CLARIFY THE LANGUAGE ON RENEWABLE ENERGY

Secretariate Issue Paper #36

Issue Paper Theme: **Cross-cutting**

BACKGROUND

About 90 percent of the electricity used by UN Peace Operations is produced by diesel generators. While providing a flexible and low upfront cost energy solution, diesel generators contribute to almost half of the total greenhouse gas emissions from the UN Secretariat and are expensive to operate and maintain, with yearly fuel expenditure of over 100 million USD. The reliance on diesel generators limits UN Peace Operations energy autonomy and the delivery of diesel fuel to remote bases may represent a significant logistics and security challenge for the UN and the Troop / Police contributors (T/PCC).

In several resolutions, the UN General Assembly encourages UN Peace Operations to reduce their environmental footprint, including though the use of renewable sources. In addition, at the Climate Summit in 2019, the UN Secretary-General set ambitious climate targets for the UN Secretariat including transitioning to 80 percent renewable energy by 2030[1].

Guided by the Environment Strategy for Peace Operations, UN missions are progressively introducing renewable energy solutions to reduce their reliance on diesel generators. In 2020-2021, about 5 percent of the electricity used in UN Peace Operations was provided by renewable sources, mostly UN-owned solar photovoltaic (PV) systems, and local power grids supplied by renewable energy sources[2]. Transformative changes will be required to meet the Secretary-General's targets in UN Peace Operations.

One of the such changes involves the progressive deployment of contingent-owned (COE) renewable energy systems by T/PCC to reduce the use of diesel generators in the field. In 2020-2021, COE diesel generators produced about 35% of the electricity used in missions, while accounting for about 23% of the Peace Operations' greenhouse gas emissions[3].

In addition to reducing the carbon footprint of field operations, the transition to renewable energy solutions can bring several other practical benefits for T/PCC, including but not limited:

- Improving the energy autonomy and self-sustainment capacity of T/PCC by reducing their reliance on diesel fuel delivery.
- Reducing the need for fuel supply convoys, relieving the burden for escorts and convoy protection, thereby increasing T/PCC's capacity to perform substantive and mandated tasks.
- Reducing safety, security and health risks related to air pollutants, noise emissions, and handling flammable diesel fuel.
- Extending the life expectancy of COE diesel generators.

[1] Additional targets include a 25 percent reduction in per capita electricity consumption by 2025 and 35 percent by 2030; 25 percent reduction in greenhouse gas emissions by 2025 and 45 percent by 2030

[2] MONUSCO's connection to local hydropower grids in the Democratic Republic of Congo contributes to about half of the 5% share of renewable energy

[3] COE generators are the third largest source of greenhouse gas emissions in UN Peace Operations, following UNOE diesel generators and aviation, contributing for 32 percent and 27 percent, respectively

- Reducing the risk of soil and water pollution from fuel and lubricant spills.

Renewable energy solutions can overall bring significant cost savings as they undercut the cost of diesel generated energy in most peace operation settings.

At the 2017 COE Working Group, the COE Manual was amended to introduce reimbursement modalities to encourage T/PCC to deploy renewable energy systems as major equipment. Integrated diesel generator-solar photovoltaic systems are reimbursed based a wet lease reimbursement rate, with incentives ranging from 120% to 180% of the equipment prime power rate, increasing with the size of the generators they are combined with in a hybrid configuration. The amendment also specified that other types of renewable energy systems, including medium-to-high penetration hybrid systems, autonomous photovoltaic and battery systems, and other solar powered equipment such as solar photovoltaic lighting units, are reimbursed as a special case.

Despite the introduction of these reimbursement modalities, the deployment of renewable energy systems by T/PCC remains limited so far to a single pilot project executed by Bangladesh in 2021. This project consists in the voluntary contribution of a 10 kWp solar PV system installed in a Bangladeshi camp located in Juba, South Sudan.

Informal discussions were held with several T/PCC in the months leading up to the 2021 Seoul Peacekeeping Ministerial to explore opportunities to deploy renewable energy solutions in the field and understand the challenges and issues that may have prevented the deployment of renewable energy in the field since the introduction of reimbursement modalities in the Manual in 2017. These consultations have highlighted that the way in which the reimbursement modalities have been structured and phrased in the COE Manual may be misinterpreted by T/PCC, leading to an inaccurate financial assessment that discourages the uptake of renewable energy solutions.

It is therefore proposed to amend the COE Manual to clarify the language used to explain the benefits and characteristics of renewable energy systems, to support T/PCC in their analysis of the suitability of these solutions in their deployment to UN missions. Amendments to the wet lease reimbursement modalities for renewable energy systems are proposed in a separate issue paper (Secretariat Issue paper #20) and are not covered in this document.

PROPOSAL

Paragraph 12, Chapter 3, Annex A of the COE Manual encourages the provision of renewable energy solutions, as major equipment, to replace generators. Paragraph 12 states:

> 12. *The provision of equipment that generates electricity from renewable energy to replace any or all of the fuel generators is encouraged. Such provision will be assessed as a special case.*[4]

At paragraph 22, Chapter 3, Annex B, the use of renewable energy is encouraged under self-sustainment, stating:

> *22. The use of renewable energy electrical generation equipment to provide electrical self-sustainment in lieu of all or part of it being provided by fuel-powered generators is encouraged and will be treated as a special case.*[5]

Chapter 3, Annex A, appendix 3, para 8 provides a non-comprehensive list of the benefits of renewable energy.

> *8. **Renewable energy** increases the self-sustainment capacity of camps by reducing the need for fuel supply and related convoys, especially in areas with asymmetric attacks. Deployment of more renewable energy power generation capacity has a positive effect on the safety, security and health, and reduces the environmental impact of missions globally through a reduction of greenhouse gas*

[4] Ibid., para. 57 (b).
[5] A/C.5/71/20, para. 57 (c).

emissions, and in country through the prevention of air and ground pollution.

Unlike what is mentioned in Chapter 3, Annex A, paragraph 12 and in Chapter 3, Annex B, paragraph 22, two separate reimbursement modalities for renewable energy systems are offered by the Manual in Chapter 8, annex A, depending on the type of system.

For low-penetration hybrid systems deployed as major equipment, the Manual includes wet lease reimbursement rates under the category "Generators, renewable energy integrated diesel-photovoltaic". These are expressed as a premium ranging between 120 percent to 180 percent of the higher category ISO 8528 diesel generator only prime power rate, increasing with the size of generators the solar PV system is combined with in a hybrid setup.

For other types of systems including medium-to-high penetration hybrid systems, autonomous photovoltaic and battery systems, and other solar powered equipment (e.g., solar photovoltaic lighting units), the reimbursement modalities are to be determined as a special case.

Footnotes provide a brief description of low-penetration (photovoltaic peak power kW to generator 100 per cent load rating kW of 25-35 per cent) and to medium-to-high penetration (photovoltaic peak power kW to generator 100 per cent load rating kW of more than 35 per cent). This description is however limited and may be subject to misinterpretation.

It is therefore proposed to make the following amendments to the Manual to allow T/PCC to conduct an accurate economic assessment when considering the opportunity to deploy renewable energy systems, in line with mandates from the General Assembly:

1. Amend paragraph 12 of Chapter 3, Annex A, and paragraph 22 of Chapter 3, Annex B, to indicate that there are two distinct types of reimbursement modalities for renewable energy systems, one based on a wet lease, and the other as special case
2. Introduce two new paragraphs at Chapter 3, Annex (paragraph 12bis and 12ter) to provide a comprehensive list of benefits of renewable energy systems and to provide details on the characteristics of low and medium to high penetration hybrid systems
3. Amend paragraph 8 of Chapter 3, Annex A, appendix 3 to list additional benefits related to the use of renewable energy systems
4. Amend the text used at Chapter 8, Annex A to clarify the configuration of generators and solar systems required to be eligible for the listed wet lease reimbursement rate.

PROPOSED MANUAL TEXT

The proposed amendments are detailed in **Bold** and proposed removal of text is shown as ~~Strikethrough.~~

1. Proposed amendments to paragraph 12, Annex A of Chapter 3, page 31/271

It is proposed to include both types of reimbursement modalities for renewable energy systems at paragraph 12.

12. The provision of equipment that generates electricity from renewable energy to replace any or all of the fuel generators is encouraged. Such provision will either be assessed **on a wet lease reimbursement rate or** as a special case **depending on the type of system as detailed at Chapter 8, Annex A.**

It is further proposed to add a new paragraph 12bis to list the benefits of renewable energy systems. The proposed new paragraph is detailed below:

12bis. Renewable energy increases energy autonomy and the self-sustainment capacity of camps by reducing the use of diesel fuel and petroleum-based lubricants and reducing the need for fuel supply and related convoys, especially in areas with asymmetric attacks. The deployment of renewable energy power generation capacity has a positive effect on the safety, security and health of personnel and the host community, and reduces the environmental impact of

the contingent and the mission through a reduction in emission of greenhouse gas and other air pollutants, and in country through the prevention of soil, air, and water pollution. The use of renewable energy systems in contingent camps also reduces exposure of personnel to elevated noise levels from diesel generators, contributing to the welfare of personnel.

It is further proposed to add a new paragraph 12ter to provide details on the characteristics of low and medium to high penetration hybrid systems. The proposed new paragraph is detailed below:

12ter. Hybrid systems are combined power generation set-ups consisting of solar photovoltaic systems and diesel generators, where the former produces power for instantaneous consumption in parallel to the latter. The solar energy output is seen as a negative load by the generators, which continue to match their output to the changing demand profile and support power quality on the grid. Depending on the share of energy supplied by the solar PV system, hybrid systems can be categorized as low-penetration systems or medium-to-high penetration systems. Low-penetration hybrid systems are defined systems where the ratio between the solar photovoltaic peak power and the diesel generator 100 percent load rating kW is between 25 and 35 percent. These systems allow to achieve significant fuel savings compared to diesel generator only mini grids, reducing both energy costs and environmental impacts, while keeping 24/7 energy production reliability, with the diesel generators capable of covering the full load. Maintenance requirements are also very low, making these systems adequate for field contexts. Medium-to-high penetration hybrid systems also combine diesel generators with a solar photovoltaic system but the ratio between the solar photovoltaic peak power and the diesel generator 100 percent load rating kW is more than 35 percent. They can achieve a proportionally higher reduction in fuel use and greenhouse gas emissions but may require additional space and may be more complex to operate. For high-penetration systems, an energy storage system is required to store and utilize the excess solar photovoltaic energy generated by the system. The design and selection of equipment for a low and medium-to-high penetration hybrid systems shall be based on an estimated site load profile. Considerations shall be made as to whether a controller is needed to guarantee the energy system stability.

2. Proposed amendment to paragraph 22, Annex B of Chapter 3, page 53/271

It is proposed to include both types of reimbursement modalities for renewable energy systems at paragraph 22. The proposed amendment is detailed in bold text below:

22. The use of renewable energy electrical generation equipment to provide electrical self-sustainment in lieu of all or part of it being provided by fuel-powered generators is encouraged and will **be reimbursed on a wet lease reimbursement rate or** treated as a special case **depending on the type of system as detailed at Chapter 8, annex A**.

3. Proposed amendment to paragraph 8, appendix 3, Annex A of Chapter 3, page 46/271

It is proposed to include additional benefits related to the use of renewable energy to paragraph 8. The proposed amendment is detailed in bold text and strikethrough text below. The resulting paragraph will be the same as the proposed new paragraph 12bis at Annex A of Chapter 3 (see proposed amendment 1 above).

8. **Renewable energy** increases **energy autonomy and** the self-sustainment capacity of camps by reducing **the use of diesel fuel and petroleum-based lubricants and reducing** the need for fuel supply and related convoys, especially in areas with asymmetric attacks. Deployment of more renewable energy power generation capacity has a positive effect on the safety, security and health **of personnel and the host community**, and reduces the environmental impact of the **contingent and**

the missions globally through a reduction of **emissions of** greenhouse gas ~~emissions~~ **and other air pollutants,** and in country through the prevention of **soil,** air **and water** ~~and ground~~ pollution. **The use of renewable energy systems in contingent camps also reduces exposure of personnel to elevated noise levels from diesel generators, contributing to the welfare of personnel.**

FINANCIAL IMPLICATIONS

The proposed amendments are not expected to have implications for the UN or troop/police contributing countries, as they mostly aim at clarifying existing provisions.

PREVIOUS HISTORY

The issue paper has not been previously submitted to the Contingent-Owned Equipment Working Group for its consideration.

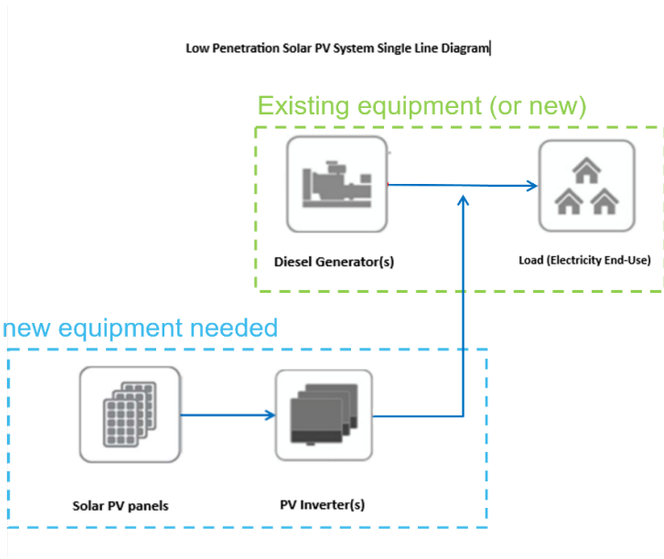
Appendix - DEPLOYMENT OF RENEWABLE ENERGY SYSTEMS IN UN PEACEKEEPING MISSIONS

SOLAR PV HYBRID SYSTEMS

About 90% of the electricity used in UN peacekeeping missions is still provided by diesel generators. Costly to operate, diesel generators used by the UN and troop and police contributing countries (T/PCC) in field missions emit more than 500,000 tonnes of greenhouse gas to the atmosphere on a yearly basis. As mandated by the General Assembly, the UN is striving to reduce the environmental footprint of peacekeeping operations and is accelerating its transition to renewable energy systems. Responsible for about 35% of the electricity produced in peacekeeping missions, T/PCC can contribute to this energy transition by deploying solar photovoltaic systems (PV) in the field, taking advantage of incentives offered in the COE Manual (chapter 8, Annex A).

Solar PV hybrid systems - a simple yet efficient way to introduce renewable energy in T/PCC camps

Combining solar PV systems (solar PV panels, inverters, controllers, and related equipment) with diesel generators is the simplest way for T/PCC to integrate renewable energy in their electricity production systems in UN missions. Solar PV systems can be integrated with the diesel generators already deployed in the field to create a solar PV – diesel hybrid power generation systems. When used in "low-penetration" configuration, the solar PV components are designed to provide between 25 and 35% of the peak energy production capacity during daytime, with the remainder being provided by diesel generators. Low-penetration systems do not require the use of batteries or energy storage systems and can therefore be readily integrated with the generators already used by T/PCC in the field.



Component of solar PV hybrid	% peak energy production capacity	
	Daytime	Nighttime
Solar PV	25-35%	Nil
Diesel generators	65-75%	100%

RENEWABLE ENERGY – MULTIPLE BENEFITS FOR T/PCC AND THE UN

The transition to renewable energy in the field brings multiple benefits, contributing to improving operational resilience, improving safety and security of peacekeepers, and reducing the environmental footprint of operations:

- ✓ Improving energy autonomy, reducing the dependency on diesel fuel deliveries for electricity production
- ✓ Reducing maintenance requirements of diesel generators and extending their useful life
- ✓ Reducing greenhouse gas emissions and contribution to climate change
- ✓ Reducing noise and air pollution in camps
- ✓ Reducing the fire risk related to handling flammable diesel fuel

Simple to operate and maintain, solar PV systems are modular in nature and can be expanded to suit the evolving energy needs of the unit. In addition, solar PV systems have an extended useful life (25-30 years), allowing them to be redeployed to other operating bases or to be donated to the host community when a T/PCC unit is repatriated. In the event that neither of these options are viable, the UN will ensure environmentally responsible disposal of the solar PV system.

SUPPORT AVAILABLE FROM THE UN DEPARTMENT OF OPERATIONAL SUPPORT

The Department of Operational Support (DOS) can provide support to T/PCC exploring opportunities to deploy renewable energy systems in the field. Some of the services DOS can provide to T/PCC include:

- ✓ Support in identifying project opportunities based on site specific context and mission needs
- ✓ Support the scoping and preliminary engineering design of renewable energy systems
- ✓ Explore capacity building opportunities
- ✓ Facilitate partnerships between T/PCC and other Member States aimed at implementing renewable energy projects in the field
- ✓ Support technical and economical assessments for the deployment of renewable energy systems
- ✓ Support for the delivery of renewable energy systems into mission.

For more information and a detailed briefing, please contact DOS at the Uniformed Capability Support Division (generic email address), the Environment Section (dos-ousg-envs@un.org), or DPO at the Strategic Force Generation and Capability Planning Cell (sfgcpc@un.org)