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WORKING PAPER

SHIFTING POWER

Transitioning to Renewable Energy in United Nations Field Missions

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 Energy
Peace
Partners

Powering Peace
A joint initiative of the
Stimson Center and
Energy Peace Partners

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ABOUT POWERING PEACE

Powering Peace is a joint research initiative of the Stimson Center and Energy Peace Partners, and aims to explore cleaner and more efficient energy options for multinational field operations in fragile states. The Stimson Center, a Washington, D.C.-based research and policy center, has led studies and research on peace operations since its founding 30 years ago, and works to protect people, preserve the planet, and promote security and prosperity. Energy Peace Partners is a U.S.-based organization that works to leverage climate and finance solutions to support peace in places affected by violent conflict. The Powering Peace initiative envisions a broad policy shift within the United Nations (UN) system and among its member states to adopt renewable energy in field operations for both short-term and long-term benefits. As part of a shorter-term effort, the initiative aims to help the UN embrace more efficient and cost-saving technologies, and shift to greater use of renewable energy, now within the context of the UN Secretariat's 10-year Climate Action Plan to source 80 percent of electricity from renewable energy by 2030. The initiative also seeks to identify impacts of and improve on current practice, such as reducing the expense or insecurity associated with long fuel convoys or corruption. As part of a longer-term effort, the initiative aims to help the UN better integrate climate solutions in crisis-affected areas as part of the way it does business, an effort that can support peacebuilding and fulfill the organization's ambition to achieve universal global access to energy under the sustainable development goals. Powering Peace examines the extent to which the footprints of international humanitarian and peace operations can be leveraged to introduce and extend the benefits of renewable energy to communities in fragile states. The project includes the use of reports and case studies as a research tool to identify innovative practices, incentives, and disincentives facing field missions, as well as opportunities for greater efficiency and peacebuilding. Our first report, *Renewable Energy and UN Peacekeeping: Untapped Potential in the Democratic Republic of the Congo*, was published in September 2019. Powering Peace is undertaking a series of case studies of energy use by UN missions in conflict-affected countries.

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ABOUT THIS INTERIM REPORT

This report is intended to demonstrate initial, interim findings in advance of a final report in mid-2020 and to help spark a wider conversation across professional communities involved in fragile states, energy, economics, peace operations, development, and climate issues. We invite comments and criticisms of this working draft and seek review and insights from policy experts and practitioners. This working draft draws on desk and field research, as well as meetings and interviews with experts, practitioners, policymakers, and individuals working within the UN Secretariat and field missions. This report reflects research by the Powering Peace team from 2017-2019, including field visits to the Democratic Republic of the Congo, Lebanon, and South Sudan, as well as interviews with UN mission leadership and officials in New York, Washington, DC, and elsewhere. The final version of this report will include additional interviews and research, and is planned for publication in the summer of 2020.

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GLOSSARY OF TERMS

A4P	Action for Peacekeeping
ACABQ	Advisory Committee on Administrative and Budgetary Questions
AMIS	African Union Mission in Sudan
AMISOM	African Union Mission in Somalia
C-34	Special Committee on Peacekeeping Operations
CAR	Central African Republic
CEB	Chief Executives Board for Coordination
COE	contingent-owned equipment
DFS	Department of Field Support (was replaced by DOS)
DMSPC	Department of Management, Strategy, Policy and Compliance
DOS	Department of Operational Support (replaced the DFS)
DPKO	Department of Peacekeeping Operations (was replaced by the DPO)
DPO	Department of Peace Operations (replaced the DPKO)
DPPA	Department of Political and Peacebuilding Affairs
DRC	Democratic Republic of the Congo
EMG	Environmental Management Group
EMP	energy management plans
EPP	energy project plans
GHG	greenhouse gas
GW	gigawatts
HIPPO	High-Level Independent Panel on United Nations Peace Operations
IDPs	internally displaced persons
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
ISO	International Organization for Standardization
kW	kilowatts
kWH	kilowatt-hours
kWp	kilowatt-peak
MINUSCA	UN Multidimensional Integrated Stabilization Mission in the Central African Republic
MINUSMA	UN Multidimensional Integrated Stabilization Mission in Mali
MONUC	UN Mission in the Democratic Republic of the Congo
MONUSCO	UN Stabilization Mission in the Democratic Republic of the Congo
MOU	memorandum of understanding
MW	megawatts
OIOS	Office of Internal Oversight Services
PCC	police-contributing country
POC	protection of civilians

SDG	sustainable development goals
SG	Secretary-General
SIPRI	Stockholm International Peace Research Institute
SNEL	Société nationale d'électricité (national utility in the DRC)
SOCODEE	local business consortium in the DRC
SRSG	Special Representative of the Secretary-General
TCC	troop-contributing country
UNAMID	United Nations-African Union Mission in Darfur
UNEP	UN Environment Programme
UNIFIL	UN Interim Force in Lebanon
UNMIK	UN Interim Mission in Kosovo
UNMIS	UN Mission in Sudan
UNMISS	UN Mission in South Sudan
UNOE	UN-owned equipment
UNSCAP	UN Secretariat Climate Action Plan
UNSOM	UN Assistance Mission in Somalia
UNSOS	UN Support Office in Somalia

Executive Summary

In his closing remarks at the 2019 United Nations (UN) Climate Action Summit, UN Secretary-General (SG) António Guterres committed the UN Secretariat to slashing its carbon emissions and dramatically increasing its use of renewable energy to 80 percent by 2030. This is an important step forward for the UN to lead by example and to transform its operations. While the UN as an organization has championed efforts to tackle climate change for decades, these are new, concrete goals set for reducing its emissions and scaling up its renewable-energy usage by a clear date.

The activities of the Secretariat constitute approximately 60 percent of the UN system's greenhouse gas emissions, with the largest share coming from peace operations. Today those operations include roughly 13 peacekeeping and 25 special political missions, which deploy to prevent conflict, protect civilians, facilitate peace processes and support peacebuilding activities. Thus, to meet its ambitious carbon-reduction and renewable-energy targets, the UN will need to transform its approach to sourcing and generating power, and rapidly move away from its current heavy reliance on diesel generators in field missions. No other multinational organization has the same international reach and scale as the UN to respond to conflicts and crises. As such, the UN is always leading efforts to strengthen its peacekeeping missions around the world. Addressing the role of energy can also help missions better deliver on their mandates.

The interim report examines how UN peace operations can implement their respective mandates with more diversified energy sources, particularly renewable energy. As seen in the field, missions may be able to improve efficiency, save money, reduce pollution, enhance security, kickstart local access to energy or investment, and reduce corruption – while meeting their mandates. The report also considers how the energy-related policies of UN operations deployed in fragile states can concurrently support international and host-country objectives to reduce global carbon emissions and achieve universal access to electricity. At the current pace, these ambitions could take decades to realize in fragile states. The report offers initial findings from field missions and how they could accelerate beneficial shifts to diversified energy options and meet the SG's goals for increasing the use of renewable energy. In addition, the report identifies areas for further study, as well as goals for the final report.

This report also focuses on UN leadership, and looks at the **broad vision** across the UN system for addressing modernization and efficiency in field operations, as well as to use more renewable energy, increase access to energy, support carbon-neutrality, consider the environmental footprint, and reduce emissions to address climate change. The

report then considers how **current UN policies** translate that vision into mission policy, design and practice.

Next, this report reflects on **lessons from UN peace operations** regarding their efforts to adopt more efficient practices and renewable-energy use, and the relationship to policy goals. The research includes cases based on field research (the Democratic Republic of Congo, Lebanon, and South Sudan), and desk research (Central African Republic, Darfur, Kosovo, Mali, and Somalia) to follow that **chain from theory to practice**, and to **highlight examples from the field that demonstrate innovation**.

Field and desk research identified **examples of innovation and renewable energy throughout peace operations**, even as missions are inconsistent in their usage and results are limited. Most missions have not linked their efforts to the local or national community goals for increasing sustainable-energy options. In addition, decision-making and leadership vary across missions. Policies and guidelines from headquarters offer some support for renewable energy in the field, but missions lack sufficient financial resources, technical capacity, political backing, institutional incentives, and organizational tools (such as the proper systems contracts) for a shift. Other factors reinforce reliance on diesel generators, such as:

- Short-term financing and mandate cycles that impede longer-term budgeting;
- Reliance by troop and police contingents on generators as part of deployment;
- Uneven implementation of strategies to expand renewable energy and minimize the environmental footprint of field missions;
- Difficulty in engaging the private sector and accessing technologies; and
- Lack of attention and data regarding the role of energy and options to shift sources on energy.

Initial Findings

First, energy should be made a more visible part of UN operations. Despite the vision of shifting missions away from fossil fuels, UN policies and decision-making around energy are segregated across agencies and missions. Peace operations are mandated to help bring peace to regions, protect civilians, and enable nations to transition away from conflict. Those goals are the priority and are supported by the activities of the mission. The role of energy is lesser known, poorly understood, and not viewed as an area for research and policy engagement. Yet a fresh focus on energy practices in field missions is required to improve mission effectiveness and to achieve the goals set out in September 2019 by the UN Secretariat Climate Action Plan (UNSCAP). This approach may be resisted by some as being secondary to the primary

mission of UN operations, but it is not an either-or situation. Missions will benefit from tracking their energy use, collecting data, and embracing the benefits that renewable energy can provide across many areas for missions starting up, continuing, or scaling back.

Second, field incentives and disincentives for changing energy options need understanding – and addressing. Each mission has a unique story around how energy impacts its function, as shown by the examples in the Democratic Republic of the Congo (DRC), Lebanon, and South Sudan, as well as Kosovo and Mali, among others. This initial research found that some efforts are underway to make change, but that change needs support, technological know-how, and new financial solutions. There are also opportunities for new and better collaboration with host nations. Mission-specific case studies can help identify the discrepancies between UN visions and their implementation in the field, and help policymakers appreciate the broad variation within individual UN entities and determine how to address these. Member states will need to embrace new approaches, align policies and budgets, and support the deployment of renewable energy in the field, be it with hybrid generators, solar, wind or hybrid minigrids, or by connecting to and supporting the local grids of host nations.

Third, leadership needs to recognize the benefits of renewable energy and accelerating change. Those in leadership at the UN and within member states have pushed forward ambitious new policy goals and approaches. To operationalize these goals and gain the benefits of greater renewable-energy usage, that approach needs to be systemwide. The UNSCAP should accelerate these actions. The SG's office should appoint a champion for and put together a team in support of those leading the UNSCAP implementation plan. They will need support for the combination of innovation, transformation, and partnerships required – the fundamental shift identified in the UNSCAP to move beyond incremental change – to achieve energy savings and peacebuilding benefits for local communities. Policies should follow the vision and drive change, and translate into consistent incentives for the field. Some existing challenges could be addressed by better communications between headquarters, the field, and member states; other challenges will require a change in the way the UN does business across the board. Setting high-level goals and offering political leadership could incentivize and change how the system works.

Fourth, the story of why this shift matters needs broader understanding. Successful renewable-energy projects have been realized across UN field missions, with localized positive impacts and benefits, such as in the DRC, Lebanon, and South Sudan. Yet these good examples tend to be little known outside of each specific mission. Capturing and learning from these experiences can help the UN determine what works, where the blockages are, and where change can be catalyzed. Examples of successful

renewable-energy transitions from outside the UN system, in both the public and private sector, can also be instructive. The transition to a greater use of renewable energy can support a whole range of UN and mission-specific goals, from cost savings and improved security to local energy access and peacebuilding. Although the UNSCAP provides a climate-driven push for this change, the potential positive impacts can be much broader.

Finally, transforming mission energy use is an area deserving of and ripe for partnerships across the research, UN, private-industry, member-state, and philanthropic communities. Transitioning UN field operations from diesel to renewable energy offers a significant potential win for the UN and aligns directly with other international priorities, including the sustainable development goals (SDGs) – particularly energy access (SDG 7), climate action (SDG 13), and peace, justice, and strong institutions (SDG 16). Renewable energy is a rapidly growing sector that is driving jobs, investment, and growth around the world. There are opportunities for partnerships for the UN to adopt new technologies and finance models; to deepen research on the links between energy, conflict, and peacebuilding; and to identify opportunities for renewable energy to support communities and host nations in meeting their goals. Likewise, the UN and its member states should work with philanthropic funders, research organizations, and the private sector to accelerate renewable-energy development, innovation, and investments, and to help identify new models and financing solutions that fit the unique challenges of field missions.

This interim report is an initial attempt to map the UN’s policy and practices around energy provisions in field missions. This inquiry is timely given the UNSCAP and its ambitious new renewable-energy goals, which injects new urgency into confronting change. Our goal is to help build a strong cross-cutting community of interest and to support further research and analysis, as well as deepen dialogue across member states, UN leaders, and those addressing fragile states. The picture that emerges from this research is a complicated one around energy management in UN field missions – a challenge that has historically lacked strong high-level leadership, with decision-making spread across multiple agencies and missions. The good news is that those goals are achievable. Renewable energy has undergone a revolution over the last decade and continues to grow and expand as the world greens its electricity supply. Although UN field missions are unique, there are ample examples, from big governments and corporations to small humanitarian operations and villages, of communities that have figured out how to transition to renewable energy. The UN can do the same.

Initial Recommendations

For UN Headquarters and the Secretariat:

- Establish a team to document and collect lessons learned, identify best practices around current mission efforts on renewable-energy transitions in the field, and identify the incentives/disincentives.
- In addition, commission case studies of current practices for a range of UN peace operations.
- Develop a plan to implement the UNSCAP and empower its implementation by engaging across the UN system in dialogue with actors who support or work in UN peace operations. Develop a concept, strategy and options for advancing Track 2 of the UNSCAP plan on innovation, which will require reviewing new approaches to energy provision, including external partnerships and novel financial arrangements.
- Develop systems contracts to support missions' purchases of renewable-energy hardware, system design, installations, and maintenance for field missions.
- Develop new incentives and support packages to help missions transition to renewable energy for UN-owned equipment and contingent-owned equipment (COE).
- Brief troop-contributing countries (TCCs) and police-contributing countries (PCCs) on the new renewable-energy goals and existing options for generators; create new incentives for TCCs and PCCs to make better use of efficient and hybrid capacities; survey member states to understand who has hybrid generators and renewable energy technology available to deploy; and update them through the COE Working Group discussions in 2020.
- Direct each UN mission to produce an electrification plan by September 2020 to help identify ways to diversify energy sources and increase the use of renewable energy.
- Explore alternative financing options to help support upfront investments and overcome limitations of annual funding cycles, such as a new investment fund to finance the deployment of renewable-energy systems in field missions.
- Develop a concrete set of indicators related to budget plans and use of renewable energy, for each mission to report against.

For Peace Operations:

- Initiate joint processes for mission leadership, from political offices and mission support, to engage on strategic energy issues such as the mission's electricity usage and renewable-energy targets. Identify what is needed to accelerate change toward greater use of renewable energy.

- Explore options for local grid connectivity, where relevant, taking into account both price and environmental footprint of local energy grids.
- Begin to identify mission site locations that could be most suitable for on-site solar/battery systems, based on factors including high energy costs, difficulty of fuel resupply, and likelihood of continuing long-term presence.
- Expand data collection efforts around a mission's energy loads, diesel usage, and energy expenses to create a cost baseline.
- Engage with the local renewable-energy community in a mission's respective country to explore local renewable-energy options and solutions.
- Explore options for private sector renewable-energy-as-a-service solutions, or energy-leasing arrangements.
- Prioritize the hiring of engineering staff with renewable-energy backgrounds, knowledge, and expertise.
- Explore opportunities to support local renewable-energy capacity-building, and the deployment of renewable-energy systems as a means to support better socioeconomic outcomes, improved security, and/or peacebuilding efforts.

For Member States and Troop-Contributing and Police-Contributing Countries:

- Understand UN policy options and prioritize use of renewable-energy technology for contingents deploying to missions.
- Instruct deploying or deployed contingents to explore both local clean grid-connected energy options, and to identify locations and opportunities for transitioning diesel-powered generators to renewable-energy systems.
- Report back on contingent options for energy in the field.
- Support the deployment of renewable energy by troop and police contingents.
- Offer to subsidize or help fund this technology initially for TCCs and PCCs to deploy with renewable-energy technology.

Support implementation of recommendations from the final report of the Expert Panel on Technology and Innovation in UN Peacekeeping¹ to create technology-contributing countries with the capacity for renewable energy to strengthen deployments.

1. Introduction and Scope

Worldwide, the United Nations (UN) plays a central role in addressing global crises. No other multinational organization has its reach and scale, or the international legitimacy and credibility required to respond to crises. As a result, and operating in fragile states, UN peace operations are mandated to prevent conflict, protect civilians, facilitate peace processes, assist in political transitions, and conduct a range of peacebuilding activities.² The UN Secretariat and a diverse range of actors support peace operations in implementing their mandates. More than 100 member states contribute uniformed personnel, civilian experts, and equipment. Even more nations provide financial and diplomatic support. The effectiveness of UN operations to deliver in the field and achieve their mandates is the primary goal of most member states, UN leaders, and various policy initiatives.

Countries that host peace operations seek to address the immediate crisis that drew the UN response, as well as the underlying challenges to their stability, such as poverty, conflict, displacement, and underdevelopment. The international community also supports those goals. Nations have committed to addressing global development through sustainable development goals (SDGs), which target greater access to energy, support for peace, and actions and interventions to combat climate change. Member states are pressing for an effective response to climate change, both to reduce emissions and warming, as well as to prevent intensified conflict and displacement.

This report examines how UN peace operations can implement their respective mandates more effectively and efficiently by shifting from broad dependence on diesel to using diversified energy sources, particularly renewable energy. The report looks at how energy-related decisions for peace operations deployed in fragile states can concurrently support key international-community and host-country objectives, including reducing carbon emissions and achieving universal access to electricity, ambitions that will take decades to realize in the fragile-state context. This inquiry comes as UN Secretary-General (SG) António Guterres, in September 2019, committed the UN Secretariat to demonstrating leadership and making its own contribution to tackling climate change:

The United Nations Secretariat has adopted a new 10-year Climate Action Plan aimed at transforming its operations to achieve a 45 per cent reduction in greenhouse gas emissions and sourcing 80 per cent of electricity from renewable energy by 2030.³

These targets are articulated in the UN Secretariat Climate Action Plan (UNSCAP) for 2020-2030.⁴ The plan aims to align UN operations with the latest recommendations

from the Intergovernmental Panel on Climate Change (IPCC, 2018) and the *UN System Strategy for Sustainability Management*, a report of the UN Chief Executives Board for Coordination (CEB).⁵

The link is clear: the activities of the Secretariat constitute approximately 60 percent of the UN system’s greenhouse gas (GHG) emissions, with the largest share coming from its peace operations. Thus, for the UN to meet its ambitious carbon-reduction and renewable-energy targets, it will need to transform its approach to sourcing and generating power, and rapidly move away from its current reliance on diesel generators in field missions.

Better Achievement of UN Mission Goals

Given the broad mandates and multiple challenges facing UN peace operations, member states and UN decision-makers actively support modernization and reform. Recent initiatives include the 2019 restructuring of the UN Secretariat, which delegates more authority to the Special Representatives of the Secretary-General (SRSGs) in leading missions and overseeing resources in the field; the Action for Peacekeeping initiative (A4P), kicked off in 2018 to rally member states and the Secretariat to make commitments to increase capacity and political support for peacekeeping; and the Santos Cruz report, which brought focus to improved safety and security for missions. Some policy plans also look at the UN operations for environmental purposes in-depth, such as the *2017 Environment Strategy for Field Missions*, which seeks to mitigate the environmental impact of field operations. In the context of energy, the environment strategy encourages peace operations to reduce energy demand, increase energy efficiency, and, where feasible, introduce renewable sources of energy.⁶ These recent initiatives underscore the complexity of contemporary peace operations and the desire to design and deploy peace operations that are fit for the future.

UN field missions today, however, reflect the designs and realities of a different era. Peace operations are frequently deployed as urgent measures to address a crisis. While most operations stay for more than a decade, they are established as short-term missions by the Security Council. Usually missions are set up in host countries with poor or unreliable electricity-grid infrastructure, so operations use diesel-generated power as the main source of electricity. Uniformed peacekeeping contingents also deploy with diesel generators. Hence peace operations, particularly those deployed to off-grid locations, remain almost exclusively reliant on fossil fuels for power generation. Despite the introduction of renewable energy in some peacekeeping and political missions, an internal United Nations report in 2017 recognized the need for a change given that less than 1 percent of energy supplied in peace operations came from renewable sources.

Why the UN Should Walk the Talk with Renewable Energy

As the SG and the UNSCAP have laid out, there are multiple reasons for the UN to shift to renewable energy. The UN is at the forefront of efforts to tackle climate change. The seminal reports of the IPCC continue to assess the science related to climate change and the underlying human activity. UN legal instruments, including the Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement, have raised global awareness and strengthened collective action in the face of climate change. The UNSCAP is the latest demonstration of UN leadership in this area.

The UN system itself achieved climate neutrality in 2019, one year ahead of schedule – a real accomplishment.⁷ This achievement was only possible, however, with the purchase of certified carbon credits that reduced, or offset, total UN emissions. Climate neutrality did not meaningfully alter how carbon-intensive UN peace operations source electricity. The incentives and disincentives for bringing about the type of transformation in peace operations that would result in the deployment of renewable energy at scale are still not well understood. This makes it harder for member states and UN officials to implement required changes in policy and practice across the UN Secretariat, including within those departments and offices that provide capabilities to field operations.⁸

In the past decade, the global-energy landscape has undergone rapid transformation. Nations and communities worldwide have diversified their sources of energy and rapidly increased their use of renewable energy. Driven by advances in technology and dramatic cost decreases, solar and wind power, in particular, have proven economically competitive with fossil-fuel-generated energy in many countries. Energy has an enormous impact on the environment and is among the priority sectors requiring rapid change toward cleaner practices. Governments, corporations, and communities have become aware of the negative externalities associated with fossil-fuel dependence (including local pollution) and long-term climate change, and of the political, economic, social, and environmental benefits associated with transitioning to more sustainable forms of energy. The last decade has seen a dramatic increase in renewable energy in many parts of the world – including over a trillion dollars in new investment – such that it now makes up an increasing share of the global energy mix.

At the same time, nations have embraced the SDGs. Originally set in 2015 by the UN General Assembly to be achieved by 2030, the 17 interconnected goals provide a roadmap for member states. The goals include SDG 7 on affordable and clean energy, SDG 13 on climate action, and SDG 16 on peace, justice, and strong institutions. Countries have pledged to uphold these global goals in support of national interests and international obligations.

These efforts to ensure a sustainable and equitable future have reinforced the unique role the UN plays in consolidating collective action against some of the defining challenges of our time.

Multiple Goals of UN Missions

Peace operations personnel conduct Council-mandated tasks that support peacemaking, peacekeeping, and peacebuilding, while operating alongside emergency humanitarian relief and long-term development actors. Implementation of substantive tasks are the principal focus of senior mission leadership. The scale and complexity of modern peace operations necessitate that operational support is readily deployed to ensure that mission objectives can be accomplished. Over the last decade, greater priority has been given to mitigating the environmental impact of missions, but consideration of the energy resources required for the mission's supply of electric power is not a primary concern.

Crisis-response mechanisms, including peace and humanitarian operations, are also designed as short-term emergency responses to often unforeseen crises. The priority is rightly on saving lives, mitigating crises, achieving mission mandates, and keeping the peace. That approach limits the interest and willingness of UN decision-makers at headquarters and in the field to address long-standing issues related to mission design that are secondary to the mission's core priorities and not clearly supported by financial calculations.

Today, however, consideration of the long-term impacts of mission design may help achieve mission objectives and longer-term peacebuilding, particularly because missions' lifespans usually run for more than a few years.⁹ Given the protracted nature of contemporary crises, the accompanying increase in the duration of peace operations, the ever-present fiscal realities of having to accomplish more with fewer resources, the links between energy and the environment, and ongoing efforts to strengthen the humanitarian-development-peace nexus, discussions regarding modernizing peace operations are incomplete without an in-depth examination of how missions plan, procure for, and sustain their energy requirements.

The question is how to support mission priorities and functions more effectively and enable new options for operations to consider energy sources. Most peace operations are authorized with renewable, short-term, one-year mandates with allocated budgetary resources that cannot exceed the duration of the mandated period. As missions need to generate and sustain power from day one, but are limited to planning beyond one year, a procurement-centric model built around the deployment of diesel generators and the import of diesel has evolved, particularly for missions deployed to regions with poor or limited grid infrastructure. Despite the

increasing affordability of new renewable-energy technologies like solar and wind power, their financial viability is based on large upfront capital investments that are recouped over several years. As short-term mission mandates disincentivize large capital expenditures, many missions remain largely dependent on fossil fuels for power generation.

How can the requirements to provide cleaner and cheaper sources of energy be reconciled with short-term mission mandates? Can the introduction of renewable forms of energy enhance a mission's operational efficiency and effectiveness while also contributing to the achievement of core UN objectives in the host country, including those related to peacebuilding and development? Should the sizable footprints of peace operations, some of which are among the largest producers and consumers of electricity in the host country, be leveraged to introduce new renewable-energy capacity into some of the least-electrified countries in the world? To what extent can the energy-related decisions of missions contribute to advancing universal access to electricity (SDG 7) and climate action (SDG 13) in host countries?

In the context of the recently launched UNSCAP, these questions have new urgency, and new ways of doing business will be required to calibrate a modern approach to energy provision in peace operations that is designed for the future.

Member states, the UN leadership, and the peace operations community face a system designed with one set of core objectives that needs to change to be 80 percent reliant on renewable-energy options in the field by 2030. The obvious positive impact – maximizing benefits for civilians and operations in adopting sustainable energy for both the short and longer terms – will need a concerted effort. This report looks at progress – in the vision of leaders and policymakers, as well as in innovations in the field – to demonstrate a way forward. A picture of renewable-energy usage in the field is emerging – with some individual successes, amid both local and system-level obstacles to change. This report begins to identify hidden costs of the current system, such as the transportation of fuel and, in extreme cases, the link to supporting black-market economies. It further acknowledges factors that will challenge a shift in the field, such as a lack of existing supply chains and know-how in operating new technology in the field (e.g., solar farms).

How the UN Could Better Achieve Its Own Goals

This study looks at the chain of actions – from the role of the SG and UN policies and mission design, to the way operations are deployed and member-state contributions – to begin to identify where changes can and must take place for the UN to achieve its ambitious new renewable-energy goals. This report takes stock of the existing vision of

the UN, its entities, and member states; looks at existing policies for key headquarters and field entities; and maps out the chain of actions that supports mission design and current energy use in the field. The report offers interim findings and recommendations for the UN and its member states to maximize use of renewable energy in a sustainable way. Throughout, the report also considers areas of experimentation and initiative in the field and argues that tapping into areas of innovation will support the new goals laid out by the SG and, more broadly, by the Environmental Strategy.

Chapter 2 looks at the broad vision across the UN system for addressing UN modernization and efficiency in field operations, and its ambitions to increase access to energy and support a reduction in emissions to address climate change. The section also looks at the growth in technology and financing for renewable energy, and how climate and security are related.

Chapter 3 considers how those goals, including increasing the use of renewable energy and achieving carbon-neutrality, are translated into mission policy and design.

Chapter 4 reflects on lessons from UN peace operations in the field and efforts to expand more efficient and renewable-energy use, as well as the relationship to policy goals, incentives, and disincentives. The research looks at three cases based on field research (the Democratic Republic of Congo, Lebanon, and South Sudan), and five cases based on desk research (Central African Republic, Darfur, Kosovo, Mali, and Somalia) to follow that chain from theory to practice in the field, and to highlight examples from the field that demonstrate innovation.

Chapter 5 offers initial findings of how field missions could accelerate a beneficial shift to diversified energy options and meet the SG's goals for increasing use of renewable energy. Early findings consider how energy options could improve efficiency, save money, reduce pollution, enhance security, kickstart local access to energy or investment, and reduce support of corruption. Given the UN role of organizing, deploying, and managing the largest number of peace operations worldwide – and addressing sustainability and peace – it argues that UN missions could benefit from continued innovation, and should adopt policies in line with the goals of environmental and energy sustainability, wherever possible and cost-effective. Finally, it identifies areas for further study and the goals of the final report.

2. What Is the Vision?

Public Goals and Support for Energy Diversity

The UN operates in harsh environments, working to address the world's most complex political, humanitarian, and security challenges. This role drives the SG, senior leaders, and member states to champion the modernization of UN operations in order to match mandates with capacity, increase efficiency and savings, strengthen tools to protect civilians, and establish a more stable peace. Many UN operations have limited energy options, however: they often deploy in remote, poorly electrified, and insecure environments with weak infrastructure and challenging logistical supply lines.¹⁰ These regions frequently have lower levels of reliable energy infrastructure and energy access. The UN's largest peace operations, for example, are in sub-Saharan Africa, which has the greatest regional concentration of energy poverty.¹¹ The majority of peacekeepers serve in large missions in some of the least electrified countries in the world, including Central African Republic (CAR), Darfur, the Democratic Republic of the Congo (DRC), Mali, South Sudan, and Somalia, where the UN supports the African Union-led AMISOM enforcement mission with a logistics capacity and political mission.¹²

For the last decade, reform efforts have included environmental goals, highlighted by UN initiatives such as those described in *Greening the Blue* and the *2017 Environment Strategy for Field Missions*, to address the effectiveness and best practice in UN field missions. More broadly, the UN has embraced carbon-neutrality and sought to reduce its environmental footprint in various ways. While pushing to strengthen peace operations and political missions, member states are also driving support for the SDGs, including for poverty alleviation, climate action, and improved access to energy. Nations have pressed to address and mitigate the impact of climate change, such as through commitments made at the 2015 Paris Climate Summit.

These issues came together at the September 2019 UN Climate Summit, when SG Guterres announced the new and ambitious UNSCAP, an opportunity for the UN to walk the talk. The plan included the goal of reducing UN emissions from Secretariat-related functions by 45 percent and achieving 80 percent renewable-energy usage by 2030. This ambition unites many UN efforts – strengthening peace operations, increasing energy access, and reaching climate targets. The UNSCAP was bolstered by recommendations of the UN's Chief Executives Board (CEB), including its May 2019 report calling for accelerating the UN's use of renewable energy and a systemwide approach to implementing the UN's broader sustainability goals across its programs and activities.¹³

The dropping costs and significant growth of renewable energy over the last decade, and the increased recognition of links between climate change and conflict, will assist. Likewise, international efforts to increase energy access and peacebuilding could collaborate with UN missions in fragile states in areas with less energy infrastructure and finance. To meet these goals, however, the UN will need to incentivize and adopt new practices to accelerate a shift in energy use, with support from UN leaders and member states.

looks at the broad vision across the UN system for addressing UN modernization and efficiency in field operations, and its ambitions to increase access to energy and support a reduction in emissions to address climate change. The section also looks at the growth in technology and financing for renewable energy, and how climate and security are related.

Overview – What is the UN Vision for Field Operations?

Data from the 2017 *Greening the Blue* report found that the Secretariat is responsible for roughly 60 percent of the UN system's total carbon footprint.¹⁴ About 90 percent of the Secretariat's carbon emissions stem from field missions operating and managing their own facilities and infrastructure, with the majority concentrated across the larger peace operations. The UNSCAP marks the first time that clear, time-bound renewable-energy-related goals have been set for UN peace operations.

Many reform proposals have encouraged missions to address parts of the issue. As discussed in Chapter 3, the goal of increasing efficiency and diversified use of energy options dates back to at least the 2007 launch of the *Greening the Blue* initiative. For UN peace operations, the 2017 *Environment Strategy for Field Missions*, issued by the UN Department of Field Support (DFS) and the Department of Peacekeeping Operations (DPKO), encouraged missions to adopt renewable energy use and increase efficiencies. More broadly, successive UN reform proposals – from the current A4P framework to the earlier 2015 report from the High-Level Independent Panel on United Nations Peace Operations (HIPPO) and the 2000 Brahimi Report¹⁵ – have urged adoption of new technology and approaches, increased efficiencies, and accelerated modernization. Reform proposals (such as the Santos Cruz report) recognized the hazards of long fuel-supply chains and urged efforts to reduce insecurity and increase the safety and security of UN peacekeepers.

These policy issues are impacted by the leadership and vision of the United Nations and its member states, and how they see a link between peace and security, access to energy, and addressing climate change intersecting with how the UN operates in the field.

The Role of UN Leaders

The SG plays a critical role in setting priorities and articulating a vision for the UN and its members. The goal of climate-neutrality was put forward by SG Ban Ki-moon (2006-2016), who became an active champion of addressing climate change, sketching out the ambition for the UN to be energy efficient and climate-neutral by 2020.¹⁶ In 2007, Ban called for transforming the UN into a more energy-efficient organization, and making the UN Headquarters in New York climate-neutral and a “globally acclaimed model of efficient use of energy and resources.”¹⁷ He envisioned the same for UN operations. He cited the protection of the environment and procedures that include improved power generation as key to ensuring a “responsible United Nations presence and a positive legacy.”¹⁸

Ban’s vision for a more efficient UN was followed by efforts to achieve climate-neutrality across the UN system. In 2007, the executive heads of UN agencies, funds, and programs committed to shift their respective organizations toward climate-neutrality. To implement this commitment, the UN’s Chief Executives Board (CEB) developed a UN Climate Neutral Strategy, eventually coordinated by the UN Environment Program (UNEP), asking UN organizations to estimate, reduce, and ultimately analyze options for offsetting UN GHG emissions from facilities and operations.¹⁹ Ban wrote to the CEB members and UN funds and programs in September 2014, alongside the UN Climate Summit, urging “full compliance with the United Nations Climate Neutral Strategy” and climate neutrality by 2020 “at the latest.”²⁰ The CEB recommitted to the goal of carbon-neutrality for the UN by 2020, but cautioned that it should not be solely achieved through carbon credits but through footprint reductions.²¹

Greening the Blue to the UN Climate Summit

The *Greening the Blue* initiative emerged from the 2007 climate-neutral strategy and Ban’s call for the UN to lead by example. The main objectives were to address the UN’s own actions, including (1) to measure and report on environmental impacts; (2) to undertake efforts to systematically manage and reduce environmental impacts; and (3) to achieve climate-neutrality by 2020.²² These efforts were supported by the UN Environment Sustainable United Nations Facility and the Environment Management Group.

By the 2018 *Greening the Blue* report, 43 UN agencies were reported to be carbon-neutral, with 39 percent of the UN’s reported GHG emissions being offset. UN field missions were an outlier, however, both in terms of reporting on their emissions and failing to achieve carbon-neutrality, while accounting for more than half of all UN emissions.²³

Since 2017, SG Guterres has made climate change a priority, urging action and moving the UN into a carbon-neutral posture. In 2018, he told the media that “I am beginning to wonder how many more alarm bells must go off before the world rises to the challenge,” noting that 2017 had been filled with climate chaos and 2018 had already brought more of the same.²⁴ “The Stone Age did not end because the world ran out of stones. It ended because there were better alternatives. The same applies today to fossil fuels,” he said, stressing the need for a further cut in GHG emissions of at least 25 percent by 2020.²⁵

In early 2018, Guterres renewed calls for governments, businesses, and civil society to “run faster than climate change,” and enhance their ambition “to make sure that we reach the end of the century with an increase in temperature of about 1.5 and below 2 degrees Celsius,” the key goal of the 2015 Paris Agreement.²⁶ In September 2018, Guterres outlined his vision for the 2019 UN Climate Summit. Labeling climate change as “the defining issue of our time,”²⁷ he argued that although the global community has the tools to be effective, a lack of political leadership and ambition put nations behind on meeting pledges laid out in the 2015 Paris Agreement to reduce their emissions and combat climate change. He argued that “technology is on our side in the battle to address climate change,” and cited the growth of renewable energy:

The rise of renewable energy has been tremendous. Today, it is competitive [with] – or even cheaper – than coal and oil, especially if one factors in the cost of pollution. ... More than 250 investors representing 28 trillion dollars in assets have signed on to the Climate Action 100+ initiative. They have committed to engage with the world’s largest corporate greenhouse [gas] emitters to improve their climate performance and ensure transparent disclosure of emissions. ... All the pioneers I mentioned have seen the future. They are betting on green because they understand this is the path to prosperity and peace on a healthy planet. The alternative is a dark and dangerous future. These are all important strides. But they are not enough. The transition to a cleaner, greener future needs to speed up. We stand at a truly “use it or lose it” moment.²⁸

In announcing the 2019 Climate Summit, Guterres stressed raising ambitions dramatically, and to focus on “the heart of the problem – the sectors that create the most emissions and the areas where building resilience will make the biggest difference.” Specifically, he urged reaching net-zero carbon emissions by midcentury, shifting from coal to solar and wind, expanding carbon pricing, and strengthening sustainable food-supply chains that reduce loss and waste. On financing, he called for governments “to mobilize 100 billion dollars a year for climate action in support of the developing world.” The test is whether governments, industry, and civil society will take action.

The SG oriented the summit around increasing member-state ambition to implement the 2015 Paris Agreement commitments.²⁹ In June, Guterres called for government and business leaders to present plans to cut GHG emissions by 45 percent by 2030 and to achieve carbon-neutrality by 2050.³⁰ One question remained: What were the goals for the UN itself to make in line with these commitments and for its operations?

The Missing Message: Is the UN Walking the Talk?

In May 2019, UN leaders addressed that question. The CEB, which includes the leaders of 37 UN organizations, issued a joint appeal to the SG ahead of the Climate Summit. Reiterating calls for member-state ambition, the CEB encouraged the SG to focus on the UN system's "raising its own ambition to take concrete steps to combat climate change and to integrate more systematically sustainable development considerations into how we operate." The CEB report, *Strategy for Sustainability Management in the UN System 2020-2030*, announced that it would develop an environmental and social sustainability strategy to "ensure the UN system practices the principles that it promotes and systematically embodies the SDGs, addressing the full picture of environmental and social sustainability in its policies, strategies, programmes, projects, facilities and operations."³¹ To decrease the UN carbon footprint, the CEB's joint appeal stated:

In the area of GHG emissions, in particular, we intend to align with the recommendations of the IPCC report, and we will take concrete steps in energy demand reductions in all facilities and operations, transition to renewables, and improvements in our travel and transport management and climate neutrality.³²

Building on the progress of Greening the Blue, the CEB also called to "upscale and improve our sustainability reporting framework to communicate transparently about our progress, our efforts and challenges on the journey."³³ The strategy recognized a "a very low uptake of renewable energy across the UN system due to ongoing reliance on costly and polluting diesel generators."³⁴ The recommendations included efforts to:

- Establish a UN-wide baseline using the existing UN GHG emissions data and feasibility of a UN shift to renewables;
- Decarbonise energy supply, by purchasing renewable electricity and heating utility wherever it is available;
- Increase, wherever possible, the use of renewables via investments in on-site self-production;
- Where appropriate, support dedicated private sector renewable energy projects to supply the UN;
- Consider where renewables are not available to switch to Renewable Energy Certificate.³⁵

The urgency for UN action is to “ensure that its own activities do not cause further harm.” They also recognized the role of peacekeeping. Despite some progress, the strategy stated that “the remaining challenge is to achieve climate neutrality for the whole UN Secretariat, particularly UN peacekeeping activities, which make up over 90 percent of reported UN system emissions not currently offset.”³⁶

The UN Secretariat Climate Action Plan

Ahead of the 2019 Climate Summit, the UN Secretariat announced the UNSCAP, a new 10-year climate action plan meant to slash emissions by almost half by 2030. Referring to the plan as a way to show the world that the UN intends to lead by example, SG Guterres highlighted it in his closing remarks. Specifically, he announced the Secretariat’s commitment to reduce GHG emissions by 25 percent by 2025 and 45 percent by 2030; and to source 40 percent of the Secretariat’s electricity from renewable energy by 2025, and 80 percent by 2030.³⁷ The plan would bring UN operations in line with the 2018 IPCC recommendation to limit climate change to 1.5 degrees Celsius. The announcement of these quantitative targets for emission reduction and renewable-energy usage is a significant step for the UN to walk the talk, and the first UN performance targets to drive action on energy use beyond neutrality.

The UNSCAP states its goal as being more efficient, climate smart, and good for sustainable development. It sets out the ambition of “transforming its operations to achieve ambitious reductions in greenhouse gas emissions while generating long-term efficiencies and benefits to sustainable development efforts overall.”³⁸ On renewable energy, the plan says the Secretariat should “reduce energy consumption and transition to a significantly greater reliance on renewable energy while generating operational and financial co-benefits.”³⁹ In addition to the sustainable development agenda, the UNSCAP refers to several mandates that form the basis of the plan’s rationale. The plan highlights General Assembly resolutions on two sets of issues: environmental management and sustainability; and sustainable energy for all, using renewable energy and energy efficiency. It also builds on work from the CEB and represents the UN Secretariat’s response to the request of the SG to align UN Secretariat efforts with those of the wider UN system.⁴⁰

In terms of implementation, the plan envisions an integrated and simultaneous approach along three tracks: intensification, innovation, and internal and external outreach. The intensification track seeks to accelerate current efforts by focusing on behavior change linked to consumption, energy efficiency, connection to existing renewable-energy grids where possible, and some limited renewable-energy self-generation. The innovation track aims to deploy innovative and complex solutions that rely on external partnerships, including scaling up new technology and purchasing renewable energy in field locations from new private or public facilities. The internal

and external outreach track is meant to support the efforts of the first and second tracks with a “sustained communication and educational campaign to affect institutional change and facilitate resource mobilization efforts.”⁴¹

With recognition by the SG and UN leaders of the need to address peace operations, was that recognition shared by the Security Council?

The Security Council

The role of the Security Council in addressing the impact of climate change was first explicitly examined in 2007. A main point of contention is whether or not the Council is the appropriate body to address climate change, and whether it is impacting international peace and security, which is the basis of the Council’s agenda. Some members have argued that the Council should consider climate-related issues, underscoring the security implications of land degradation and food insecurity, for example. Some permanent members, including China and Russia, argue that this issue is a matter for the General Assembly and the Economic and Social Council.⁴² In general, the Council’s treatment of climate change fell into a set of “nontraditional” security threats, along with disease and transnational organized crime.

In April 2007, the U.K. held a ministerial-level open debate on the relationship between energy, security, and climate, with a briefing by SG Ban. While the U.K. argued the security implications of climate change could “exacerbate some of the core drivers of conflict, such as migratory pressures and competition for resources,”⁴³ other states were skeptical, with China describing climate change as an issue of sustainable development.⁴⁴ The Council debated climate change again in July 2011, with Germany negotiating a presidential statement that reaffirmed the UN Framework Convention on Climate Change as the “key instrument for addressing climate change,” and noting that the Council “expresses its concern that possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace and security.”⁴⁵

For some members, they highlighted specific issues in their region. In November 2016, for example, Senegal chaired an open debate on “water, peace, and security,” which examined the relationship between climate change and water scarcity, transboundary water management, and the negative effect of conflict on access to clean water.⁴⁶ Language around climate change is included in Council resolutions for other missions, including Darfur, Mali, and the Sahel and West Africa more broadly. After a March 2017 visit to the Lake Chad region, the Council adopted Resolution 2349, which addressed dimensions of the Boko Haram conflict and emphasized the need for adequate risk assessment and management strategies by governments and the UN as they relate to the security effects of ecological factors in the Lake Chad Basin.⁴⁷ In 2018, the Council

issued a presidential statement connecting climate change and insecurity in the Sahel and West Africa. The statement reflected growing acceptance that the Sahel and West Africa are extremely vulnerable to threats posed by climate change, recognizing the “adverse effects of climate change and ecological changes among other factors on the stability of West Africa and the Sahel region, including through drought, desertification, land degradation, and food insecurity.”⁴⁸ The statement argued for risk assessments and risk-management strategies by government and the UN related to these factors.⁴⁹

In 2018, Sweden elevated climate change within the Council, focusing on how climate threats disproportionately impact fragile populations who have contributed little to the anthropogenic nature of the problem.⁵⁰ In July 2018, Sweden hosted a debate on understanding and addressing climate-related security risks. UN Deputy Secretary-General Amina J. Mohammed said:

The impacts of climate change go well beyond the strictly environmental. Climate change is inextricably linked to some of the most pressing security challenges of our time. It is no coincidence that the countries most vulnerable to climate change are often those most vulnerable to conflict and fragility. Fragile countries are in danger of becoming stuck in a cycle of conflict and climate disaster. Where resilience is eroded, communities may be displaced and exposed to exploitation. That said, the impact of climate change on security can take many different shapes, as the concept note for this debate continues to argue. They include loss of livelihoods, food insecurity and risks to the natural resource base. Many of those manifestations become visible only over time.⁵¹

The Council broke new ground in March 2018 by formally recognizing the “adverse effects of climate change, ecological changes and natural disasters among other factors on the stability of Somalia” into its resolution extending the mandate of the UN Assistance Mission in Somalia (UNSOM).⁵² While this recognition by the Council is encouraging, the impact on the mission’s activities or approach in the country is unclear.⁵³ In January 2019, the Dominican Republic initiated an open debate in the Council to address the impact of climate-related disasters on international peace and security.⁵⁴ Their concept note highlighted a question about the UN’s field operations:

How can the missions deployed by the Council, notably its peace support operations and special political missions, be harnessed to prevent and better manage crises resulting from such disasters, for example through the proactive collection of local knowledge, including from women and young people?

Broadly, the open debate hosted speakers who saw a demonstrable need for better climate-risk management, as an important contribution to maintaining international

peace and security.⁵⁵ The Dominican Republic's leadership reflected a trend toward highly vulnerable nations asserting themselves at the UN in an effort to demonstrate that to many low-lying island countries, the threat of climate change is existential. Less was said about peace operations, however. Lindsay Getschel of the Stimson Center, serving as a youth and civil society representative, urged the Council members to adopt a resolution committing UN missions to transition to cleaner energy practices in its own operations and seeking to be using 50 percent renewable energy by 2025.⁵⁶

The issue should be of direct concern to the Security Council. A recent report from the Stockholm International Peace Research Institute (SIPRI) found that eight of the ten countries hosting larger multilateral peace operations were in countries highly exposed to climate change.⁵⁷

General Assembly

The UN General Assembly is the main policy-making organ of the UN, and the only one in which member states are equally represented. General Assembly resolutions are nonbinding, unlike those of the Security Council. In recent years, a handful of resolutions have tackled issues related to energy in UN field missions. For example, Resolution (A/RES/72/224) of December 20, 2017, broke new ground with a series of critical points, including that it:

- “Strongly encourages Governments and other relevant stakeholders to take actions to achieve universal access to affordable, reliable, sustainable and modern energy, increase the global share of new and renewable energy, improve the inclusion of developing countries in energy sector cooperation...”;
- “Encourages Governments, the United Nations system and relevant stakeholders to leverage the cost-competitiveness of renewable energy, especially in off-grid areas, in order to achieve universal energy access, such as by establishing policy frameworks for metering and payment systems, requiring cost comparisons between grid extension and off-grid solutions, facilitating investment by domestic and foreign banks and educating students, communities, investors and entrepreneurs on renewable energy and energy efficiency, among other activities, where feasible and appropriate”;
- Emphasizes, while noting progress, that the large-scale deployment of technologies has been uneven and that support is required to realize their potential, along with appropriate policy initiatives and investments at the national and international levels, with governments working in collaboration with relevant stakeholders, including the private sector;
- Calls upon the Secretary-General to promote renewable energy, energy efficiency and related sustainable practices in all United Nations facilities and operations around the world, set implementation targets

and timelines, building on and avoiding duplication with existing initiatives, and report on progress, within the most relevant existing reporting frameworks.⁵⁸

This resolution identified the broad need for the UN to set its own targets and timeline for adopting and reporting on use of renewable energy, goals taken up by UNSCAP if not the whole UN system fully.

Sustainable Development Goals

Expanding Access to Energy

Member states embraced the SDGs in 2015, agreeing to support transformation across multiple goals to end poverty, support development, and sustain peace. All of the 17 SDGs are relevant to the efforts of different UN institutions. While some relate more closely to development agencies, others overlap more directly with the goals and activities of UN field missions, including SDG 16 (peace, justice, and strong institutions). Each goal is organized around a series of targets and indicators (see Box 1 on SDG 7's targets and indicators).

Box 1: SDG 7: Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All

“In 2015, the UN General Assembly adopted the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs), which include a dedicated and stand-alone goal on energy, SDG 7, calling to ‘ensure access to affordable, reliable, sustainable and modern energy for all.’ Energy lies at the heart of both the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change. Ensuring access to affordable, reliable, sustainable and modern energy for all will open a new world of opportunities for billions of people through new economic opportunities and jobs, empowered women, children and youth, better education and health, more sustainable, equitable and inclusive communities, and greater protections from, and resilience to, climate change.” (From: <https://sustainabledevelopment.un.org/topics/energy>)

TARGETS

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.
- 7.3 By 2030, double the global rate of improvement in energy efficiency.
- 7.A By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.
- 7.B By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.

INDICATORS

- 7.1.1 Proportion of population with access to electricity.
- 7.1.2 Proportion of population with primary reliance on clean fuels and technology.
- 7.2.1 Renewable energy share in the total final energy consumption.
- 7.3.1 Energy intensity measured in terms of primary energy and GDP.
- 7.A.1 Mobilized amount of United States dollars per year starting in 2020 accountable towards the \$100 billion commitment.
- 7.B.1 Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services.

SDG 7 seeks to ensure access to affordable, reliable, and modern energy, including by increasing substantially the share of renewable energy in the global energy mix by 2030. That includes the ambition to achieve universal electrification, energy efficiency, and greater use of renewable energy, all goals in line with reducing climate change. Regions with the greatest energy deficits include sub-Saharan Africa and South Asia, which need help improving energy access.⁵⁹ UN missions are present in many of the least electrified countries, including CAR, the DRC, Mali, Somalia, and South Sudan.

The Global Trend of Growing Renewable-Energy Usage and Deployment

Policy Drivers and Efforts to Promote Renewable Energy

Renewable-Energy Revolution. The dramatic expansion of renewable energy is driving an energy transformation across the world and reshaping the global energy landscape. New renewable-energy technologies have registered unprecedented growth over the past decade.⁶⁰ Between 2010 to 2019, \$2.6 trillion will have been invested in renewable-energy capacity, more than triple the amount invested in the previous decade.⁶¹ In 2018 alone, the share of global electricity generated from renewables increased from 11.6 percent in 2017 to 12.9 percent in 2018.

Solar and wind are the renewable-energy technologies responsible for the boom over the past decade, attracting the most investment at \$1.3 trillion and \$1 trillion, respectively.⁶² Together they accounted for 84 percent of annual renewable-energy growth in 2018.⁶³ By late 2019, they are projected to account for about 18 percent of global generating capacity, compared with just 4 percent a decade earlier. Solar and wind are now the cheapest sources of electricity across more than two-thirds of the world and are projected to power half the globe by 2050.⁶⁴

The story of solar is noteworthy. At the end of 2009, there was only 25 gigawatts (GW) of mostly grid-connected solar power capacity worldwide. Over the next decade, approximately 638 GW of solar capacity was added. More solar capacity has been installed over the past decade than any other fossil-fuel-based or renewable source of generation. While the majority of investment in renewable-energy capacity has supported utility-scale projects (typically more than 1 megawatt in size), financing has also flowed for minigrids (in the tens or hundreds of kilowatts) that serve small enterprises or communities, as well as household solar systems (in the hundreds or watts or single kilowatts). In parts of sub-Saharan Africa, for example, the off-grid, pay-as-you-go market has allowed households to buy or lease competitively priced solar products (up to 150 watts) to power appliances, lighting, and phones.

Key Drivers of the Revolution. New renewable-energy technologies were initially expensive and relied heavily on subsidies and government mandates. Today, the business case for renewables, particularly for solar and wind, has become more compelling. Since 2010, the cost of solar has decreased by 85 percent and wind by 49 percent, and the cost of batteries by 85 percent.⁶⁵ Costs for many renewable sources of generation have undercut new fossil fuels. The cheapest source of new electricity-generating capacity in many countries is either solar or wind. This downward price

pressure on solar- and wind-generation capacity has been driven by massive investments from China, Europe, and the United States, combined with advances in technology, more efficient manufacturing, low interest rates (i.e., the cost of finance), and increased competition.

Ease of access to project finance for “bankable” projects has also supported the rapid expansion of renewable-energy technologies. Upfront capital expenditures for solar and wind projects, in particular, far exceed the operating expenditures to sustain projects once commissioned.⁶⁶ In order to equity- or debt-finance these large capital costs, developers must demonstrate that a project will generate sufficient returns, which, in turn, are dependent on contracts that guarantee a price for the purchase of electricity. This is done through government-mandated contracts such as feed-in tariffs or power-purchase agreements with utilities or credit-worthy companies.⁶⁷ More recently, government auctions for building renewable-energy capacity have led to historically low electricity prices for wind and solar projects in many countries.⁶⁸

Finance Flows. During 2017-2018, \$579 billion was spent on global climate finance, primarily for climate mitigation, with the majority of this expenditure (58 percent) supporting renewable-energy generation. The majority of global climate finance (61 percent) funded projects in developing countries outside the Organization for Economic Co-operation and Development, led by China, which remained the largest country both to provide and receive investment. While almost all regions have witnessed an increase in climate finance, most investment flows to or within the largest carbon-emitting geographies rather than to or within regions that are most climate-vulnerable or least electrified. **Although the Middle East and Africa are promising growth markets for renewables, this region accounted for less than six percent of total climate finance last year. Sub-Saharan Africa accounted for only about three percent.**⁶⁹ Africa, where one in two people lack electricity access, also receives a small share of global electricity finance, i.e., investment for expanding access to electricity (including both renewable and nonrenewable technologies). Only 17 percent or \$5 billion annually of the total global electricity finance was allocated to Africa in 2018, representing a 32 percent decrease from the previous year. At the same time, financing for off-grid solutions and minigrids – which could enable much of Africa to leapfrog into a sustainable energy future – is a tiny fraction, at \$430 million or 1.2 percent of total financing going into expanding electricity access. The majority of this funding is concentrated in Kenya, Tanzania, and Uganda.⁷⁰ In the meantime, fragile states, many of which are among the most climate-vulnerable and energy-poor countries, receive little of either global climate finance or investment to increase energy access.

Development Benefits of Renewable Energy. The SDGs provide a set of 17 global goals to achieve by 2030. Renewable energy is most commonly associated with SDG 7 (access to affordable, reliable, and sustainable forms of energy) and SDG 13 (climate action). SDG 7 is key to accomplishing many other SDGs, such as health, education, food security, gender equality, poverty reduction, and employment, as well as climate action. **Today about 840 million people still lack access to electricity, and 78 percent live in 20 countries in sub-Saharan Africa and Asia.** Off-grid solar and other decentralized renewable-energy solutions have the potential to close the electricity gap for communities without electricity access, including rural and last-mile communities for whom extending the grid is not feasible. Indeed, some developing countries with significant deficits in energy access have embraced strategies that combine better-centralized grids with decentralized renewable-energy solutions.⁷¹

Introducing renewable-energy capacity in areas with limited access to affordable and reliable electricity can bring many benefits, including low-carbon economic growth, increased livelihood opportunities, improved health and education outcomes, enhanced security conditions, and support to national climate goals. A key benefit is the potential for renewable power to serve as an engine for job creation. As global renewable-energy capacity expands, jobs are being created every year across the sector, including in the manufacture, sale, installation, operation, and maintenance of renewable-energy technologies. Labor-intensive solar is responsible for creating the majority of these new jobs. Renewable energy now employs 11 million people worldwide, with 3.6 million jobs in solar and 322,000 jobs in Africa.⁷² The International Renewable Energy Association (IRENA), estimates that at least 4.5 million jobs could be created in the off-grid sector, a step to universal access to energy by 2030.⁷³

A startling transformation has since taken place over the past decade. New renewable-energy technologies, particularly solar and wind, are transforming the electricity sector in many countries. The business case for renewables, driven by increasing cost-competitiveness and proven financing models, is more compelling than ever. **The scale of global renewable-energy investment is unprecedented. However, fragile states, many of whom are climate-vulnerable and among the least electrified countries in the world, receive little of this investment.** The opportunity for UN peace operations is to leverage their footprints to introduce renewable-energy capacity into fragile regions where they deploy, thus delivering benefits to both the missions and host communities.

The Link Between Environment, Climate Change, and Conflict

There is a growing interest in – and evidence of – the intersection between climate change and conflict. This is generating debate about the nature and weight of that

linkage, and what should be done about it. Deforestation, desertification, and extreme weather events such as flooding, droughts, and tsunamis are leading to areas of accelerated displacement and disruption of livelihoods. Those conditions can stress preexisting or fragile faultlines, affecting governance, disease management, peace agreements, and territorial integrity, and contribute to the risk of conflict. While climate impacts are being felt worldwide, fragile states are especially vulnerable, with fewer resources and governmental capacity to respond.⁷⁴ These impacts are compounded when countries already face conflict or post-conflict challenges.⁷⁵ As noted earlier, a 2019 SIPRI study found that eight of the ten countries hosting the largest peace operations were in countries highly exposed to climate change.⁷⁶

Climate change has been dubbed a “threat multiplier” for conflict risk by the U.S. military, whose *Quadrennial Defense Review 2014* noted: “The pressures caused by climate change will influence resource competition while placing additional burdens on economies, societies, and governance institutions around the world. These effects are threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions – conditions that can enable terrorist activity and other forms of violence.”⁷⁷ Just as there is no single, universally agreed cause of conflict, climate change does not have a single, easily identifiable impact. Climate change can intersect with the many often-nuanced political, economic, demographic, or identity-based drivers of conflict in different ways, exacerbating existing tensions or putting increased pressure on preexisting divisions or fault lines. For example, a report on the security impacts of climate change in Africa found that warming temperatures and potential shifts or decreases in rainfall could have outsized consequences on the continent because of the high reliance on subsistence farming for livelihoods and rain-fed agriculture on the continent for food production. These potential impacts could exacerbate other factors that contribute to or drive violent conflict.⁷⁸ Other research found that climate-related disasters have a higher risk of leading to violence in ethnically divided societies.⁷⁹ Mercy Corps has identified four main pathways by which climate change impacts can contribute to conflict: 1) extreme weather, disaster, and displacement; 2) natural-resource-based livelihoods insecurity; 3) food insecurity and price volatility; and 4) changing transboundary water flows.⁸⁰

While the nature and weight of these links are debated, without consensus on what should be done, there is growing agreement on a link between climate change and specific conflicts. For example, the conflict in Darfur, Sudan, began in 2003 following years of drought and desertification that pushed Arab pastoralist tribes further south, leading to conflict with African farming communities over grazing land. Politicized and militarized by the central government, this ethnic fault line became a defining characteristic of the Darfur conflict, clearly evident in both the pattern of atrocity

crimes committed and the ongoing civil war. In 2007, SG Ban flagged climate change as a contributing factor to the war in Darfur.⁸¹

Another well-known example is the Lake Chad Basin area, where the initial shrinking of Lake Chad in the 1970s and 1980s led to economic and social devastation among communities that relied on it for their livelihoods. Combined with population growth and economic disruptions, conditions for extremism and violence grew, as evidenced by the birth of Boko Haram, which has drawn primarily from these affected communities.⁸² An Adelphi study highlighted the complexities of the regional conflict, and how climate-change impacts and conflict created a negative feedback loop that reinforced each other.⁸³ To break this “climate-conflict trap,” the report highlights the importance of addressing climate-change impacts as part of peacebuilding efforts. In Somalia, climate change has played a role in years of drought, which contributed to conflicts between clans over the control of natural resources, enabling the recruitment for Al-Shabaab and other terrorist groups, and driving migration.⁸⁴

Water scarcity is an obvious potential risk for conflict, yet energy is given scant attention in most climate-security analysis, however. Similarly, energy access and increased electrification is discussed in the context of SDG 7, but not often linked to SDG 16 (peace, justice, and strong institutions). Energy is highly relevant and a clear area for action by the UN and UN field missions.

The rapid expansion of renewable energy represents the most conspicuous global response to climate change over the last decade, with as much as 75 percent of global climate finance going to renewable energy in recent years. As noted above, little of this investment is reaching the developing world in general, and fragile or conflict-affected states in particular.⁸⁵

Next Steps

Given that UN field missions are often among the largest consumers and producers of power in the fragile countries in which they are deployed, transitioning these field missions from their current reliance on diesel to a greater share of renewable energy can unlock multiple benefits. The next two chapters will discuss these benefits in detail; they include the following.

- **Cheaper energy generation:** A dramatic reduction in the cost of solar and wind power technology in recent years has made renewable energy cost-competitive or cheaper in many parts of the world. This is particularly true in many of the sunny but energy-poor locations that host UN field missions, which

ironically often have very high energy costs due to fuel scarcity and long fuel-supply lines.

- **Emission reductions:** Given that the Secretariat accounts for 60 percent of all UN emissions, with UN field missions responsible for the vast majority, transitioning from dirty diesel to clean renewable energy is a necessity for the UN to meet the goals set out in the new climate action plan.⁸⁶
- **Reduced insecurity and corruption:** Diesel can often function as a scarce commodity in conflict settings, with parts of the supply chains controlled by conflict actors and overlapping with the war economy, such as in Lebanon, Somalia, South Sudan, Syria, and elsewhere. International humanitarian missions that rely on local diesel procurement can inadvertently channel millions of dollars to conflict actors, a dynamic that can be mitigated significantly through a transition to renewable energy. Furthermore, the need to transport and protect fuel convoys has been identified by the UN as one of the greatest threats facing peacekeeping missions today.⁸⁷ A transition to renewable energy can significantly reduce a mission's fuel requirements, and therefore the frequency of fuel convoys.
- **Creating new clean energy development to support peacebuilding and atrocity prevention:** Leveraging UN field missions to build out new clean energy development in fragile settings can create entry points for peacebuilding and atrocity prevention in at least three different ways, recognizing that each solution will be context-specific.
 - **Creating future peace dividends for the post-conflict phase:** For example, South Sudan hosts a \$2 billion+ per year international peacekeeping and humanitarian operation, which is almost entirely powered by imported diesel. South Sudan's reliance on fossil fuel for energy is part of a broader zero-sum dynamic in the country, in which those in power have access to resources, and those outside fight to gain access. Transitioning these operations from diesel to solar can create significant new decentralized energy infrastructure, which can transition to local ownership and serve as a future peace dividend in a post-conflict and/or mission-drawdown scenario. It can also help diversify the country's energy base and reduce the country's near-total reliance on oil and provide new opportunities for capacity building and economic development.⁸⁸
 - **Mitigating current conflict dynamics:** The Virunga National Park in Eastern DRC has benefited in recent years from the construction of several

new hydroelectric dams, which power local industry and provide energy to neighboring communities in the conflict-ridden Kivu provinces. The project was designed specifically to reduce the need for illegal logging; create new jobs and economic development to undercut the economic drivers behind poaching and local conflict; and support local peace-building.⁸⁹

- **Catalyzing opportunities for cooperation and confidence-building:** The technical preparatory work for Lebanon's first large-scale wind project, in northern Akkar province, led to a new agreement on a local boundary that had previously fueled conflict between two neighboring communities in northern Lebanon.

3. Aligning Vision and Policies for Operations

To increase the effectiveness of UN missions, as well as to expand the use of renewable energy and meet the new UN climate goals, ambitions need to translate into policies and actions. Until recently, the primary environmental guidance for UN peacekeeping operations came from the 2009 Greening the Blue and its subsequent reports, and the UN Department of Field Support's *2017 Environment Strategy for Field Missions*. The new UNSCAP is significantly more ambitious. With its specific goals to reduce emissions from the UN Secretariat by 45 percent, and to increase the percentage of electricity from renewable sources to 80 percent by 2030, attention will shift to UN peace operations' outsized carbon footprint. As noted earlier, the UNSCAP calls for three tracks, pursued simultaneously, including an *intensification* of current efforts, *innovation* with new efforts focused on technology and approaches, and *internal and external outreach* to maximize participation across UN staff and non-staff personnel, member states, and other public-sector organizations.⁹⁰ The Secretariat, with more than two dozen offices and entities, collectively accounts for about 60 percent of reported UN GHG emissions.⁹¹ Of those emissions, the vast majority (90 percent) come from field operations, primarily UN peacekeeping missions.⁹²

This chapter looks at the UN Secretariat and its role in organizing, deploying, and supporting UN peace operations. It considers how missions are designed and how policies reflect the larger goals and vision identified in Chapter 2, including policies that precede the UNSCAP, what is already in line with those goals, and the gaps between the ambition and policies. This review considers major initiatives to improve peace operations effectiveness, safety, and impact, and ways to support more renewable-energy sources in the field as part of meeting the UN's goals.

Secretariat Efforts in Policy and Practice

Mandated by the Security Council, peacekeeping missions are directed to support political agreements, protect civilians, strengthen the rule of law, and enhance human rights. They also support humanitarian efforts, disarmament, security-sector reform, and mediation, among other measures. The larger peacekeeping missions – such as in the Democratic Republic of the Congo (MONUSCO), South Sudan (UNMISS), and Mali (MINUSMA) – have personnel levels ranging between 15,000 and 20,000.⁹³ Led by civilian SRSGs, missions are comprised of civilian, police, and military personnel. In the field, UN leaders are responsible for missions meeting their mandates – and juggling

competing priorities to deliver in the field, manage operations, and support political negotiations. They must support efficiency and effectiveness, reduce costs, improve security, and strengthen management reforms – as well as implement policies on the environment.

Peace Operations Policies

Overall, modernization and reform efforts aim to strengthen field capacity, increase efficiency and security, reduce costs, and support technological innovations for peace operations. The role of energy, however, has not been a core consideration in the past. One exception is the 2015 expert report on technology and innovation, *Performance Peacekeeping: Final Report of the Expert Panel on Technology and Innovation*, which acknowledged the deep reliance UN missions have on energy, the challenges in finding reliable sources, and the benefits for using renewable energy:

As with so much of modern life, peacekeeping missions require energy for every conceivable aspect of their operations. However, many mission areas lack reliable access to local energy grids and continue to rely on diesel generators as a prime source of energy for operational needs. ... [and] if not carefully sourced, peacekeepers risk finding themselves depleting the very reserves that their host communities count on. Our recommendations provide a pathway to a more sustainable approach which places less strain on the fragile environments and local communities in which peacekeepers serve, and which reduces the burden on mission support.⁹⁴

The report went on, arguing that:

Advances in alternate sources of energy, including solar and wind, can provide partial solutions for power needs, especially for specific applications such as powering isolated facilities. As an example, UNIFIL's full-scale solar arrays have been successful at reducing fossil fuel consumption. Aggressive application of alternate energy technologies, especially those that can be sourced locally or regionally, could significantly reduce the requirement of fuel transportation.⁹⁵

Reform and modernization initiatives, such as the UN and member-state commitments made by more than 100 countries under the A4P initiative kicked off in 2018, seek to strengthen partnerships, policy, and political engagement. In the *A4P Declaration of Shared Commitments*, member states also agreed to embrace “sound environmental management by implementing the United Nations Environmental Policy for UN field missions” and “support environmentally-responsible solutions to our operations and mandate delivery.”⁹⁶ That remained a Secretariat priority “for UN field missions to minimize risk to personnel, communities and environments in all peacekeeping missions,”⁹⁷ even as it wasn't clear how A4P was driving change.⁹⁸ A4P commitments

are consistent with increased renewable-energy usage, which could facilitate broader A4P goals of better field conditions to reduce peacekeeper fatalities, enhance safety and security, support peacebuilding and the local community, and improve medical, technical, and logistical support in peacekeeping operations. Recent UN-commissioned reviews of peace operations, such as the 2017 Santos Cruz report on safety and security,⁹⁹ also shape priorities for UN modernization and reform.

The 2015 HIPPO report made broad recommendations for improving UN missions, with an emphasis on political strategies. That report took note of the 2009 Environmental Policy for UN Field Missions and called for the Secretariat and peace operations to participate in the UN's broader efforts to mitigate climate change.¹⁰⁰ Furthermore, with respect to ensuring a responsible presence of UN peace operations, the HIPPO report recommended that:

- Environmental impact assessments should be carried out as part of the assessment and planning of new missions and undertaken regularly during the lifetime of a mission; and
- Peace operations maximize opportunities for local procurement through updating and revising the existing rules and regulations to prioritize local capacities.¹⁰¹

These reforms were then taken up by member states and referenced by a series of high-level summits of national leaders focused on increasing offers of key capacities in short supply for UN peacekeeping.¹⁰²

Member states play a substantive role in UN Secretariat policies on peacekeeping, and approve budgets and policy in addition to providing uniformed officers and contingents to missions. The

UN General Assembly's Special Committee on Peacekeeping Operations (C-34) is made up of member states and works alongside the budget committees of the General Assembly, for example. The C-34 usually negotiates a joint document to address current peacekeeping issues. In 2018, for example, the C-34 referenced the environmental footprint of missions, and greater use of renewable resources for efficiency of missions, along with the improved health, safety, and security of both peacekeepers and local communities:

The Special Committee looks forward to the planned update of the United Nations environmental policy for peacekeeping operations and its waste management policy and environmental action plan and encourages greater use of renewable resources in order to achieve more efficient use of energy and water, reduce waste production and improve the health, safety and security of local communities and United Nations personnel.¹⁰³

The report also recognized that contingents “are responsible for deploying with a self-sustainment capacity for accommodation for six months, after which the United Nations provides either reimbursement or accommodation,” and urged that standards of accommodations be reviewed with the COE Working Group and the General Assembly’s Fifth Committee to update principles in compliance with UN environmental standards.¹⁰⁴ The C-34 Committee also recognized the benefits of a smooth and beneficial transition of mission facilities to the local population, which could open the door for the transition of renewable-energy assets to local communities:

The Special Committee recognizes that co-use and post-mission-use of United Nations facilities by the local population and members of the United Nations system can contribute positively to a smooth transition.¹⁰⁵

In general, few nations have focused on reducing the UN carbon footprint.¹⁰⁶ During the 2019 annual deliberations of the C-34, however, Italy and Bangladesh announced the creation of a Group of Friends for environmental management in the field, calling it “a strategy that clearly illustrates how such activities can strengthen operational effectiveness and efficiency.”¹⁰⁷

Together, the budget and policy guidance to missions focuses on the core objectives of peace operations. Mission-specific peacekeeping budgets and mandates are generally approved on a 12-month cycle, reflecting the temporary nature of the original vision for peacekeeping. Yet the average lifespan of a UN peacekeeping mission currently is more than a decade, and often more than two.¹⁰⁸ As discussed below, one-year funding renewals pose a challenge for missions looking to invest in infrastructure with larger upfront costs, including renewable-energy systems.

Key UN Secretariat Entities Responsible for Energy-Related Decisions

UN peacekeeping missions generate power for their operation using both UN-owned equipment (UNOE) and contingent-owned equipment (COE). In general, the UNOE capacity supports the peace operation’s offices and staff, including for civilian personnel and mission leadership, which in many cases encompasses the mission’s substantive offices and housing. Uniformed troop and police contingents bring their own equipment, including generators, to be self-sufficient as directed. For that equipment they are reimbursed under COE rules. Management and oversight of these processes is shared across multiple actors within the UN Secretariat and within field operations. Overall, the chief of mission support is responsible for the logistics and infrastructure that back up operations, as well as dealing with logistics, procurement, and supply-chain issues. In particular, the COE and UNOE system is important for understanding and

mapping the incentives and disincentives behind decision-making around energy by contingents. These different streams overlap in the field and need to be understood and updated in order to catalyze a transition to renewable energy.

In early 2019, the main Secretariat offices overseeing the organization, deployment, and assessment of UN peace operations changed to include:

- **UN Department of Operational Support (DOS).** DOS replaced the Department of Field Support (DFS). According to its website, DOS “provides operational support to all UN Secretariat entities, including advisory, operational and transactional support services and, where needed, exercises delegated authority on behalf of clients. DOS supports the entire UN Secretariat, consisting of almost 100 entities located around the globe.”¹⁰⁹
- **UN Department of Peace Operations (DPO).** DPO replaced the Department of Peacekeeping Operations (DPKO). According to its website, DPO “provides political and executive direction to UN peacekeeping operations around the world and maintains contact with the Security Council, troop and financial contributors, and parties to the conflict in the implementation of Security Council mandates.”¹¹⁰ With new decision-making authorities delegated to the field, DPO supports missions and guides decisions and political strategies, working closely with both the civilian staff of missions and in helping recruit and support the uniformed personnel from member states who deploy as peacekeepers.
- **UN Department of Political and Peacebuilding Affairs (DPPA).** DPPA replaced the Department of Political Affairs. It leads UN efforts “to prevent and resolve deadly conflict around the world.” DPPA brings focus to areas in international peace and security, including: analysis and early warning, preventing conflict and managing political crises, sustaining peace, and enhancing partnerships. According to its website, “DPPA monitors and assesses global political developments with an eye to detecting potential crises before they erupt and devising effective responses. The Department provides support to the Secretary-General and his envoys, as well as to UN political missions deployed around the world to help defuse crises or promote lasting solutions to conflict. The Peacebuilding Support Office ... within DPPA fosters international support for nationally-owned and led peacebuilding efforts.”¹¹¹
- **UN Department of Management, Strategy, Policy and Compliance (DMSPC).** DMSPC replaced the Department of Management. According to its website, DMSPC “serves the United Nations globally to drive organizational

excellence through innovation, accountability and solutions. Amongst others, the department oversees and is responsible for:

- intergovernmental and interagency relations
- internal administration of justice
- communications and outreach on management-related topics and initiatives
- programme planning, finance and budget
- human resources
- business transformation and accountability
- Umoja, the enterprise resource planning project
- information and communications technology.”¹¹²

The 2019 UN Reforms and Delegating Authority to the Field

Among the key aims of the SG’s new reforms (January 1, 2019)¹¹³ are streamlining UN management through decentralization of decision-making; simplification of policies and processes; and strengthening a culture of performance, accountability, and transparency.¹¹⁴ At the same time, greater authority and responsibility was delegated to SRSGs, who report directly to the SG. These changes may impact how UN goals and policies for reform efforts, including the Environmental Strategy and the UNSCAP, are implemented. Whether agencies are well-equipped to carry out new responsibilities and manage resources under the new reforms may be impacted by their own understanding of how operations function and the priority on these goals. In a recent study, Kevin S. Kennedy and Laura Powers observed:

A core element of the management reform launched by Secretary-General Guterres is the delegation of authority to the field level, with a corresponding increase in accountability. Implementation of the reform presupposes that heads of mission and their colleagues ... understand the UN system’s complex management processes and procedures. They should at least know what questions to pose when making operational decisions that have resource implications, involve potential reputational risk for the organization, or put at risk the safety and security of personnel. Member states expect the UN to optimize the use of scarce resources and expect mission leaders to be responsible and capable managers.¹¹⁵

In his vision for a new management paradigm for the Secretariat, the SG proposed that DOS:

support the objective of effective mandate delivery and will do so through the provision of operational advisory services to clients, support for the implementation of decisions and, in exceptional cases, exercise of delegated authority on behalf of clients across the Secretariat.¹¹⁶

The DOS reorganization expanded the scope of its support to Secretariat entities. As such, DOS is responsible for the operational support to all UN field missions – which includes the UN’s major political and peacekeeping missions – and other entities of the UN Secretariat, consisting of nearly 100 entities around the globe, with the largest missions being peace operations.¹¹⁷ For peace operations, DOS coordinates the capacity that UN uniformed contingents bring to field missions by liaising with contributing countries on memoranda of understanding (MOUs), reimbursement rates, and by serving as the Secretariat for the triannual meeting of the COE Working Group.

As part of its responsibility for UN field operations, DOS has supported strategies and policies related to environmental management and energy use in the field. The DFS Environment Section, previously responsible for supporting implementation of the environmental sustainability management framework in peace operations (via operational support, guidance, and technical assistance), is now in the front office of the DOS Under-Secretary-General, for example. The scope of the Environment Section has expanded to encompass the entire Secretariat, drawing upon its experience gained supporting peace operations in the management of environmental impact and associated risks, while continuing to leverage the expertise of UN Environment.¹¹⁸

Greening the Blue, and DFS/DPKO Environmental Policy for UN Field Missions

In 2009, the DPKO and DFS adopted the *Environmental Policy for UN Field Missions*, drafted with the support of the UNEP, under the umbrella of Greening the Blue.¹¹⁹ The policy focused on several environmental concerns, including solid and hazardous waste, energy, water and wastewater management, wild animals and plants, and cultural and historical sites. It required all UN peace operations – at the direction of the heads of mission – to promulgate an environmental policy to include an environmental baseline study, an environmental action plan, and an emergency preparedness plan. The 2009 policy also required each mission to appoint an environment officer to be “responsible for coordinating and managing actions on environmental issues in the mission.”¹²⁰ The policy’s focus on energy is relatively small compared to issues like solid and hazardous waste.

In response to the 2010 cholera outbreak in Haiti (which resulted from poor wastewater management practices by the UN mission), the UN increased its efforts to strengthen implementation and reduce its impact on the environment.¹²¹ The growing footprint of UN peace operations also led to calls from member states for a more environmentally conscious peacekeeping enterprise – one aware of the longer-term impacts of missions on local communities and the environment. These calls, and new leadership at the DFS, led to the creation of an environment strategy in 2016 with more specific, time-bound

phases of implementation, including an environmental scorecard and associated indicators.

Environment Strategy for Field Missions

In 2016, the DFS announced its Environmental Strategy, putting a renewed emphasis on environmental issues in peacekeeping and operationalizing the 2009 Environmental Policy. The strategy took effect in January 2017, offering a vision of how environmental management in peace operations should look by 2023. The first phase includes objectives up to June 2020, across five pillars: energy; water and wastewater; solid waste; wider impact; and environmental management systems.

The strategy aims to reduce overall demand for energy, increase the proportion of energy generated by renewables, and reduce pollution created by peace operations.¹²² The approach laid out by the DFS to achieve energy objectives includes incremental introductions of “behavioral incentives and efficient infrastructure.”¹²³ In the initial phase, the strategy focuses on improving environmental analytics to monitor progress effectively, as well as efforts to improve energy efficiency, which DFS officials consider to be low hanging fruit and more easily achievable.¹²⁴

The strategy highlights that “generator fleet management” will be a priority to maximize the potential of hybrid solar photovoltaic-diesel generator systems that utilize renewables and storage systems. The energy pillar also notes that “immediate efforts are focused on energy audits, and project design/development for renewable-energy systems to be connected to generator grids.”¹²⁵ The strategy does not include concrete energy targets, but outlines three performance indicators for the energy pillar: 1) fuel consumption per capita per day; 2) installed renewable-energy capacity (share of total on-site capacity); and 3) GHG emissions per capita per year.

The strategy’s second phase establishes that the pillars will be reviewed with specific targets to be set for implementation by June 2023. The strategy connects to the overall goal of the DFS to assist in the deployment of “responsible missions that achieve maximum efficiency in their use of natural resources and operate at minimal risk to people, societies and ecosystems; contributing to a positive impact on these wherever possible.”¹²⁶ Working groups have been tasked with developing details of operational plans across each pillar.¹²⁷

With the promulgation of the DOS environment strategy, each UN peace operation was tasked with establishing an Environmental Policy Unit headed by an environmental affairs officer who reports to the director or chief of mission support.¹²⁸ Environmental affairs officers have responsibility for managing a wide range of activities in support of the mission’s Environmental Action Plan, including briefings within the mission to

uniformed personnel, liaising with host nation officials and other UN organizations, and tracking data and writing reports. Although environmental affairs officers serve in most UN peace operations, “the management and responsibility for energy provision and its use is housed across the mission offices, from the mission support teams to the political leadership to the contingents themselves,” reflecting the disaggregated nature of energy-related decision-making in the field.¹²⁹ In 2017, more than 35 environmental positions were reported in 13 peacekeeping and political missions, including the larger operations in CAR, Darfur, the DRC, Mali, Somalia, and South Sudan, as well as missions in Afghanistan, Kosovo, Lebanon, and Western Sahara.¹³⁰

Troop and Police Contingents: Self-Sustainment and Contingent-Owned Equipment

Peacekeeping missions rely on thousands of personnel and equipment to deploy as part of operations. While the deployment levels have varied over the last three decades, the number of total peacekeeping personnel has remained steady at roughly 100,000 deployed globally at one time over the last five years. Multidimensional and more robust peacekeeping mandates have emphasized the deployment of military and police personnel, often to remote locations, which also necessitates procurement and deployment of the equipment and services those contingents need to operate.

The COE system is important to understanding and mapping the incentives and disincentives behind the use of energy sources, as well as a potential transition to renewable energy by the UN in the field. As noted above, peacekeeping missions procure and deploy the equipment needed to fulfill their respective mandates through two main channels: purchased by the UN through the mission budget or provided by a contingent from a troop-contributing or police-contributing country (TCC/PCC). TCCs/PCCs provide this equipment on the basis that the UN will then reimburse the country at an established rate. TCCs/PCCs ensure they have the capacities to be self-sustaining in the field. The system that governs this process of reimbursement is known as the COE system. The system’s intricacies play a crucial role in determining what contributing countries bring along when deployed, which has a substantive impact on energy practices in the field.

Adopted in 1996, the COE system seeks to simplify the process through which contributing countries are reimbursed for providing equipment, personnel, and self-sustainment support to military or police contingents in peacekeeping operations.¹³¹ The cornerstone of the COE system is the MOU, “the binding agreement between the UN and the Troop/Police Contributing Country.”¹³² The MOU provides details on the major equipment, self-sustainment services, and personnel that a contributing country is

asked to deploy and for which it is entitled to be financially reimbursed. Those rates are determined by the COE Working Group.¹³³

The COE Working Group is a technical body of representatives of member states. Meeting every three years for two weeks in January, the main function of the working group is to update the COE manual, which contains the policies, procedures, and rates of reimbursement for the COE system. As a subsidiary body of the Fifth Committee, the Working Group's recommendations are presented to the General Assembly, along with recommendations from the Advisory Committee on Administrative and Budgetary Questions (ACABQ), for its approval.¹³⁴ After considering reports of the SG and the ACABQ, the Fifth Committee and General Assembly adopt resolutions on the "triennial review of the rates and standards for reimbursement to Member States for contingent owned equipment."¹³⁵ Changes accepted in these resolutions are subsequently included in a new edition of the COE manual. The COE Working Group therefore represents an important entry point for supporting change in the field toward greater use of renewable energy by TCCs/PCCs.

2017 Policy Evolution: Encouraging Renewable Energy

The last meeting of the COE Working Group was in January 2017.¹³⁶ It included the first recommendations concerning the inclusion of renewable-energy systems for the purpose of electricity generation, and the resulting report laid out a process for supporting the use of renewable energy and hybrid generators by TCCs/PCCs for the first time. In doing so, the working group cited multiple reasons for using renewable energy in the field:

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 is positive for the personnel's safety, security and health, as well as reducing the missions' environmental impact globally through a reduction in greenhouse gas emissions and in country through air and ground pollution prevention.¹³⁷

The COE negotiations also led to agreement on new reimbursement rates for a range of generators, including for hybrid systems that use solar photovoltaic technology alongside a traditional diesel generator set.¹³⁸ However, there has yet to be a single case reported of a TCC or PCC bringing this type of hybrid solar-diesel generator to a field mission and applying for this new reimbursement.¹³⁹

There are potential explanations for why countries have not deployed with renewable-energy technology, despite the new reimbursement rates. One explanation is that the reimbursement rates are too low to cover the cost of the technology, and therefore

TCCs/PCCs are not sufficiently economically incentivized to switch from diesel generators. UN officials believe that this may be part of the problem.¹⁴⁰ A second explanation could be that there is not high-level emphasis on this initiative in order to push peacekeepers to change behavior, or not yet enough information or awareness about this initiative. A third explanation is that the equipment base from which many contributing nations are drawing, i.e., their domestic military and police equipment, does not yet include options for renewable energy or hybrid generators.¹⁴¹

This effort to deploy more efficient generators utilizing standards developed by the International Organization for Standardization (ISO) was supported by the United States, which submitted a paper calling for recognition of the various types of generators,¹⁴² alignment of their energy production and costs, and including renewable-energy generators in the future. The paper further argued this would increase savings – an argument left out of the COE Working Group decision mentioned above – and reduce fuel use by COE, enhance transparency, help standardize systems, and increase the quality of equipment as well as improve the provision of energy. The paper also argued that there would be a positive security impact related to reduced fuel resupply missions.¹⁴³ The argument was persuasive and opened the door for the expanded COE reimbursement for the deployment of more efficient generators and renewable-energy technology. The 2017 COE Working Group also called for the development of site energy plans:

Site energy plans will be developed for both existing and planned sites on the basis of energy assessments and forecasts. The core of the plans will be the design of an optimized diesel generation solution for the site, which may consist of an individual generator for the smallest of sites and a bank of two or more generators for other sites. Renewable energy solutions will be integrated into the plans where appropriate.¹⁴⁴

Taking Advantage of New Opportunities

The management, funding, and oversight of UN peacekeeping has a complex history, with environmental and energy practices just one among many variables – and historically, a relatively low-priority one.

Even with the impact of large UN peace operations, the existing energy policies and systems are not the focus of most policy reform efforts aimed at helping implement ambitions to increase efficiency and security, reduce costs and the energy/environmental impact, and support technological innovations. As noted by the Expert Panel on Technology and Innovation, sometimes the challenge is in introducing “basic environmentally-friendly technologies” into systems contracts, which then stall in procurement.¹⁴⁵ Without a clear organizational owner for energy issues, decision-

making is spread out across multiple departments, field missions, and TCCs/PCCs. In the past, the lack of a strong political champion and concrete energy-related goals has meant that change in energy practices has been slow. The UNSCAP creates momentum and opportunities for peace operations to embrace cleaner and cheaper energy solutions, with accompanying security and efficiency savings. This shift could also open new opportunities for local communities to benefit from new energy access and economic benefits in the countries in which field missions are deployed. The 2019 reorganization provides flexibility for new approaches – but also some uncertainty around the division of responsibilities between departments and within missions. The effect on energy use, and whether a push for renewable-energy usage will be embraced or resisted by entrenched forces or structural disincentives, is not yet known. To better understand the practical implications of energy usage in the field, including examples of successful renewable-energy deployment, the next chapter focuses on a number of large peacekeeping missions and their experiences with energy in the field.

4. Progress and Challenges in the Field

Overview: Translating Policy into Practices?

For some missions, increasing the share of renewable energy is linked to successful implementation of Secretariat-level policy goals and directives. In other cases, the shift toward greater use of renewable energy is driven more by leaders in the field – who make progress by seeking to improve efficiencies, save money, expand energy options, support local power generation, increase security for the mission, and/or decrease use of personnel for convoys. In all cases, missions still rely heavily on diesel generators for power. This chapter aims to illustrate the experience of energy provision in the field, using data from firsthand field research and interviews, and supplemented by desk research and analysis.¹⁴⁶

This exploration assesses practices of several major peacekeeping operations, including efforts to meet current UN guidance to source electricity from renewable sources, and what obstacles missions face in doing so. With the UNSCAP's ambitious goals, where do peace operations stand in meeting those new targets? Certainly, the ambitions run deep – from the goals of the SG to the CEB, to the work of DOS and the DMSPC, to the calls from member states and the Secretariat – yet the results are less clear.

To start understanding the data and how missions are making use of energy, this section considers publicly available UN information and data, including from mission budget documents and reports of the SG and the ACABQ. This section is augmented by field research and interviews, which provide insights into approaches and practices related to power generation at the mission level. In addition, it considers how the deployment of uniformed peacekeepers and the contingent requirements for self-sufficiency and equipment impact the use of energy options, including through the COE process. Finally, this section describes efforts in the field to adopt renewable energy, and the need for the institution to capture and share this knowledge, and, in the process, improve the relevant systems and processes. A preliminary analysis of the findings and areas for further research are also identified.

Field Operations

Increased energy efficiency and the accelerated deployment of renewable energy, in line with the UNSCAP, offer an opportunity to reduce the Secretariat's significant emissions. Around 90 percent of the Secretariat's carbon emissions stem from peace operations, which operate and manage their own facilities and infrastructure, with the majority of emissions concentrated across a few of the larger peacekeeping missions.¹⁴⁷ Those are in Central African Republic (MINUSCA), Darfur, Sudan (UNAMID), Democratic Republic

of the Congo (MONUSCO), Mali (MINUSMA), South Sudan (UNMISS), and Somalia (UNSOS).

Secretariat policies meant to encourage an energy transition also have met mixed implementation by field operations. Reasons for this gap may include limited support, information, and flexibility to drive innovation that can achieve the goals backed by member states and UN leaders. Uniformed peacekeepers are less connected to these ambitions; for example, troop-contributing countries and police-contributing countries seem to have few incentives to adopt more energy-efficient generators. Some challenges could potentially be addressed by increased coordination between headquarters, the field, and member states, while other challenges will require a new approach in the field; both will necessitate a change in the way the UN does business.

Given the size and scale of UN peace operations, several questions are worth considering. What data on energy consumption and generation is available? What does this data reveal about current energy practice? To what extent and how are missions making use of renewable-energy options? What are the incentives and disincentives for renewable-energy transitions? How do missions assess the costs and benefits of these transitions? What type of political and technical support exists for facilitating these transitions? What are the lessons learned from missions that have deployed renewable energy? What changes would help the field to maximize the diversification of energy sources? No single source of information addresses these questions, however. As discussed in the last chapter, energy-related decision-making takes place in different units, sections, divisions, and departments. The disaggregation of responsibility and information makes the task of accurately assessing the problem very challenging.

Energy Use in Peace Operations

UN peace operations are designed primarily to help support a political peace process, protect civilians, and bolster the rule of law and accountability to prevent further violence and conflict. Several host countries, particularly those in sub-Saharan Africa, are experiencing high levels of climate insecurity, which can further exacerbate existing conflict dynamics. At the same time, many of these missions are deployed in fragile regions often characterized by poor or limited electrical-grid infrastructure and high levels of energy poverty – environments that have not drawn as high levels of renewable-energy investment. As a result, given missions' need for predictable power generation, the UN must deploy personnel and equipment with diesel generators and fuel.

The support component of peacekeeping, called Mission Support, is responsible for the operation's budget as well as its physical operations, including energy sources. Each mission also aims to operate efficiently and sustainably, and, to varying degrees, in line

with the UN's environment strategy. Resources are available to mission support staff to guide them in executing their duties. Management of energy infrastructure is laid out in guidance and policies, with standard operating procedures, documents, and templates. For example, the January 2019 standard operating procedure issued by DPO and DOS, *Development of Energy Infrastructure Management Plans for UN Field Missions*, covers a range of responsibilities, including for missions with more than 500 personnel to undertake a “comprehensive energy profile development and planning process,” and produce an energy management plan (EMP) with projects linked to its implementation.¹⁴⁸

Peace Operations: Examples from the Field

This section looks at the experiences around renewable energy in three field missions, focused on areas where Powering Peace has interviewed UN personnel and conducted field research: South Sudan, the DRC, and Lebanon. The heads of these missions report to the Security Council on progress in achieving their mission mandates. Mission leaders provide rationales for their annual budgets, which include past and projected spending for mission energy and infrastructure. These documents are reviewed by the General Assembly's committees, including the ACABQ and the Fifth Committee, made up of member states who approve budgets annually. The documents reveal some data from the field about energy use and the introduction of renewable energy.

South Sudan/UNMISS: Realizing Solar Potential?

The world's newest country, South Sudan, offers an extreme example of the challenges posed by conflict for the development of electrification infrastructure and energy access. South Sudan is among the least electrified and most fragile countries in the world. Following decades of violent struggle against northern Sudanese rule, South Sudan gained its independence in July 2011 with strong international support. Concurrent with its independence, the Security Council authorized the UN Mission in South Sudan (UNMISS) to replace the earlier peacekeeping mission, UN Mission in Sudan (UNMIS), which was formed in 2005 to help oversee implementation of the Comprehensive Peace Agreement. UNMISS was mandated to assist the young country of South Sudan with building a stable peace and governance.

By 2012, internal divisions grew with the government's voluntary closure of its domestic oil production, amid a dispute with Sudan over the terms of oil transport and processing. That action hastened an economic collapse, and a new civil war erupted in late 2013. The conflict devastated governance, human rights, development, and economic momentum, and deepened a humanitarian crisis across the country as civilians fled to UN sites and neighboring states. Today, UNMISS operates in a country

torn along tribal and political divisions, mandated to protect civilians, monitor human rights, and support the peace process.

The struggles of UNMISS with regard to energy provision reflect the broader difficulties of operating in South Sudan. The previous UNMIS mission had been headquartered in the Sudanese capital, Khartoum, and was connected to local energy grids where available. It had a large footprint across South Sudan, however, where most UNMIS personnel and operations were based across the region and the mission was powered primarily by on-site diesel generators.

Prior to independence in 2011, South Sudan began to develop fossil-fuel-powered grids in its larger cities and plans for the construction of several large hydrodams in the southern part of the country. Before the 2013 civil war, South Sudan had just 22 megawatts (MW) of installed operational electricity generation, based in the larger cities.¹⁴⁹ The economic collapse and conflict that followed led to the demise of both local power production and larger project planning.

After the civil war broke out in the South Sudanese capital, Juba, large-scale fighting and destruction spread across the city and in other major cities across the country. UNMISS and international agencies were not spared as goods and equipment were looted or destroyed. Civilians were targeted along tribal lines and fled to UN bases for protection, leading to the creation of protection of civilians (POC) sites at UNMISS bases in major cities where the mission protected internally displaced persons (IDPs). Those camps were inside the fences of the peacekeeping mission. As of November 2019, there were still more than 190,000 IDPs residing in POC sites in South Sudan.¹⁵⁰ A 2015 peace agreement brought the main opposition group back to Juba, only for heavy fighting to break out again in July 2016. This triggered another round of significant violence, looting, and destruction of property.

UNMISS and other international agencies have focused on their mandate to protect civilians, as well as to mitigate the risk of violence and support the security of UN infrastructure. Many agencies and donors operated on a temporary crisis-response basis following the 2013 outbreak of civil war, even as the conflict dragged on. With regard to energy, virtually the entire international peacekeeping and humanitarian footprint in the country – as well as business, hotels, and government – relied on generators powered by imported diesel. Although fuel coming into South Sudan was technically imported and subsidized by the government, much of the fuel supply was resold on black markets and was intertwined with the local war economy.¹⁵¹ Being a large, insecure, landlocked country with few roads, South Sudan faced very high fuel prices in much of the country – and some of the highest electricity costs in the region – for those with access to electricity.

UNMISS is one of the largest peacekeeping missions in the world, with roughly 19,400 personnel and an annual budget over \$1.2 billion.¹⁵² For its part, UNMISS relies on Tristar Energy, a private contractor, for its fuel supply and delivery. The mission's annual energy demand is reported to be approximately 25 MW, supported almost entirely by diesel generators. UNMISS has installed 0.5 MW of solar power for its communications equipment, and through "quick impact projects" has installed solar systems in local health centers, hospitals, and training facilities across the country.¹⁵³ In interviews, UNMISS engineers expressed an interest in renewable energy, but had concerns around the security of solar systems, land requirements, and challenges related to budgeting and financing for the new systems.

Despite some bumps, UNMISS has begun a transition toward greater use of renewable energy, and it stands to be a leader in this regard. In 2016, UNMISS purchased 2.2 MW of solar panels and batteries through a preexisting systems contract that UN headquarters had negotiated and approved with a supplier. The mission is working on installing the panels across two systems based in Juba and Wau; it anticipates that once installed, these will reduce the mission's diesel power requirements by 10 percent.¹⁵⁴

These projects can pave the way for other missions, with several notable lessons.

- *Available Funds and Contracts.* UNMISS was in the unusual position of being able to purchase solar power equipment (more than \$10 million) with end-of-year unspent funding. That approach allowed it to finance the high-upfront capital expenditure requirements associated with solar power that are often a challenge for the UN to budget. This scenario is not easily replicable. UNMISS also reportedly maxed out the UN systems contract for solar panels at the time; this is a prenegotiated contract managed through UN headquarters in New York, capped at a certain dollar figure, which is used by all other missions. It subsequently had to be renewed and renegotiated.¹⁵⁵
- *Useful UN Guidance on Renewable Energy.* In explaining their purchase motive, UNMISS officials cited a directive from the DFS for field missions to aim for 50 percent of their energy to be generated from renewable sources by 2020.¹⁵⁶ This directive was not included in the DFS environment strategy, which came into effect in 2017, but was documented in ACABQ budgetary reporting as the 2020/50 Greening Initiative.¹⁵⁷ According to the ACABQ, the solar farm project was approved by the mission's integrated project management team on the basis of its business case as developed by the Engineering, Standardization, and Design Center of the UN's Global Service Center at Brindisi, Italy.¹⁵⁸ This experience

shows the importance to and impact on the field of the UN taking on ambitious targets and commitments.

- *Lack of Installation Contracts.* UNMISS made this purchase *before* any design and installation plans had been developed. A multiyear delay followed, as UNMISS struggled through a centrally managed UN procurement process to get the installation contract approved, as there was no pre-existing systems contract or guidance for solar system installations.¹⁵⁹ Without a clear idea for where and how to deploy these solar and battery systems, the equipment remained stored in containers for several years. External contractors eventually developed installation plans for Juba and Wau, by which time the batteries had ceased to function.

This case shows the power of UN goals to incentivize missions to use renewable energy and UN contracts for procuring – and installing – this equipment. The eventual installation of these systems is expected to have a significant positive impact for UNMISS, and the renewable-energy sector in South Sudan.

Another development is in Malakal, at the POC site located within the UNMISS base, where a humanitarian camp will get its energy from a private sector solar energy. Both the POC camp for IDPs and the associated humanitarian hub are managed by the International Organization for Migration (IOM). In April 2019, the IOM announced an agreement with private solar companies Scatec Solar and Kube Energy, to build a new 700 kilowatt (kW) solar-plus-battery system in the humanitarian hub.¹⁶⁰ The agreement is groundbreaking for UN missions and marks one of the first examples of an energy-as-a-service leasing arrangement for UN agencies, whereby the private solar companies finance the development and construction of the project, and the user of the electricity (in this case, the IOM) agrees to purchase the energy at a prenegotiated set price. This energy-leasing model has helped propel renewable-energy growth around the world, but has been difficult for UN agencies and the international aid sector to replicate because of the short-term funding cycles that hinder entry into multiyear agreements. In this instance, the IOM was able to enter into a multiyear arrangement in a manner that was firmly in line with its financial rules and regulations. The agreement in Malakal will deliver cost savings for the IOM, and create lasting energy infrastructure outside the destroyed regional capital of Malakal – a peace dividend for the future.¹⁶¹

Democratic Republic of the Congo/MONUSCO: Limited Progress, Available Hydropower

The DRC hosts the world's largest UN peacekeeping mission, MONUSCO, with roughly 20,000 personnel and an annual budget over \$1 billion. Initially deployed in 2000 as

MONUC to monitor the Lusaka Peace Agreement that ended the DRC's second regional war, the mission (renamed MONUSCO in 2010) grew to be a complex, multidimensional operation, with a strong focus on the conflict-affected eastern part of the country. The DRC government, member states, and the Security Council view the peaceful transfer of power after national elections in 2018 as an opportunity to reduce MONUSCO's presence. The mission is expected to begin downsizing, with the goal of supporting civil society and the government to take on key responsibilities, laid out in a strategic review of MONUSCO.¹⁶²

The DRC is one of the poorest countries in the world, and among the least electrified.¹⁶³ In 2017, the World Bank reported that less than 20 percent of the population had access to electricity: 49 percent in urban areas and less than 1 percent in rural areas.¹⁶⁴ A combination of conflict and a history of mismanagement and corruption have severely undercut development of the national electricity sector, despite strong hydropower potential and largely untapped solar- and wind-power potential.

The DRC has multiple hydropower grid networks in different parts of the country, yet large areas are not connected to any central grid and lack electrification. MONUSCO is unique among UN peacekeeping missions in that it has the opportunity to connect to an electrical grid fed principally from renewable sources in some part of the country. The mission relies on a mix of energy sources to support its facilities and bases, including sites for troop and police contingents, with diesel generators as its main source of energy.

MONUSCO has a large electricity footprint as a result of its size, with a reported annual electricity consumption of 46,552,583 kilowatt-hours (kWh) per year – roughly equivalent to the total annual electricity consumption of 4,500 American households.¹⁶⁵ For the 2017-18 financial period, the mission reported that it supplied and stored 39.5 million liters of petrol, including 10.9 million for generators and other facilities.¹⁶⁶ In March 2019, MONUSCO reported that the expected output in terms of fuel-management services for the mission was 35.6 million liters of petrol, including 9.1 million for generators and other facilities.¹⁶⁷

Some of this reduction in diesel usage is a result of the mission connecting to the national power grid in several new locations. **The mission reports that roughly a third of its power comes from the national utility SNEL, which runs hydropower grids in three parts of the country.** In the summer of 2019, the mission reported to Powering Peace researchers that roughly another third of its power comes from renewable sources, between local hydropowered grid connections and a 650 kWh solar power farm in Goma (which is expected to generate savings in fuel

consumption of \$182,000 per year).¹⁶⁸ Meanwhile, the mission had reported in December 2018 that only 5 percent of its energy is derived from renewable sources.¹⁶⁹

MONUSCO's Kinshasa headquarters is connected to SNEL hydropower, which, it reports, provides 70 percent of the mission's electricity in the capital, with the rest produced by diesel generators.¹⁷⁰ MONUSCO's eastern Goma headquarters and Goma airport use approximately 6 hours of SNEL hydropower daily, with the remaining 18 daily hours provided by on-site diesel generators.

There is an easy opportunity for MONUSCO to expand its share of renewables. First, the mission could switch from 6 hours of SNEL hydropower in Goma to 24 hours of hydropower on offer from the Virunga SARL hydropower project (distributed to Goma by the local business consortium SOCODEE). Transitioning Goma airport this way could save the mission more than \$155,000 per year, with similar savings if the same switch were made at Goma headquarters.¹⁷¹ Second, after a long internal struggle within MONUSCO, two peacekeeping troop contingent camps in the east, Munigi and Kiwanja, recently transitioned from using diesel generators to using 24-hour Virunga hydropower. This has provided savings for the mission, improved its environmental footprint, and supported a local hydropower project that benefits the conservation of Virunga National Park and reduces deforestation for charcoal and timber. Other troop contingent sites may also be eligible to switch from diesel generators to Virunga hydropower.

The broader notion that connecting to local electricity grids could yield substantial cost savings appears to be well understood at the mission level as well as at the Secretariat, as evidenced by recent reports of the ACABQ that track the liters of fuel, cost per liter, and savings from MONUSCO's connection to the national power grid.¹⁷²

MONUSCO has developed an environmental management system to guide the mission's efforts to "control its interactions with and effect on the environment in order to minimize negative environmental impacts and increase positive environmental impacts, based on a 'plan-do-check-act' model which emphasizes continuous improvements through regular audits and management reviews."¹⁷³ This effort was first proposed in the SG's report on MONUSCO from March 2018, and represents a pilot program on behalf of other field missions. In proposing the initiative, the SG contended that increased capacity to collect field data and disseminate environmental information would enhance MONUSCO's effectiveness in implementing a functional environmental management system. To that end, the SG recommended establishing two posts of environmental assistant to follow up on the implementation of initiatives in field locations, collect data on different environmental aspects, and support the Environmental Protection Unit in disseminating information.¹⁷⁴

Lebanon/UNIFIL: Maxed Out on Solar

The UN Interim Force in Lebanon (UNIFIL) was established in 1978 to confirm Israel's withdrawal from Lebanon, restore international peace and security, and assist the Lebanese government in restoring its effective authority. Following the July-August 2006 war, UNIFIL's mandate expanded to include monitoring the cessation of hostilities, supporting the deployment of the Lebanese armed forces throughout the south of Lebanon, and facilitating humanitarian access to civilian populations and the return of displaced persons.¹⁷⁵

UNIFIL is the sixth-largest UN peace operation by annual budget (\$480.1 million for 2019-2020) and fifth-largest by deployed uniformed personnel (more than 10,000 peacekeeping troops from 43 countries, supported by a small civilian component). The mission is deployed in southern Lebanon, with headquarters in the village of Naqoura, two logistical and administrative support offices in Beirut, and 52 field positions throughout its 1,090-square-kilometer area of operations, as well as a maritime deployment along the entire Lebanese coastline.

Over the last 40 years, as a result of the unreliable nature of electricity supply from the Lebanese national grid, UNIFIL has generated almost all of its own electricity through the use of diesel-powered generators. Notably, UNIFIL has emerged as a leader on environmental management within UN peace operations, as a result of mission personnel expertise and efforts to increase efficiency through the use of renewable power. As a result, the SG recently reported that UNIFIL will provide environmental support services to other missions in the region.¹⁷⁶ A point of pride for UNIFIL personnel is the mission's third-place ranking on overall environmental performance (after the UN Global Service Center in Brindisi and the UN Mission in Kosovo).¹⁷⁷

Based on data from February 2019, UNIFIL operates and maintains 168 UN-owned generators and 15 small solar farms, while utilizing two electricity connections from a local provider for its offices in the capital, Beirut.¹⁷⁸ The current electricity-generation capacity of UNIFIL's mission headquarters in Naquora is approximately 4 MW. This includes the mission's total installed solar capacity of 373 kilowatt-peak (kWp), which produces 578 megawatt-hours of electricity per year. **Hence solar power accounts for 5 percent of total electricity production at mission headquarters.** UNIFIL's installation of solar panels in the 2017-18 and 2018-19 periods resulted in cost savings of \$96,690 and \$60,767, respectively,¹⁷⁹ efficiency gains that have been welcomed by the ACABQ. For the 2019-20 period, the mission is planning to deploy solar-generated power for perimeter security lights at UNIFIL headquarters and

battalion headquarters, and to install 100 additional solar panels estimated to produce 53,795 kWh of electricity per year.¹⁸⁰

On average, the mission uses about 15 million liters of fuel annually to generate power for its headquarters and field positions. The diesel is purchased locally utilizing five-year competitive fuel-supply contracts.¹⁸¹ UNIFIL's local procurement arrangement, agreed with the Secretariat, ostensibly takes advantage of local supply chains given the mission's Middle East location. As in all peace operations, UNIFIL supplies diesel fuel for its own generators (UNOE) as well as generators brought by troop contingents under self-sustainment or major equipment arrangements (COE). UNIFIL personnel estimate that its current installed solar capacity is saving the mission as much as 14,000 liters of fuel per month.¹⁸²

The mission's incentives for introducing renewable sources of power are primarily driven by Secretariat-level policies and arrangements, and the existence of systems contracts for equipment such as solar panels. Based on interviews conducted in Beirut in November 2018, UNIFIL personnel report that they have been procuring the maximum amount of solar equipment each year. The mission is eager to do more, including potentially deploying solar equipment to field positions as financial resources dictate.

UNIFIL has explored connecting to Lebanon's electrical grid. Such an arrangement would reduce the mission's need to generate power significantly. However, Lebanon's power sector is complex and faces significant challenges. Vital grid infrastructure was destroyed during the country's civil war, which ended in 1990, and the power sector has never fully recovered. Électricité du Liban, the state-run electricity company, is still unable to provide 24-hour power to the general population, forcing households and businesses to supplement grid electricity with back-up power from local diesel suppliers. While the prospect of UNIFIL's connection to the national grid makes economic and environmental sense, it needs further exploration. At the same time, the economic case to introduce more renewables appears stronger than ever. However, if UNIFIL is to move beyond incrementally increasing its share of renewable energy, more financial resources to support capital investment will be required.

Other Field Missions: Snapshots of Energy Usages

The following section includes short snapshots of energy and renewable-energy usage for several field missions. This section is based on desk research, interviews, and analysis of publicly available budget documents; no field research was undertaken.

Kosovo/UNMIK: Leading on Renewable Energy

The UN Interim Administration Mission in Kosovo (UNMIK) was authorized by the Security Council in 1999 to establish an international security presence to prevent renewed hostilities, and to provide political, administrative, and development support through the mission's international civil presence.¹⁸³ Since the declaration of independence by the Kosovo authorities and the entry into force of a new constitution on June 15, 2008, UNMIK's mandated tasks have shifted to the promotion of security, stability, and human rights initiatives.¹⁸⁴ With less than 400 personnel and an annual budget of \$37.25 million, UNMIK is much smaller than the other missions explored.¹⁸⁵ Even with a small physical footprint, UNMIK has sought to increase energy efficiency and reduce its reliance on diesel generators.

The SG reported that in 2016-2017, UNMIK prioritized "continued efforts to mitigate the environmental impact of its operations through the installation of a solar energy system in August 2017 in the Pristina headquarters."¹⁸⁶ UNMIK completed the installation, as well as low-consumption lighting systems on all premises, "to increase the proportion of renewable energy."¹⁸⁷ In 2017 the mission also embraced an initial goal of meeting 50 percent of its electricity from renewable sources, which it appears to have achieved.¹⁸⁸ It is unclear how the mission settled on the goal of 50 percent renewable-power generation, but it likely stems from the same 2020/50 Greening initiative that was referenced by UNMISS in South Sudan.¹⁸⁹

Darfur/UNAMID: Impediments Proliferate

The joint UN-African Union Mission in Darfur (UNAMID), authorized in 2007, took over from the African Union-led Mission in Sudan (AMIS). The missions were deployed after conflict and extreme violence to support protection of civilians and a series of fledgling peace processes. With regular challenges and blockages from the Government of Sudan, UNAMID has faced some of the greatest logistics and security challenges of any peace operation. These challenges include power outages. The supply chain requires overland travel from Port Sudan; UN convoys face delays and insecurity; and the mission is regularly harassed by visa delays and carjackings. Civilian displacement and humanitarian needs have been consistently high. The mission is slated to downsize, though that approach has been impacted by the peaceful popular uprising in Sudan in 2019 and the removal of President Omar al-Bashir and much of the old regime.¹⁹⁰ On October 31, 2019, the Security Council unanimously adopted Resolution 2495 to extend UNAMID's mandate for one year, through October 2020. Regarding an eventual drawdown, the Council decided to maintain the mission's current troop and police levels until March 21, 2020, and keep all team sites other than the sector headquarters in South Darfur,¹⁹¹ which was formally handed over to the government of Sudan on

November 19, 2019.¹⁹² At that ceremony, UNAMID Joint Special Representative Jeremiah Mamabolo noted the mission would be handing over an estimated \$99.4 million of assets, including 204 vehicles and 175 generators.

UNAMID has invested relatively little in renewable-energy systems, according to budget reports, despite prodding from New York. From 2011-2017, the mission installed and maintained 700 solar photovoltaic panels across the mission's area at a cost of \$279,300. The ACABQ expressed concerns that only one of eight photovoltaic systems was monitored by UNAMID – and its production was just 27.6 percent of the expected power generation.¹⁹³ Of the 700 panels maintained, 70 were not operational, and two systems were not properly maintained.¹⁹⁴ An analysis of UNAMID budget documents reveals ongoing tensions between the mission and the ACABQ around increasing the use of renewable energy throughout the mission.

In May 2018, the ACABQ urged UNAMID to pursue alternative energy options more aggressively, while recalling that it had previously “urged the Operation, on a number of occasions, to strengthen its environmental efforts and to pursue the utilization of alternative renewable-energy sources in order to minimize the need for fossil-fuel-powered equipment, including generators.”¹⁹⁵ In November 2018, the mission acquired a 50 kW solar electric system unit for its headquarters in El Fasher.¹⁹⁶ Based on ACABQ reports, UNAMID planned on implementing one solar electric system during the 2017-2018 period and another during the 2018-2019 period, at costs of \$281,300 and \$400,000, respectively. Both systems were meant to be installed at UNAMID's El Fasher headquarters.¹⁹⁷

Somalia/UNSOS: Managing Fuel, Gaining Ambition

The UN Support Office in Somalia (UNSOS) provides support to three entities: the African Union Mission in Somalia (AMISOM), which is an African Union-led peace enforcement mission; the UN Assistance Mission in Somalia (UNSOM), the UN-led political mission; and the Somalia National Army. UNSOS provides different packages of support to each entity, funded through assessed contributions of the UN and its member states. UNSOS has an environmental-compliance management system, a standard operating practice on environmental policy for UNSOM and UNSOS, and supported activities for AMISOM.¹⁹⁸ UNSOS reports to the Security Council and the relevant General Assembly committees on its activities.

Somalia has an active and vibrant private sector, with competing energy companies. The leadership of UNSOM recognized the need to diversify energy options for the people of Somalia. In 2017, then-SRSG Michael Keating co-hosted with the Somali government a conference on renewable-energy development in Somalia, and visited local renewable-energy projects.¹⁹⁹

The main source of energy for UNSOS is diesel fuel, and its demand has fluctuated over the past several years without exhibiting any noticeable trend. UNSOS regularly records the largest share of this fuel (between 41 and 47 percent) as being purposed for use by generators and other facilities.²⁰⁰ In 2014, there were six reported incidents of fuel theft from the UN-supported mission in Somalia.²⁰¹ Two years later, nine AMISOM soldiers were jailed for selling the mission's fuel to civilians in Mogadishu.²⁰² In 2016, an ACABQ report noted that UNSOS claimed to be implementing the installation of solar-power camp lights and water heating systems and creating electric microgrids with synchronized power sources.²⁰³ In 2019, the mission reiterated its intention to pursue renewable-energy sources like solar, as well as wind, including detailed estimates on cost savings of a plan to install solar-powered water pumps.²⁰⁴

The mission's efforts to reduce its environmental footprint have fallen into three types of activities: adopting policies and procedures, conducting studies, and reducing demand for fuel. UNSOS developed an environmental action plan in 2017-2018.²⁰⁵ Most activities have focused on reducing the mission's demand for energy, such as installing more efficient light bulbs, measuring devices to control power consumption, and timers on air conditioning units, as well as synchronizing generators.²⁰⁶ The mission has also moved to reduce the amount of fuel used by ground vehicles by installing tamper-resistant fuel tanks to reduce fuel theft and fraud,²⁰⁷ as well as introducing more pooled transportation.²⁰⁸ The introduction of the electronic fuel-management system in August 2018 increased the mission's visibility into actual fuel consumption that reportedly realized a savings of \$3 million for the mission.²⁰⁹ The mission also reported working with AMISOM to implement a mechanism that would ensure that fuel is provided on the basis of equipment composition and historical usage as opposed to requests.²¹⁰

Mali/MINUSMA: Potential Safety and Security Benefits of Renewable Energy

The UN Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) was established in 2013 following French- and African-led interventions in Mali to prevent state collapse and the spread of extremist forces after a rebellion in 2012 in the north and attempted military coup. With a force of more than 15,000 uniformed personnel, and long and insecure supply lines – including for fuel convoys – to supply remote regions in the north of the country, MINUSMA has become the most dangerous UN peacekeeping mission in the world.²¹¹ In the north of Mali, convoys of 50-80 vehicles drive hundreds of kilometers to deliver fuel and food rations to remote bases – journeys that can take up to three weeks to complete.²¹²

MINUSMA relies on fuel as its main source of energy, with the amount used growing steadily by about 5 million liters per year over the last four years.²¹³ The 2019-2020 budget request broke this trend, remaining relatively consistent with the request during the 2017-2018 cycle.²¹⁴ Recent data suggests that MINUSMA “supplied or stored” 50 million liters of fuel from the period from July 1, 2017, to June 30, 2018, of which roughly half was used to supply generators and other facilities.²¹⁵

MINUSMA currently uses only a limited amount of solar energy, and instead “relies heavily on generator power for most of its operations.”²¹⁶ One analysis found that peacekeepers in MINUSMA’s “Camp Castor” in Gao use about 8,500 megawatt-hours yearly, of which 370 are generated by solar panels and the rest by generators.²¹⁷ Internal reporting found that solar energy is used mainly as a back up and not for general energy supply, and that “MINUSMA does not have in place adequate renewable-energy systems for any accrued monetary impact.”²¹⁸ MINUSMA has pursued several projects to increase its renewable energy, installing some solar panels and hybrid power systems in the north in 2018.²¹⁹ In 2017, the mission aspired to connect all air conditioning units for equipment rooms to renewable-energy grids,²²⁰ although progress on this commitment has not been documented. The mission’s environmental priority has been to improve its waste management system, however; mission reporting on using more renewable energy is vague and frequently aspirational. There are some indications that this is changing. Reporting has become more specific – for example, the mission went from pledging to “continue to rely on solar panels” in 2016²²¹ to committing to use solar panels to generate power “for all existing equipment rooms” in 2017,²²² to reporting that MINUSMA uses solar panels as a power backup for the ICT infrastructure, and aims to replace its older generators with hybrid generators in 2019.²²³ The mission’s efforts to track energy use through the smart-metering pilot project also demonstrates a more strategic approach to reducing fuel use.

Despite MINUSMA’s efforts to reduce its environmental footprint, its demand for diesel fuel has continued to grow. MINUSMA’s increased fuel demand may reflect that the deployment phase of a mission requires a larger amount of energy, and MINUSMA has expanded its presence with new bases. Much of the fuel it uses is justified as going toward a projected increase in the mission’s vehicle holdings and generator use as it has expanded generators to all mission personnel in the north of the country.²²⁴ In his February 2019 budget report, the SG wrote, “As MINUSMA reaches a mature stage of deployment, there is more focus on ensuring that the environmental footprint of the Mission is reduced through various environmental mitigation measures.”²²⁵

Central African Republic/MINUSCA: Recognizing Security and Political Benefits

The UN mission in CAR (MINUSCA) is a 14,700-person mission authorized in 2014 to take over after a French-led intervention and a regional African Union mission (known as MISCA), which had been deployed in response to the Seleka rebellion that led to the overthrow of the Bozize regime. The mission is mandated to protect civilians and support transition processes in the country.

MINUSCA budget documents from 2016 to late 2019 indicate a general trend toward more robust efforts to mitigate the mission's environmental footprint. Sometime in late 2016 or early 2017, MINUSCA implemented an environmental management program to support implementation of its environmental action plan, which has been operational since September 2015.²²⁶ The mission also demonstrated a willingness to address energy-efficiency issues. To a small extent, these energy-efficiency initiatives have included deploying renewable energy to lower emissions. MINUSCA budget reports explicitly state the potential impact the mission's operations can have on social and economic tensions among local communities. For example, in 2017, the SG reported the following:

The Mission will limit the environmental impact of its operations on energy, water, and liquid and solid wastes, and protect the natural and cultural heritage of the country. ... The environmental footprint of the Mission, if not properly managed, has the potential to contribute to tension with local communities over access to and use of scarce or contentious natural resources. In addition, the operations of the Mission could potentially result in pollution and degradation of the environment.²²⁷

The same report noted the mission was carrying out initiatives for environmentally responsible power generation, focusing mostly on installing new metering systems for generators, and generator synchronization.²²⁸ The synchronization of main power-supply generators in Kaga Bandora, Bria, and Bouar was estimated to curtail fuel consumption by around 14,320 liters per month, an efficiency gain estimated to save \$283,000 in 2018-2019.²²⁹

In addition to efficiency efforts like generator synchronization, MINUSCA has sought to deploy renewable energy in at least four locations. In 2018, the mission completed the installation of two photovoltaic power systems, referred to as solar panel farms, in the tented camps in Bambari and Bossangoa, and is installing two more at the logistics base and Camp Fidèle in Bangui. MINUSCA has also started the installation of 200 solar lighting units. Initiatives to enhance the mission's energy performance will continue and

are meant to “ensure improved efficiency in fuel consumption and reduce the Mission’s dependence on fossil fuels while contributing to reducing the Mission’s greenhouse gas emissions.”²³⁰ The mission has articulated the potential security and environmental benefits of using scalable renewable-energy equipment such as low-capacity hybrid (diesel-photovoltaic) power-supply systems and solar streetlights. Efforts such as these “would increase the self-sustainment of camps, reducing both security and environmental risks through less of a reliance on resupply operations.”²³¹

Hidden Costs, Obstacles, and the Benefits of Change

Costs of Relying on Fossil Fuels

UN missions rely on diesel fuel to power their vehicles and generators for operations and facilities. This near-complete dependence on diesel fuel reflects a long culture of using diesel and its wide accessibility. That reliance, however, can be costly for the UN and can undermine its objectives in the field. This section explores the ways in which the reliance on diesel fuel has an impact that can undermine UN field missions. The section highlights the added cost of diesel relative to some alternatives, the financial and human costs of transporting fuel, and the risks posed by fuel theft and fraud.

Safety and Security. Recent reviews of UN peacekeeping missions have identified the need to adjust to a variety of environments. For example, a 2017 report led by former Brazilian General Santos Cruz looked at increased challenges to the safety and security of UN personnel in modern missions, noting that risks include threats to supply convoys and a need for more focus on mobility and mission-specific and contingent-specific capacities appropriate to the area of deployment:

Long, slow-moving convoys traveling extreme distances to large, remote field presences present easy targets, as evidenced by the fact that over 50% of fatalities were sustained during vehicle movements (i.e. convoys, escorts, patrols, etc.). Civilian staffing levels that exceed what is absolutely required to achieve the Mission’s objective in a particular location implies inherent risk to personnel while their requirements for sustainment by burdensome logistic convoys increase risk as described above.²³²... In some missions, interlocutors estimated that 90% of the capacity of the Force is spent on logistics (e.g. convoy escort) and self-protection. This allows security threats in the form of armed and terrorist groups to widen their areas of operation and take the initiative, because uniformed components are unable to conduct operations to eliminate threats and deter attacks.²³³

Transporting fuel to remote parts of peacekeeping missions’ areas of operations can be an extremely costly and time-intensive endeavor. In Mali, fuel convoys of 50-80 vehicles can take up to three weeks to deliver fuel and food rations to remote bases.²³⁴ In CAR, it

can take as long as three weeks for MINUSCA to supply fuel to its remote base in Obo.²³⁵ These journeys are often dangerous, and the cost of transporting fuel can be human as well as financial. The missions in CAR, Darfur, Mali, and South Sudan have all suffered casualties when convoys came under attack.²³⁶

The challenge of fuel convoy safety is exemplified in northern Mali, where, in late 2015, improvised explosive devices hit roughly 66 percent of MINUSMA convoys operating between Anefis and Gao, and 80 percent of convoys between Gao and Ménaka.²³⁷ At times, fuel convoys were deliberately targeted for their added security risk. UN experts posited that attackers “were targeting a convoy that included a fuel truck, knowing full well that an attack on a fuel truck would cause an even greater number of casualties.”²³⁸

Diesel and Related Transport Costs. In peacekeeping, efforts to reduce reliance on diesel are already showing benefits and signs of financial gains for missions. As noted earlier, MONUSCO has connected some of its facilities to city power grids throughout the DRC and the surrounding region. The ACABQ estimated that MONUSCO’s connection to the national power grid would save the mission \$1,362,040 during the 2018-2019 budget cycle in reduced fuel costs.²³⁹

The security risks of transporting fuel can also divert resources from other tasks of the mandate to provide protection for logistics convoys. In Mali, for example, escorts for convoys, including logistics convoys carrying fuel, require support from the mission’s military element, which can come at the expense of other responsibilities of the mission. This requirement can seriously hamper the mission’s ability to implement its mandated tasks, including the protection of civilians.²⁴⁰ The Santos Cruz report found that in some missions, an estimated 90 percent of the capacity of the force is spent on logistics (e.g., convoy escorts) and self-protection.²⁴¹

The costs related to delivery of fuel are difficult to track. Limited data is available. Diesel prices and usage fluctuate, and available data does not usually include associated costs such as fuel transport or convoy protection, which fall under other budget lines and are not included in calculating energy costs. In October 2015, for example, a South Sudanese rebel group captured a UNMISS fuel barge traveling to Renk, confiscating all 55,000 liters of fuel and temporarily holding mission personnel hostage.²⁴² According to a former senior UNMISS official, this incident led to barge-rental transport costs for the mission spiking from between \$1 and \$1.5 million per trip to approximately \$2.5 million per trip. UNMISS had no choice but to shift and use aircraft to fly its fuel to northern locations as a cheaper alternative. These elevated transport costs were classified as “freight forwarding costs” in the budget, however, and not counted as energy-related expenses, making it difficult to show the true cost of relying on fossil-fuel supply chains for power in South Sudan.²⁴³

Fuel Theft and Fraud. UN reliance on diesel also opens missions to the risks associated with fuel theft and fraud. Fuel stolen or pilfered from missions – sometimes by UN personnel themselves – has financial and reputational implications for these missions and the UN. Such activities can also feed into war economies or corrupt oil markets that are driving or exacerbating the conflicts that the UN has been deployed to address.

Examples of fuel fraud and theft in UN field missions abound. In Lebanon in 2007, the UN found that senior officers of a UNIFIL contingent systematically overstated fuel requirements and fuel consumption, and sold the excess fuel to local buyers.²⁴⁴ UN staff in Burundi were complicit in inflating vehicle-fuel docket; the fuel not dispensed was alleged to have been sold in local markets and the proceeds distributed among perpetrators.²⁴⁵ In Mali, peacekeepers allegedly “colluded with fuel attendants to illegally withdraw money from preloaded fuel cards.”²⁴⁶ In 2014, there were six reported incidents of fuel theft from the UN-supported mission in Somalia.²⁴⁷ Two years later, nine AMISOM soldiers were jailed for selling the mission’s fuel to civilians in Mogadishu.²⁴⁸ In Timor-Leste, a vendor fraudulently altered documents to cover up the theft of more than 100,000 liters of fuel from the UN mission.²⁴⁹

These incidents have cost the UN millions of dollars. An Office of Internal Oversight Services (OIOS) audit of UNSOS found that 3.3 million liters of fuel valued at \$4.7 million were pilfered from the mission between January and September 2014.²⁵⁰ A 2009 investigation of the UN Operation in Côte d’Ivoire found that seven staff members had been involved in fraudulent fuel transactions causing a financial loss of approximately \$70,000.²⁵¹ These losses are all the more significant when considered in the current context of member-state pressure to reduce peacekeeping budgets and UN spending.

Finally, fuel theft and fraud have the potential to undermine sustainable peacebuilding objectives by contributing to war economies and corrupt oil markets. It is not clear whether fuel stolen from the UN by armed groups is used or sold by them to sustain their activities, support attacks against the mission, or harm civilian populations. Moreover, the UN often operates in countries where oil is linked to corruption, including in Sudan, South Sudan, and the DRC.²⁵² Fuel pilfered from UN missions has the potential to feed into those opaque markets and reward corrupt practices, undermining economic and political transparency that is critical to good governance and sustainable peace.

Obstacles to Change

As demonstrated by the examples of innovation and uses of renewable energy discussed above, missions are not consistent in their practice or results in the field. The policies

and guidelines from headquarters offer some support for renewable energy in the field, but the pace of change is not at a level to meet the SG's goals and UNSCAP ambitions. A number of factors reinforce a reliance on diesel generators as the primary practice in the field, and will need to be addressed to implement the goal of achieving 80 percent renewable energy by 2030. These include the following.

Challenges in hanging TCC/PCC Behavior. As discussed earlier, the uniformed contingents make up the majority of UN peacekeeping personnel, and thus represent the largest energy users in a mission. Emissions could be reduced if more TCCs and PCCs used renewable energy. There are various ways to do this, including using locally provided energy (e.g., in the DRC) or energy provided by the mission.

Another option is the deployment of hybrid generators to missions, for which the UN now offers reimbursements. To date, no nation has yet come forward to take up this option, and conversations with UN officials indicate this could be for a variety of reasons. In general, no contributors have said they would like to provide solar or hybrid sources of power generation.²⁵³ Habits are accrued by experienced TCCs and PCCs in peacekeeping, for example, and some have served for several decades. This often means that those with existing processes and well-established deployment rotations may naturally reuse approaches and equipment they already have.

Path dependency does not fully explain the lack of TCC/PCC deployment of reimbursable renewable energy in the field. There are other potential factors. First, the reimbursement rates may be too low to cover the cost of the technology, and contributing countries may not be sufficiently incentivized to switch from diesel generators. One UN official who has been involved with Greening the Blue efforts, including the 2017 push to incentivize renewable energy in COE, framed the situation as a simple cost-benefit analysis made by TCCs/PCCs, noting that many benefit from the current systems.²⁵⁴ Second, there has not been a high-level emphasis on this initiative in order to push TCCs/PCCs to change behavior. There appears to be limited information or awareness about this initiative. Third, it is possible that the equipment base from which many TCCs/PCCs draw, i.e. their domestic military and police equipment, does not include options for renewable-energy or hybrid generators. If that is the case, partnerships between countries that have the technology and those deploying could make sense.

Changing this dynamic will require a concerted effort to engage TCCs/PCCs on multiple levels to understand how renewable-energy generation can be made attractive and feasible. This should be coupled with an increased economic incentive structure, technical support from relevant countries, and a high-level push around the goals of the UNSCAP.

Short-Term Financing and Mandates. The examples of larger solar systems being introduced in the field – including UNMISS’s 2.2 MW of solar panels in South Sudan, and MONUSCO’s 650 kW solar system in the DRC – mark the exceptions rather than the rule. These purchases came about under hard-to-replicate circumstances, often reflecting experienced mission personnel. UN peace missions are defined as temporary mechanisms, with generally 12-month mandate renewals and one-year budget cycles. Nonetheless, missions are often deployed in protracted conflict settings and last for years or decades. This disjuncture makes it more difficult for mission leadership to budget and plan for longer-term projects such as renewable-energy systems, given the expensive one-time upfront costs and that cost savings take a few years to realize.

The question is how to shift to a system that facilitates the procurement and use of renewable energy more easily and consistently to fit the needs of the mission. At a basic level, the solution requires energy options to be assessed on a cost-benefit analysis with a multiyear approach. A one-time renewable-energy system purchase will likely cost more than a 12-month diesel purchase, but the longer-term efficiency and savings from reduced future diesel usage pays back over time with considerable savings. As many missions have very high electricity costs, compounded by temporary infrastructure and long, expensive diesel supply chains, the payback from a solar system can take as little as two to three years in remote locations.

Difficulty in Engaging Private Sector, Energy-as-a-Service Model. One way to accelerate the adoption of increased renewable-energy options, as demonstrated elsewhere internationally, is through private-sector investment and development of renewable-energy systems anchored by core clients, such as UN sites. This is the easiest solution for UN field missions: a private sector partner builds and finances the new energy system, and the UN buys the energy. The approach treats energy as a service rather than a commodity.

Field missions are not currently designed to sign long-term energy leases or engage with private-sector companies. There are exceptions, however. Missions use multiyear leases for some services, although energy has not traditionally benefited from these. One notable and exciting development is in Malakal, South Sudan, where the IOM has entered into a multiyear energy-as-a-service lease with private solar developers Kube Energy and Scatec Solar. The 700 kW solar system will support the IOM-run humanitarian hub at the POC site within the UNMISS base in Malakal. Private developers will finance and build the solar system and sell the energy to the IOM at a prenegotiated set price. This model offers a great solution for field missions, especially for locations where there is strong likelihood and confidence that peacekeepers will remain for multiple years. Partnering with local renewable-energy companies and

developers, where feasible, also allows the mission to support the local renewable-energy sector and associated economic growth.

Lack of Clear Leadership and Goals on Energy. The examples above illustrate the absence of a consistent framework and goal structure for energy-related decisions, beyond some interest from headquarters in cost savings, efficiencies, and a fleeting consideration for Greening the Blue. The short-lived 2020/50 Greening initiative, announced internally in 2016 (encouraging missions to pursue 50 percent renewable-energy usage by 2020), seems to have had an impact. UNMISS officials cited this as the cause for their purchase of 2.2 MW of solar panels and batteries, and it seems to have also contributed to UNMIK's investment in renewable energy. The initiative was not included in the 2017 environment strategy for field missions, however, and is not evident elsewhere. However, it demonstrated the importance of policy goals, and provides a lesson for the follow-up and support that will be necessary to implement the UNSCAP. DOS and the DMSPC are leading on the implementation of the UNSCAP, an opportunity for them to integrate the goals of the climate action plan with their goals in the field.

Examples of Progress

Increased Use of Renewable Energy. Some missions are already engaging in limited use of renewables. Several operations have installed some solar energy capacity, and a smaller number of missions have managed to plug into the grids of their respective host countries, including some examples of clean grids.

Cost Savings. Various missions are reporting on internal cost savings from renewable-energy and energy-efficiency projects. In turn, the UN budget committees, including the ACABQ, have noted and flagged these ambitions and savings in budgetary documents. To support the UNSCAP, more attention to successes in the field – and ways to accelerate that shift – could further assist efficiencies and savings.

Increased Data Collection and SOPs. Energy management plans (EMPs) and energy project plans (EPPs), as envisaged in the standard operating procedure (SOP) put forth by DOS and the DPO in January 2019, are a major step forward. This SOP should be welcomed and applauded as it provides the framework through which UN field missions can translate a vision for a greener, more efficient Secretariat into a reality in the field. EMPs are intended to set out the missionwide plan for managing and improving how to facilitate energy performance for a specified period, while EPPs exist to translate EMPs into practical projects. These planning mechanisms represent a process for developing and implementing mission-level energy-infrastructure management and project plans, which are meant to inform the missionwide environmental action plan that generates the DOS environmental-management

scorecard to be reported in the mission's performance report on the results-based budget.²⁵⁵

Leadership Makes a Difference. There are signs of a growing community of UN leaders interested in greater efficiency and effectiveness from using a diversity of energy sources, who have pushed for the use of renewable energy to maximize mission effectiveness, such as in Somalia, the DRC, South Sudan, and Kosovo, among others. Their efforts suggest there is room for greater collaboration across the political and support components of missions on ways to support innovation. There is also likely benefit to an expanded exchange of cross-mission lessons learned and knowledge-sharing.

Beginning of a System Change? Member states agreed in January 2017 during the COE Working Group negotiations to optional new reimbursement arrangements that incentivize efficient power generation, including through the deployment of renewable-energy capacities.²⁵⁶ The 2020 COE negotiations hold potential to deepen this approach. There are signs that a community has started to develop with the creation of the Group of Friends for environmental management in the field, co-chaired by Italy and Bangladesh, two major TCCs.

5. Initial Findings and Recommendations

As the world mobilises to address the climate emergency, the United Nations must walk the talk. We are taking decisive action to lower our greenhouse gas emissions, reduce energy use across our facilities and operations, transition to cleaner energy sources and improve waste management systems. – Secretary-General António Guterres, 2019²⁵⁷

Aligning the UN's goals and practice to achieve 80 percent renewable-energy usage by 2030 is ambitious. Today, missions use some renewable energy on a small scale but are heavily dependent on diesel fuel. To shift and align with the UNSCAP, UN policies and missions in the field will need to make key changes. The benefits are many: save money and increase efficiency, reduce difficult supply chains to deliver fuel in remote locations, take advantage of available options that support the local economy, use UN buying power to support broader access to consistent energy to reduce pollution and GHG emissions, and reduce dependence on diesel. In some cases, using renewable energy may enhance the security of UN operations and help support local peacebuilding. Shifting to renewable energy will align the UN's practice with the ambitions set by member states to reduce emissions, and will help offer alternatives to governments that host UN operations.

The vision put forward by the SG in September 2019 built on important, decades-long initiatives such as Greening the Blue and the *2017 Environment Strategy for Field Missions*, which first recognized the importance of shifting toward cleaner and more sustainable missions. Today, UN field missions comprise a vast majority of UN Secretariat GHG emissions, primarily from their facilities and infrastructure. The UNSCAP goals can drive a concerted effort by member states and UN leaders to think afresh about how missions are designed, how they use energy, and the way they operate in host nations.

The challenge will be marrying these visions with policies, and working with each mission to implement the necessary changes. As shown in this report, each mission has a different story, with unique challenges and opportunities, including existing success stories and efforts to deploy renewable energy. Their efforts should be studied and built upon. The good news is that numerous benefits can accrue from modernizing the energy practices in peace operations.

Initial Findings

With the majority of emissions coming from UN field operations, a first step is addressing UN peace operations, primarily the large ones. Broad approaches should be considered.

First, energy should be made a more visible part of UN operations. Despite the vision of shifting missions away from fossil fuels, UN policies and decision-making around energy are segregated across agencies and missions. Peace operations are mandated to help bring peace to regions, protect civilians, and enable nations to transition away from conflict. Those goals are the priority and are supported by the activities of the mission. The role of energy is lesser known, poorly understood, and not viewed as an area for research and policy engagement. Yet a fresh focus on energy practices in field missions is required to improve mission effectiveness and to achieve the goals set out in September 2019 by the UN Secretariat Climate Action Plan (UNSCAP). This approach may be resisted by some as being secondary to the primary mission of UN operations, but it is not an either-or situation. Missions will benefit from tracking their energy use, collecting data, and embracing the benefits that renewable energy can provide across many areas for missions starting up, continuing, or scaling back.

Second, field incentives and disincentives for changing energy options need understanding – and addressing. Each mission has a unique story around how energy impacts its function, as shown by the examples in the Democratic Republic of the Congo (DRC), Lebanon, and South Sudan, as well as Kosovo and Mali, among others. This initial research found that some efforts are underway to make change, but that change needs support, technological know-how, and new financial solutions. There are also opportunities for new and better collaboration with host nations. Mission-specific case studies can help identify the discrepancies between UN visions and their implementation in the field, and help policymakers appreciate the broad variation within individual UN entities and determine how to address these. Member states will need to embrace new approaches, align policies and budgets, and support the deployment of renewable energy in the field, be it with hybrid generators, solar, wind or hybrid minigrids, or by connecting to and supporting the local grids of host nations.

Third, leadership needs to recognize the benefits of renewable energy and accelerating change. Those in leadership at the UN and within member states have pushed forward ambitious new policy goals and approaches. To operationalize these goals and gain the benefits of greater renewable-energy usage, that approach needs to be systemwide. The UNSCAP should accelerate these actions. The SG's office should appoint a champion for and put together a team in support of those leading the

UNSCAP implementation plan. They will need support for the combination of innovation, transformation, and partnerships required – the fundamental shift identified in the UNSCAP to move beyond incremental change – to achieve energy savings and peacebuilding benefits for local communities. Policies should follow the vision and drive change and translate into consistent incentives for the field. Some existing challenges could be addressed by better communications between headquarters, the field, and member states; other challenges will require a change in the way the UN does business across the board. Setting high-level goals and offering political leadership could incentivize and change how the system works.

Fourth, the story of why this shift matters needs broader understanding.

Successful renewable-energy projects have been realized across UN field missions, with localized positive impacts and benefits, such as in the DRC, Lebanon, and South Sudan. Yet these good examples tend to be little known outside of each specific mission. Capturing and learning from these experiences can help the UN determine what works, where the blockages are, and where change can be catalyzed. Examples of successful renewable-energy transitions from outside the UN system, in both the public and private sector, can also be instructive. The transition to a greater use of renewable energy can support a whole range of UN and mission-specific goals, from cost savings and improved security to local energy access and peacebuilding. Although the UNSCAP provides a climate-driven push for this change, the potential positive impacts can be much broader.

Finally, transforming mission energy use is an area deserving of and ripe for partnerships across the research, UN, private-industry, member-state, and philanthropic communities. Transitioning UN field operations from diesel to renewable energy offers a significant potential win for the UN and aligns directly with other international priorities, including the sustainable development goals (SDGs) – particularly energy access (SDG 7), climate action (SDG 13), and peace, justice, and strong institutions (SDG 16). Renewable energy is a rapidly growing sector that is driving jobs, investment, and growth around the world. There are opportunities for partnerships for the UN to adopt new technologies and finance models; to deepen research on the links between energy, conflict, and peacebuilding; and to identify opportunities for renewable energy to support communities and host nations in meeting their goals. Likewise, the UN and its member states should work with philanthropic funders, research organizations, and the private sector to accelerate renewable-energy development, innovation, and investments, and to help identify new models and financing solutions that fit the unique challenges of field missions.

Way Forward

This interim report is an initial attempt to map the UN's policy and practices around energy provisions in field missions. The questions it explores are particularly timely given the ambitious new UN renewable-energy goals. The picture that has begun to emerge from this research is a complicated one around energy management in UN field missions – a challenge that has historically lacked strong high-level leadership, with decision-making spread across multiple agencies and missions. The UNSCAP injects new urgency into addressing this, and the good news is that the goals are achievable. Renewable energy has undergone a revolution over the last decade, and continues to grow and expand as the world continues to green its electricity supply. Although UN field missions are unique, there are ample examples, from big governments and corporations to small humanitarian operations and villages, of communities that have figured out how to transition to renewable energy. The UN can do the same.

There are a series of options available to the UN in the near term to support the UNSCAP implementation. These include the following.

Track 1 – Intensification: Intensify and accelerate current efforts of Environment Strategy, including:

- Conduct case studies of field missions to understand the localized energy context and identify opportunities for each mission.
- Assess options and availability to link to current grids and local connectivity for missions.
- Identify how missions can self-generate with renewable energy – both UNOE and COE.
- Support better dialogue between the political and mission support in field missions around energy issues.
- Look at how missions in South Sudan and the DRC have adopted larger-scale renewable-energy projects and what lessons can be learned, including what budgetary or administrative systems helped or hindered that work.
- Assess local needs for energy access in current host-nation efforts, and opportunities for missions to help support energy for local populations or for national or regional grids.

Track 2 – Innovation: Partner with technological experts and providers to access and scale new technology and finance, including:

- Convene a community of experts in energy and technology with experts on peace operations to identify synergies and areas of potential future collaboration.

- Explore the potential for technology-contributing countries – those with strong domestic renewable-energy sectors or capacity – to support TCCs/PCCs that lack domestic capacity to deploy with renewable-energy solutions in field missions.

Track 3 – External and Internal Outreach: Support Track 1 and Track 2 with sustained communication and educational efforts, including:

- Create an external advisory group.
- Create an internal education campaign to support institutional change.
- Mobilize resources (human, financial, political, and knowledge) to support culture and institutional change.
- Collect data to develop a levelized cost of energy across missions.

Initial Recommendations and Areas of Further Investigation

In addition to the way forward on UNSCAP implementation, this report has illuminated some immediate recommendations for carrying out a transition to greater renewable-energy usage in field missions.

For UN Headquarters and the Secretariat:

- Establish a team to document and collect lessons learned, identify best practices around current mission efforts on renewable-energy transitions in the field, and identify the incentives/disincentives.
- In addition, commission case studies of current practices for a range of UN peace operations.
- Develop a plan to implement the UNSCAP and empower its implementation by engaging across the UN system in dialogue with actors who support or work in UN peace operations. Develop a concept, strategy and options for advancing Track 2 of the UNSCAP plan on innovation, which will require reviewing new approaches to energy provision, including external partnerships and novel financial arrangements.
- Develop new systems contracts to support missions' purchases of renewable-energy hardware, system design, installations, and maintenance for field missions.
- Develop new incentives and support packages to help missions transition to renewable energy for UNOE and COE.
- Brief TCCs and PCCs on the new renewable-energy goals and existing options for generators; create new incentives for TCCs and PCCs to make better use of efficient and hybrid capacities; survey member states to understand who has hybrid generators available to deploy; and update them through the COE Working Group discussions in 2020.

- Direct each UN mission to produce an electrification plan by September 2020 to help identify ways to diversify energy sources and increase the use of renewable energy.
- Explore alternative financing options to help support upfront investments and overcome limitations of annual funding cycles, such as a new investment fund to finance the deployment of renewable-energy systems in field missions.
- Develop a concrete set of indicators related to their plans and usage of renewable energy, for each mission to report against.

For Peace Operations:

- Initiate joint processes for mission leadership and mission support to engage on strategic energy issues such as the mission's electricity usage and renewable-energy targets. Identify what is needed, if anything, to accelerate change toward greater use of renewable energy.
- Explore options for local grid connectivity, where relevant, taking into account both price and environmental footprint of local energy grids.
- Begin to identify mission site locations that could be most suitable for on-site solar/battery systems, based on factors including high energy costs, difficulty of fuel resupply, and likelihood of continuing long-term presence.
- Expand data collection efforts around a mission's energy loads, diesel usage, and energy expenses.
- Engage with the local renewable-energy community in a mission's respective country to explore local renewable-energy options and solutions.
- Explore options for private-sector renewable-energy-as-a-service solutions, or energy-leasing arrangements.
- Prioritize the hiring of engineering staff with renewable-energy backgrounds, knowledge, and expertise.
- Explore opportunities to support local renewable-energy capacity-building, and the deployment of renewable-energy systems as a means to support better socioeconomic outcomes, improved security, and/or peacebuilding efforts.

For Member States and Troop-Contributing Countries and Police-Contributing Countries:

- Understand UN policy options and prioritize use of renewable-energy technology for contingents deploying to missions.
- Instruct deploying or deployed contingents to explore both local clean grid-connected energy options, and to identify locations and opportunities for transitioning diesel-powered generators to renewable-energy systems.
- Report back on contingent options for energy in the field.
- Support the deployment of renewable energy by troop and police contingents.

- Offer to subsidize or help fund this technology initially for TCCs and PCCs to deploy with renewable-energy technology.
- Support implementation of recommendations from the final report of the Expert Panel on Technology and Innovation in UN Peacekeeping to create technology-contributing countries with the capacity for renewable energy to strengthen deployments.

This report also points to the following areas for further consideration and investigation.

- Are leaders of peace operations in the field empowered to change their sources of energy, including using microgrids and host-nation renewable-energy sources?
- Do mission support personnel have the authority and flexibility to meet goals? What does mission support need to change to energy-as-a-service and tap the grid in the field?
- How do missions work with host nations on their energy plans, and with the SDG community, to pilot energy options where UN field operations are deployed? Have any missions worked with host nations to understand their SDGs and climate change ambitions in developing their use of funding for energy?
- Is there a community of practice across field missions that highlights success stories from the field? As shown here, many missions have engaged in using renewable energy.
- How does this relate to addressing the goals of the women, peace and security agenda and how is it seen through a gender lens?
- Likewise, would the UN need to set up new standards for decisions about what local source of energy to plug into? Should it favor state utilities or local grid efforts for renewable energy?
- The development economics around the greater goal of helping transfer the use of energy to communities and making that sustainable is not fully explored here.
- The role of energy as part of a larger strategy for peace is not well-understood.

This is an interim report intended to demonstrate initial findings and help spark a wider conversation across professional communities involved in fragile states, energy, economics, peace operations, development, and climate issues. In order to address the questions listed above in the final report, the authors seek to engage with more experts, member states, and UN officials at headquarters and in the field. The authors will conduct additional interviews to provide a more in-depth assessment of how, where, and when the UN can increase its use of renewable energy in its field missions around the world. The authors encourage and welcome comments and criticisms, and seek review from policy experts and practitioners on this working paper, and intend for the final report to build on this report's initial findings, analysis and recommendations.

Endnotes

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- ⁹ According to an analysis by the Center for International Cooperation, based on UN data, the average life of a UN peacekeeping mission at that time was 25.3 years, with a median age of 16 years. See: Global Peace Operations Review, “Strategic Summary 2016: UN Peace Operations by the Numbers,” 2017, <https://peaceoperationsreview.org/strategic-summary-2016-un-peace-operations-by-the-numbers/>.
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- ¹¹ In 2016, those in DRC without access to electricity was 65.23 million. Populations without access to electricity in nations hosting UN peace operations include 24.3 million people in Sudan, 11.14 million in South Sudan, 11.68 million in Mali, 3.95 million in CAR and 10.04 million in Somalia. See Hannah Ritchie and Max Rosen, “Energy Access,” *Our World in Data*, September 2019, <https://ourworldindata.org/energy-access>.
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¹⁹ The “Greening the Blue” website summarizes recent efforts as of fall 2019. See <http://www.greeningtheblue.org/what-the-un-is-doing/united-nations-headquarters-unhq>. For information on the UN’s broad sustainability efforts, see UN, “UN and Sustainability,” <https://www.un.org/en/sections/general/un-and-sustainability/>. For text of the UN Climate Neutral Strategy, see <http://www.greeningtheblue.org/sites/default/files/UNClimateNeutralStrategy.pdf>.

²⁰ CEB, “Action on the System-wide Road Map for UN Climate Neutrality by 2020,” 4 April 2015, <http://www.unsceb.org/content/action-system-wide-road-map-un-climate-neutrality-2020>.

²¹ *Ibid.*

²² Greening the Blue, “Overview,” 2018, <http://greeningtheblue.org/gtbreport/2018/overview>.

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¹⁰² Initiated by the United States in 2014/2015, Peacekeeping Ministerial Conferences have been held in London (2016), Vancouver (2017) and most recently, New York (2019). For more information, see: <https://peacekeeping.un.org/en/2019-peacekeeping-ministerial-conference>.

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¹⁰⁵ *Ibid.*, para. 442.

¹⁰⁶ UN News, “Clear Mandates, Viable Recommendations Key for Improving Peacekeeping Performance, Security, Speakers Stress as Special Committee Concludes General Debate”, 12 February 2019, <https://www.un.org/press/en/2019/gapk235.doc.htm>. Supporting the “do no harm” principle, Bhutan pledged to reduce its carbon footprint and impact on the local environment and natural resources in places of deployment. In 2018, they also urged restoring faith and trust between local communities and peacekeepers, including reducing the environmental footprint of peacekeeping missions including with solar energy.

¹⁰⁷ *Ibid.*

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¹²⁰ *Ibid.*, para. 21.

¹²¹ UN General Assembly, “Report of the Special Rapporteur on Extreme Poverty and Human Rights,” U.N. Doc. [A/71/40823](#), 26 August 2016, pp. 4.

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¹²⁶ Ibid., pp. 1.

¹²⁷ Ibid. The working groups consist of engineering and environmental staff from missions, UN Headquarters, and provided through REACT.

¹²⁸ In a MONUSCO job description for an Environmental Affairs Officer (P4), the responsibilities appear substantive, including, “managing the Environmental Unit” “coordinating and managing actions on environmental issues in the mission, chiefly establishing, implementing, monitoring and revising as necessary the mission’s Environmental Management System (EMS),” and providing “an environmental briefing to all mission personnel including police and military contingents during their induction training.” Also, to “liaise on environmental issues with local authorities and the Office of the United Nations Resident Coordinator and relevant United Nations bodies and agencies present in the country or region hosting the mission” and “carry out any other tasks required to support the DKPO/DFS Environmental Policy for UN Field Missions and the environmental objectives of the mission as directed by the Director of Mission Support.” Available at: <https://careers.un.org/lbw/jobdetail.aspx?id=117613>. Many of these responsibilities are paralleled in a job description for UNAMI (Iraq) for an environmental affairs officer, see: <https://careers.un.org/lbw/jobdetail.aspx?id=116772>.

¹²⁹ ImpactPool, “Making a difference as Environmental Affairs Officers at UN Peace Operations,” <https://www.impactpool.org/articles/un-peacekeeping-environment-careers>.”

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¹⁴⁰ Interview with UN official, 25 October 2018.

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¹⁴³ Ibid.

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