
BOS Practice Notes

Green Energy Assessment, Training, & Business Case

By UNDP's ITM



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Introduction & Background

The Business Operations Strategy (BOS) is a results-based framework that focuses on joint business operations to eliminate duplication, leverage the common bargaining power of the UN, and maximise economies of scale. The Secretary-General mandates all United Nations Country Teams (UNCTs) to ensure compliance with an improved BOS by 2021 to support more effective programme delivery on the 2030 Agenda.

SDG number 7, Affordable and Clean Energy, has been adopted and set as a priority by many member countries in the UN. With this in mind, there is a need to have sufficient capacity in-country to address the needs to achieve this goal. The capacity required is for hands-on work and advisory support to stakeholders and the ability to engage with technical people.

As part of greening efforts to be implemented all over UN Agencies, **the Green Energy Assessment and the Training Course will strengthen UN Country Teams' local capacity to implement sustainable energy solutions.**

The Green Energy Assessment consists of an Energy Audit performed by a specialised team of engineers assembled by the UNDP Information and Technology Management (ITM) Green Energy Team to bolster sustainable energy efforts in the organisation. This assessment aims to support UNCTs achieve optimal levels of power consumption and collect pertinent data to inform the best site-specific design for a solar energy system.

Furthermore, the training course covers the 7-Step process, which is considered Best Practice for Implementing Renewable Energy Solutions. The process focuses on the tools, software, equipment, and best practices required to design and implement a hybrid energy system, especially solar PV.

Developing a BOS provides an opportunity for UNCTs to increase and improve sustainable development practices, bringing the UN a step closer to achieving the Sustainable Development Goals and the 2030 agenda. OMTs are strongly encouraged to integrate environmental sustainability considerations at the earliest opportunity for all common services, to enhance resources and cost efficiencies of UN operations and limit adverse impacts on the local environment. Aligned with the BOS goals, and to make the most out of the opportunity to have a Green Energy Engineer on the premises, **the recommendation is to combine an Energy Audit Mission with the proposed Green Energy Training, therefore increasing local awareness and building local capacity to improve sustainable development practices.**

Objective of the practice

The Green Energy Assessment and the Training Course will support UNCTs (including projects) in implementing green energy solutions starting from conducting assessment missions to project commissioning. As the assessment consists of an Energy Audit mission performed by specialised energy engineers, its objectives are to support UNCTs in achieving optimal power consumption levels by identifying significant sources of consumption and different possibilities of energy production. A number of activities are carried out, including an effort to understand the energy consumption patterns of the premises to design the most suitable Green Energy solution and ensure efficient utilisation of the available energy sources, among other ad-hoc tasks.

In addition to the Energy Audit, UNDP ITM's Green Energy Training Course is focused on the tools and best practices required to design and implement a solar PV hybrid energy system. The

proposed training takes a hands-on approach to real projects with a minimal "classroom" approach.

This practice aims to strengthen the local capacity of UN Country Teams for the Implementation of Renewable Energy Solutions, covering different aspects from advisory guidance to hands-on work. The training is designed as a foundation technical training on sizing, designing, and managing solar PV systems to give participants capabilities to carry out solar PV related tasks with minimal remote support from a green energy engineer.

Beyond acquiring personal knowledge, the training enables participants to appreciate the value of installing solar as a renewable energy source and becoming "ambassadors" for broader adoption.

Key stakeholders and partnerships

While the energy assessment is mainly performed by ITM Green Energy engineer, with the support and collaboration of field staff, the training course is designed for any staff available to work on a solar PV project, which includes counterparts and other UN agencies. The training is recommended for both programme and operations staff in any location with a high potential for solar PV. Staff may include, but is not limited to, team leaders of technical units in UN agencies, electricians, or ICT personnel responsible for the electrical network, green energy focal point in the UNCT.

Being both on-site activities – on request, the training can be held online with a limited number of participants - led by the UNDP ITM Green Energy Team. Neither one of them require any creation of partnerships or special consideration, as the Green Energy Team has all the technical expertise, experience, and capacity to manage and lead these activities per request at all UN premises.

Implementation of the Project/ Activity

The Energy Assessment Audit mission is performed with the ultimate goal to understand power consumption practices by staff in the office and propose recommendations in terms of energy efficiency and electricity consumption.

Among the main tasks to be carried out, the assessment includes:

- (i) Installation or review of IoT and energy meters (Power Consumption Measuring and Monitoring devices and Grid Analyzers)
- (ii) Review the electrical wiring system and single line diagram
- (iii) Assess the consumption patterns of electricity appliances (e.g. use of air conditioning units)
- (iv) Analyse collection of Site Survey information for the design of the optimal solar PV system
- (v) Identifying all potential energy efficiency measures;
- (vi) Presenting to Country Office or OMT management, if required, the mission's initial findings.

Additionally, the Green Energy Training Course consists of an average of six sessions covering the topics of Creating Smart UN Facilities and the 7-Step Best Practice for Implementing Renewable Energy Solutions.

The minimum duration of the training is three full working days. Nevertheless, the duration and content of the training can be tailored based on the UNCT's needs. In case it is not ideal to have

the training for a whole day, the training can be carried out for more extended periods, e.g., only during the mornings for six days.

The training is carried out for a recommended minimum of 8 participants and a maximum of 15 participants. Two instructors are required for ten and above participants. At the end of the training course, an official certificate of attendance is provided to all attendees.

Results/Outputs/Impacts

The Green Energy team develops an energy audit report as an output of the Assessment Mission. The report consists of a comprehensive document that compiles and presents the final mission report. It consolidates all information and findings, such as identifying primary sources of energy supply, detailed analysis of the energy distribution network, and recognised potential for energy consumption reduction deriving from energy efficiency measures. **Moreover, for locations with the prospect of having Solar PV solutions, the assessment includes the compilation of a Business Case, presenting the technical, environmental, and economic assessment of the identified Green Energy solution.**

Once having completed the Green Energy training, attendees will be able to conduct the following:

Site survey for data collection

Carry out load analysis

Build a load consumption profile

Design and calculate the technical and environmental aspects of a solar PV system (kWp, kWh, generator sizing, fuel-saving, renewable fraction, carbon dioxide emission savings)

Calculate the financial aspects of the solar system (\$/kWp, \$/kWh, capital investment, annual saving, O&M cost)

Furthermore, the training covers aspects of procurement, such as technical requirements to include in the terms of reference (TOR) for the Solar PV Request for Quotation (RFQ) process and how to conduct a technical and financial evaluation of bids. The training finalises implementing project management best practices and carrying out operation and monitoring of solar PV systems.

Enabling factors and constraints

Both the Energy Audit and the on-site training are led by a Green Energy Expert, part of the UNDP ITM Green Energy Team. The team is capable and has hands-on experience in deploying these types of activities. The training course has been successfully carried out with different stakeholders, from technical attendees to non-technical personnel with little background in green energy solutions. The training is designed as a foundation training covering all steps involved in sizing, designing, and managing solar PV systems.

For the Energy Audit to be performed, it is highly recommended that the energy meters (PCMM devices and/or Grid Analyzers) are already installed, helping to fast-track mission deliverables. If data is collected for at least six weeks, the analysis of the requirements will be more accurate and the results more fact-based as opposed to extrapolation and making assumptions. Nevertheless,

the Energy Audit mission can also include installing those sensors, in case that has not been done yet.

It is necessary to have at least one electrician or technical support available on-site to complete the mission. A vast number of site-specific electrical information may not be readily available, and as such, the availability of the local electrician is essential. Additionally, the local electrician is likely to understand specific information better and therefore offer better first-level support after the mission.

When it comes to the necessary equipment to ensure the training's quality and deliverables, each participant is expected to have a properly functioning laptop with preferably 8GB memory or more and at least 5GB free space on the hard drive. It is highly preferable to have a completed preliminary site survey and running sensors of the Internet of Things (IoT) (from the ECMM common service by ITM's Green Energy Team) for energy consumption monitoring at the premises where the training will be conducted. ITM will contact the focal point to prepare for this before the training dates.

Sustainability and replicability

The Energy Audit Mission removes the need for external consultants for the same purpose who may not be available for ongoing support and significantly reduces costs associated with engaging an external consultant.

Quick wins can already be expected during the mission, instead of being confined to the Terms of Reference (ToR), eliminating the possibilities of information oversight that might significantly impact project costs. Having a Green Energy Engineer on-site adds value by ensuring alignment with corporate standards for any proposed system or recommendations for UNCT implementation, affording the Green Energy team as well an opportunity to familiarise and relate more closely with situation on the ground and, thus, offering better technical support during implementation of the Green Energy Solution.

As there's no specific equipment or requirement for the Green Energy Training to take place, it can be applied and tailored to fit the conditions of any location, making this service line easily replicable.

Participants that attended this training course will be able to navigate through all 7 steps of the process for Solar PV design; including conducting a site survey for data collection, analysing, and estimating different energy consumption profile, all the way to implementing project management best practices and carrying out operation and monitoring of solar PV systems.

In the long term, knowledge obtained can be used to deploy projects wherever required, facilitating any remote support that ITM engineers provide to UNCTs and help speed up Solar PV project implementation time.

Required investment and other information

In addition to providing an official certification of completion to all attendees, the Green Energy Training Course's will develop a Training Report by UNDP's ITM Green Energy Team that includes detailed information of the training, agenda and topics covered, main questions and feedback summary.

Table 1 below provides an estimated summary of costs for the Green Energy Training Course, including costs for the training program, estimated tickets prices and daily substance allowance (DSA).

Table 1 - Summary of costs for each option

Training packages			
Options	Labor	Ticket ¹	Total
Green Energy Training Course 3 days min.	\$ 800 per working day per person	\$3,000 2 people	\$7,800+ DSA
Green Energy Audit Mission 5 days	\$ 800 per working day per person	\$1,500 1 person	\$5,500 + DSA
Green Energy Training Course and Energy Audit Mission 10 days	\$ 800 per working day per person	\$3,000 2 people	\$11,800 + DSA

¹ Ticket prices are an estimation, and they do not reflect actual costs.

Conclusion

The Green Energy Assessment and Training Course's main objective is to perform a comprehensive Energy Audit, supporting UNCTs to achieve optimal levels of power consumption, and to present the attendees with an overview of Green Solutions, providing training on the 7-Step Best Practice for Implementing Renewable Energy Solutions. The training takes a large hands-on approach and is focused on the tools, software, equipment, and best practices required to design and implement a hybrid energy system, especially solar PV. Once having attended the training, participants can be capable of promoting and implementing a renewable energy source for different locations.

Aligned with the BOS goals, this service line provides an opportunity for UNCTs to increase and improve renewable energy practices, bringing UN personnel and operations a step closer to achieving the SDGs.

If further information or any clarification is required, please contact UNDP's ITM Green Energy Team Green Energy Helpdesk: itm.green.energy.team@undp.org with a copy to itm.green.energy@undp.org.