@undp.org). If not, then Preliminary Site Survey in combination with the results from the PCMM system will serve as a good starting point for any of the OMT's preferred vendors.

## 2. Business Case

Based on the self-assessment data, PV performance assessment and estimating tools, the OMT is expected to establish a Business Case, including estimated costs (both one-time and recurring), break-even point, annual savings, CO<sub>2</sub> reduction and other benefits to your office.

The business case should include a feasibility study that takes into consideration cost estimates for equipment, transport, support and labor, based on the site assessment done in step 1.

Please refer to Annex 5 for a Business Case template. Sample business cases may be found in Annexes 7, 8 and 9.

## 3. Procurement and Cost Proposal

This step concerns the procurement of the solar PV solution.

In order to simplify the procurement process overall, UNDP OIST/GIA and the UNDP Procurement Support Office are currently working to establish corporate LTAs with multiple vendors, on which UN Agencies piggy back. The LTAs are expected to be in place shortly, and will be included in this Common Services Package as soon as they become available.

A sample Procurement & Cost Proposal will be developed in Annex 10.

## 4. Vendor Site Survey

Once the OMT has selected a suitable vendor, the latter will conduct a comprehensive engineering assessment of the site where the solar PV solution is to be installed.

## 5. Solution Design

During this stage, the OMT may choose to involve UNDP GIA, who will engage the vendor on a regular basis in order to ensure that the system is fully aligned with the OMT's requirements. This phase should yield a full set of technical documentation:

- Solution Design Documents (Annex 11 – under development)
- Project Plan (Annex 12 – under development)
- User Acceptance Test (UAT, Annex 13 – under development). GIA can remotely participate in the UAT exercise, if practically feasible
- Operations Manual (Annex 14 – under development)
- Maintenance Plan (Annex 15 – under development)
- System Monitoring & Reporting Plan (Annex 16 – under development)

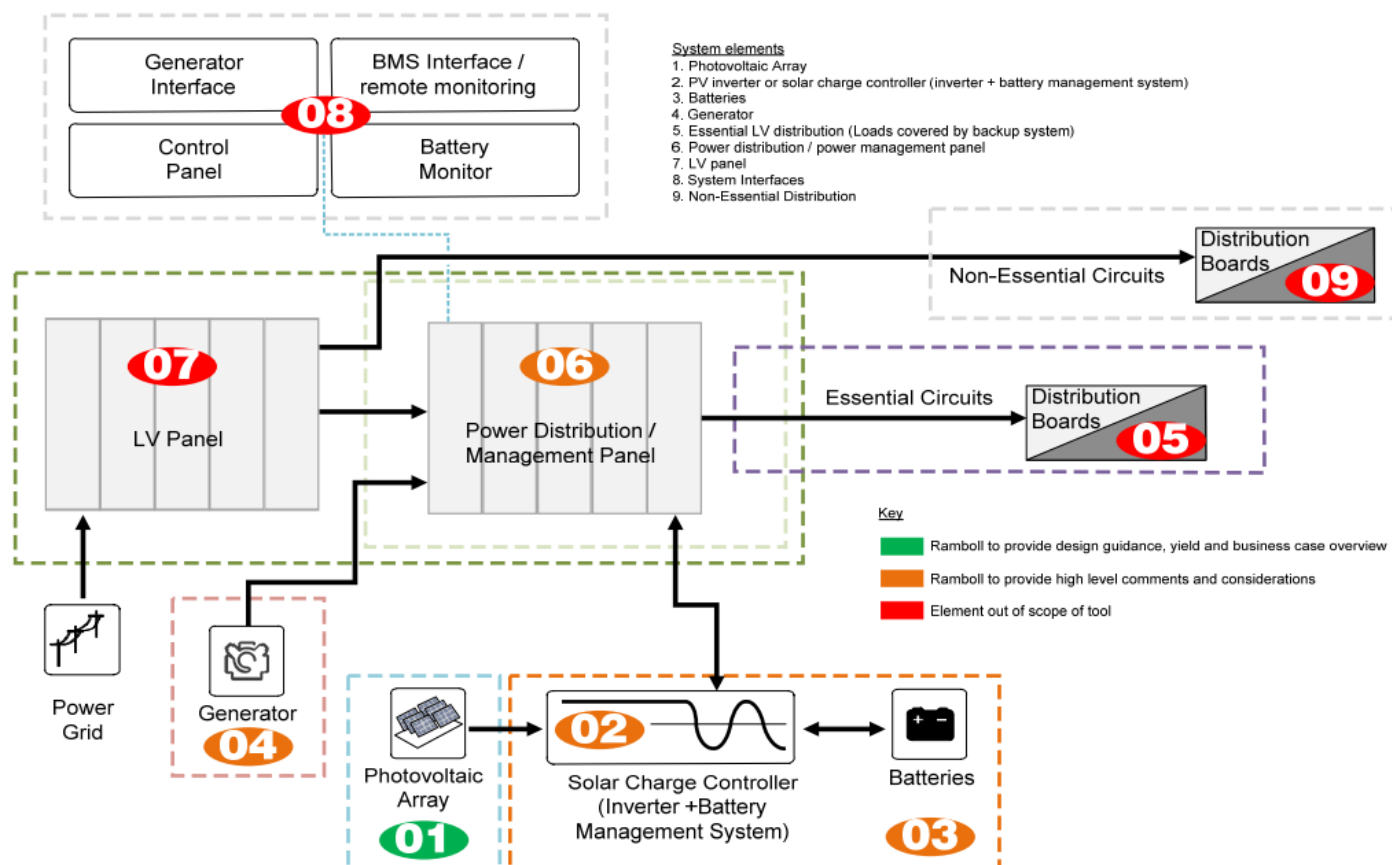
## 6. Installation

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.

*Solar Photovoltaic System Schematic, courtesy of UNDP BOM/OIST/GIA*

## General System Description

It is important to understand that a photovoltaic array is only part of a system that connects panels, inverters and distribution boards with the electrical system of a building. This tool primarily relates to design guidance for the photovoltaic array. The below diagram provides a high level illustration of the elements in a photovoltaic system. Elements are colour coded by the extent to which they are covered by the scope of the tool.



## 7. Operation & 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.

Once the solar PV solution comes online, the monitoring tool allows the OMT to measure performance 24/7. A simple assessment of energy production and consumption can inform the OMT on the need for further optimization.

## Governance

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The UNDG has developed two formal instruments that govern Common Services among UN organizations:

- The template MOU on Common Services (Annex 17)
- The template MOU on Common Premises, which also deals with premises-related common services (Annex 18)

The MOUs are *mandatory*, in that they form the legal basis for the services transaction among Agencies, and should reflect the agreed cost distribution.

While these instruments allow for a certain leeway to adapt to local context, it should be noted that any substantive deviation from the standard template is to be reviewed by the legal department of the respective lead Agency, which often causes significant delays in the process of establishing the MOU. Any fundamental changes from the template are therefore not encouraged.

The MOUs are signed by the Resident Coordinator in his/her capacity as UNCT Chair.

## Cost Recovery

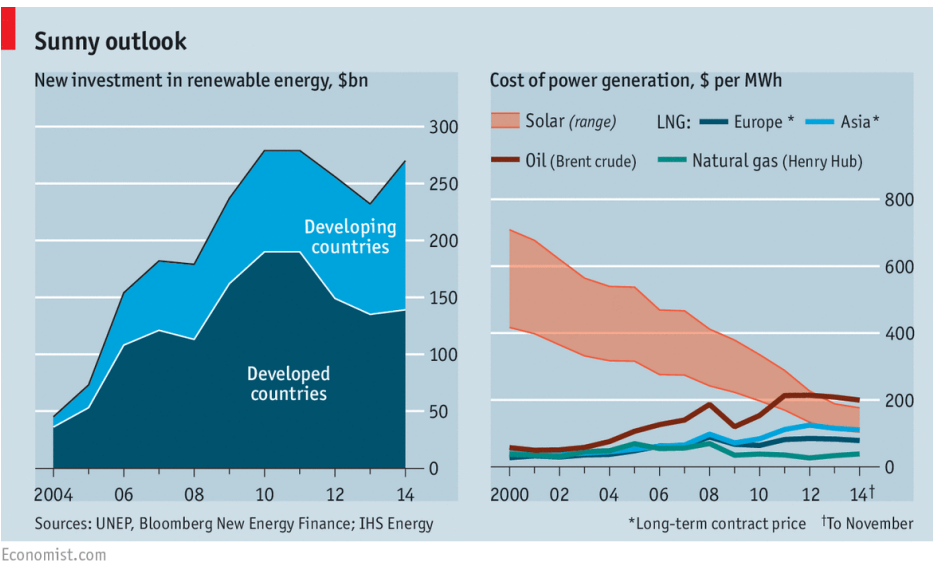
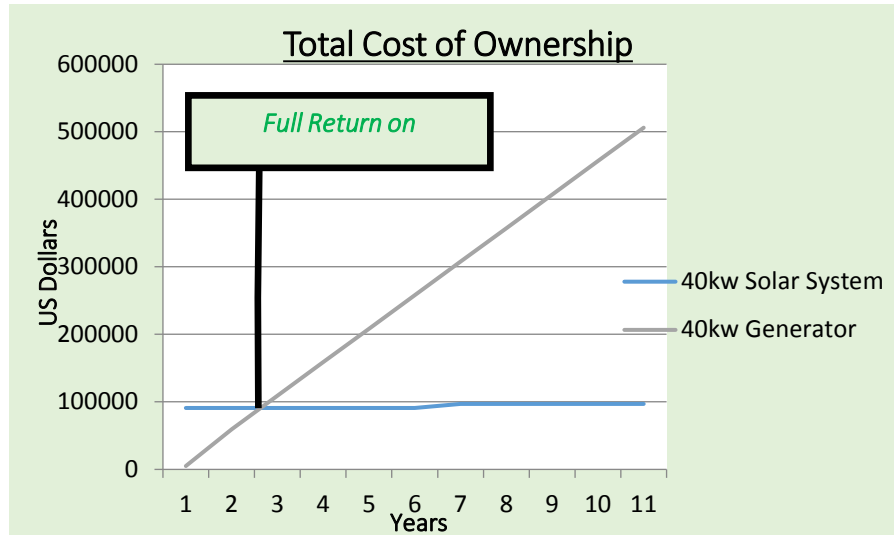
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Please refer to (Annex 19) for an Excel tool that can be used as an example for cost-sharing Common Services, using various cost drivers, i.e.:

- Square feet/square meters of (common) space
- Number of staff
- Number of computers/workstations
- Number of Vehicles

### *Return on Investment*

The solar off-grid solution has a lifespan of 20 years and although it has a high up-front cost, there are relatively low operating cost. In comparison, an average diesel generator will cost about only US\$6,000 but has a high operating cost – assuming it operates eight hours a day, the average fuel costs alone are approx. US\$150 a day. Additionally, solar photovoltaic systems have a much longer manufacturer's warranty for power output... up to 25 years, depending on the system.



Data Sources from *The economist*, 2015

Installing solar capacity, including the power management capabilities described in the Package, UN offices will demonstrate the feasibility of solar in challenging locations, as well as the resiliency, cost-effectiveness, and green-ness of solar. By creating a good example of solar success, UN offices can also help create enthusiasm among donors and momentum for additional solar installations, fostering uptake by national governments, NGOs, and other in-country entities. When the UN proves that solar is possible and practical, other organizations will follow that example, as has already been demonstrated in several locations.



## Best Practices

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Best practices from Eritrea and Sri Lanka can be found in Annex 6.

## Tools & Templates

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- Annex 1 - FAQs
- Annex 2 – Support Process Overview
- Annex 3 – Preliminary Site Survey Template
- Annex 4 – Sample RFQ for PCMM
- Annex 5 – Business Case Template
- Annex 6 – Best Practices
- Annex 7 – Sample Business Case Niger
- Annex 8 – Sample Business Case Senegal
- Annex 9 – Sample Business Case Guinea, Liberia, Sierra Leone
- Annex 10 – Procurement and Cost Proposal Example and/or Template **[UNDER DEVELOPMENT]**
- Annex 11 – Solution Design Example **[UNDER DEVELOPMENT]**
- Annex 12 – Project Plan Example and/or Template **[UNDER DEVELOPMENT]**
- Annex 13 – User Acceptance Test (UAT) Example and/or Template **[UNDER DEVELOPMENT]**
- Annex 14 – Operations Manual Template **[UNDER DEVELOPMENT]**
- Annex 15 – Maintenance Plan Example and/or Template **[UNDER DEVELOPMENT]**
- Annex 16 – System Monitoring & Reporting Plan Example and/or Template **[UNDER DEVELOPMENT]**
- Annex 17 – MOU on Common Services
- Annex 18 – MOU on Common Premises
- Annex 19 – Cost-sharing Calculation Tool