



# RENEWABLE ENERGY

**Sub-Working Group on Major Equipment**

## LIST OF ISSUE PAPERS

Bangladesh	#3
Finland	#1
United States of America	#1
Secretariat	# 20
Secretariat	# 36

## FOCAL POINTS

Germany

## SUMMARY OF PROPOSAL

This Decision Paper addresses the content of the above-listed Issue Papers.

The aims and purpose of the proposal is to

- a) encourage and enable TCCs/PCCs to provide alternative ways of producing/providing energy through environmentally sustainable equipment in UN Peacekeeping Missions
- b) clarify the language on renewable energy as reflected in the COE-Manual 2020
- c) simplify the reimbursement rates of generators with renewable energy as Major Equipment.

Clarification of language on renewable energy is provided for Chapter 3, Annex A, Paragraph 12 and 22 as well as Chapter 3, Annex A, appendix 3, Paragraph 8.

Paragraph 12 of Chapter 3, Annex A, and paragraph 22 of Chapter 3, Annex B are amended to indicate two distinct types of reimbursement modalities for renewable energy systems, one based on a wet lease, and the other as special case. Paragraph 8 of Chapter 3, Annex A, appendix 3 was amended to list additional benefits related to the use of renewable energy systems and 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.

Two new paragraphs are introduced 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.

It is proposed to amend the text used at Chapter 8, Annex A (pages 180 and 181/271) to replace the current modalities with dry and wet lease rates for various ranges of nominal capacity for solar photovoltaic systems,

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calculated using a value of US dollar per kWp of nominal capacity.

It is proposed that solar PV systems and energy storage systems (when used in conjunction with the solar PV system) start to be reimbursed once commissioned and based upon confirmation and demonstration that the systems are operational and functioning.

## PROPOSED TEXT FOR 2023 COE MANUAL

### AMMENDMENTS TO CHAPTER 3 OF THE COE-MANUAL

#### 1. AMENDMENTS TO PARAGRAPH 12 AND ADDITION OF PARAGRAPHS 12BIS AND 12 TER, IN ANNEX A OF CHAPTER 3, PAGE 31/271

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.**

**12bis. Renewable energy increases energy autonomy, operational resilience 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.**

**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**

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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. AMENDMENT TO PARAGRAPH 22, ANNEX B OF CHAPTER 3, PAGE 53/271

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. AMENDMENT TO PARAGRAPH 8, APPENDIX 3, ANNEX A OF CHAPTER 3, PAGE 46/271

8. **Renewable energy** increases **energy autonomy, operational resilience 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 **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.**

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## Changes to Chapter 8, Annex A

### Reimbursement rates for major equipment under a wet lease or dry lease arrangement

(United States dollars)

Category of equipment	Type of equipment	Generic fair market value	Estimated useful life in years	Maintenance rate	Monthly dry lease rate	Monthly wet lease rate	No-fault incident factor (percentage)	Monthly non-United Nations POL	Painting rate	Repainting rate
Generators, excess	<del>Excess</del> requirement (only for the period 2017-2020)	Wet lease reimbursement at 10 percent of equivalent prime power rate								
Generators, renewable energy integrated	diesel-photovoltaic									
20-30 kVA low penetration hybrid system		Wet lease at 120 per cent of equivalent prime power rate								
31-40 kVA low penetration hybrid system		Wet lease at 125 per cent of equivalent prime power rate								
41-50 kVA low penetration hybrid system		Wet lease at 130 per cent of equivalent prime power rate								
51-75 kVA low penetration hybrid system		Wet lease at 135 per cent of equivalent prime power rate								
76-100 kVA low penetration hybrid system		Wet lease at 140 per cent of equivalent prime power rate								
101-150 kVA low penetration hybrid system		Wet lease at 145 per cent of equivalent prime power rate								
151-200 kVA low penetration hybrid system		Wet lease at 150 per cent of equivalent prime power rate								
201-300 kVA low penetration hybrid system		Wet lease at 160 per cent of equivalent prime power rate								
331-500 kVA low penetration hybrid system		Wet lease at 180 per cent of equivalent prime power rate								
Renewable energy – solar photovoltaic system integrated with diesel generator(s) in a hybrid low-penetration configuration <sup>4</sup>	24-36 kW nominal capacity (integrated in a hybrid system with a 101-150 kVA total capacity)	49740	7	90	600	690	0.2			
	37-48 kW nominal capacity (integrated in a hybrid system with a 151-200 kVA total capacity)	70434	7	128	850	978	0.2			
	49-80 kW nominal capacity (integrated in a hybrid system with a 201-300 kVA total capacity)	106860	7	193	1290	1483	0.2			
	81-120 kW nominal capacity (integrated in a hybrid system with a 331-500 kVA total capacity)	166500	7	301	2010	2311	0.2			
	121-150 kW nominal capacity (integrated in a hybrid system with a 500-625 kVA total capacity)	224505	7	406	2710	3116	0.2			



<i>Category of equipment</i>	<i>Type of equipment</i>	<i>Generic fair market value</i>	<i>Estimated useful life in years</i>	<i>Maintenance rate</i>	<i>Monthly dry lease rate</i>	<i>Monthly wet lease rate</i>	<i>No-fault incident factor (percentage)</i>	<i>Monthly non-United Nations POL</i>	<i>Painting rate</i>	<i>Repainting rate</i>
	<b>Greater than 151 kWp nominal capacity (integrated in a hybrid system with a greater than 626 kVA total capacity)</b>	<b>Special case</b>								
<b>Other types of renewable energy systems</b>	<b>Renewable energy storage systems<sup>5</sup></b>	<b>Special case</b>								
	Medium and high penetration <sup>h</sup> hybrid systems power penetration (photovoltaic peak power kW to generator 100 per cent load rating kW) of greater than 35 per cent <sup>c</sup>	Special case								
	Autonomous photovoltaic and battery systems, with or without backup or peak demand generators <sup>c</sup>	Special case								
	Solar photovoltaic area and street lighting units, equipped with LEDs, batteries and sensors-timers <sup>c</sup>	Special case								
	Other renewable energy systems	Special case								

<sup>5</sup> Renewable energy storage systems are to be used in conjunction with a solar PV system in low, mid or penetration hybrid configuration