

STIMSON



INTERNATIONAL
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REPORT

SHIFTING POWER

Transitioning to Renewable Energy
in United Nations Peace Operations

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with David Mozersky and Sherwin Das

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The Powering
Peace Initiative

The Stimson Center &
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COVER Solar Energy Powers UN Mission
Base in Lebanon *UN Photo/Pasqual Gorriz*

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An Indonesian peacekeeper with the UN Interim Force in Lebanon (UNIFIL) is shown on patrol UNIFIL's Eastern Sector, South Lebanon.
UN Photo/Pasqual Gorriz

ABOUT POWERING PEACE

Powering Peace is a joint research initiative of the Stimson Center and Energy Peace Partners. The Stimson Center, a Washington, D.C.-based research and policy center, works to protect people, preserve the planet, and promote security and prosperity. Stimson has led studies and research on peace operations since its founding 30 years ago. Energy Peace Partners is a U.S.-based organization that works to leverage climate and finance solutions to support peace in fragile states and places affected by violent conflict.

The Powering Peace initiative envisions a broad policy shift within the United Nations and among its member states to adopt renewable energy in peace 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, effective and cost-saving technologies with a shift to greater use of renewable energy in line with the UN's own goals, including for peace operations, the UN Secretariat's 10-year Climate Action Plan, and the Sustainable Development Goals. The initiative also seeks to identify impacts of and improve on current practice. 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 uses reports and case studies as a research tool to identify innovative practices, incentives and disincentives facing peace operations, 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.

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ABOUT THIS REPORT

This report draws on desk and field research, as well as meetings and interviews with experts, practitioners, policymakers, and individuals working within the UN Secretariat and agencies, field missions, governments, and nongovernmental organizations. Research by the Powering Peace team was conducted from 2017-2020, including field visits to the Democratic Republic of the Congo, Lebanon, and South Sudan. Additional interviews were held with UN mission leadership and officials in field missions (including in the Central African Republic, Kosovo, Mali, and Somalia) and in New York, Washington, D.C., and elsewhere. This report also builds off a working paper of the same name, published in February 2020, which was used to facilitate expert engagement and solicit feedback from stakeholders on its interim findings. To that end, Powering Peace would like to thank the Belgian Mission to the United Nations for hosting our team for a roundtable discussion in December 2019. We would also like to thank the Social Science Research Council and the Loomis Council for additional workshops in 2018 and 2019.

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A Moroccan peacekeeper serving with the UN Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA) escorts a UN delegation in Bambari. *UN Photo/Catianne Tijerina*

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
EIMP	energy infrastructure management plan
GHG	greenhouse gas
GW	gigawatts
HIPPO	High-Level Independent Panel on United Nations Peace Operations
IDPs	internally displaced persons
INDC	intended nationally determined contribution
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 Organization Mission in the Democratic Republic of the Congo
MONUSCO	UN Organization Stabilization Mission in the Democratic Republic of the Congo
MOU	memorandum of understanding

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MW	megawatts
OIOS	Office of Internal Oversight Services
OPEC	Organization of the Petroleum Exporting Countries
PCC	police-contributing country
POC	protection of civilians
PPA	power purchase agreement
P-REC	Peace Renewable Energy Credit
REACT	Rapid Environment and Climate Technical Assistance
SDGs	sustainable development goals
SIPRI	Stockholm International Peace Research Institute
SNEL	Société nationale d'électricité (national utility in the DRC)
SRSR	Special Representative of the Secretary-General
TCC	troop-contributing country
UNAMID	United Nations-African Union Mission in Darfur
UNDP	UN Development Programme
UNEP	UN Environment Programme
UNICEF	UN Children's Fund
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 António Guterres committed the UN Secretariat to slashing its carbon emissions and dramatically increasing its use of renewable energy to 80% 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% of the UN System's greenhouse gas emissions, with the largest share coming from UN-led peace operations.¹ Today those operations include 13 peacekeeping and 26 special political missions/presences, 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 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.

This 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, kick-start 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 findings from peace operations and how they could accelerate beneficial shifts to diversified energy options and meet the Secretary-General's goals for increasing the use of renewable energy.

This report also focuses on UN leadership, and looks at the **broad vision** across the UN System to address modernization and efficiency in field operations, as well as to reduce consumption, 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**.

The transformation required for UN peace operations to reduce emissions is complex. Successful renewable-energy transitions in peace operations have grown, but they remain the exception rather than the rule. The system as a whole is not yet designed to support renewable energy in the field at scale — and the missions listed above have overcome internal obstacles to deploy renewables. This report finds that certain areas need change and that targeted, manageable measures will go a long way in meeting mission goals and UN climate targets. Several key findings should be considered.

FINDINGS

First, energy issues within UN peace operations remain largely hidden despite energy’s critical role as an enabler. Effective system transformation requires enhanced visibility of the role of energy in peace operations among a broader set of stakeholders. 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 core activities of the missions, and energy serves as a critical input for facilitating achievement of those mandated goals and mission functions. Beyond a small subset of subject-matter experts on the support side, energy is less familiar and less understood than other elements of logistics (e.g., air assets or engineering units) despite being a major component of the missions. Its role is not a frequent area for research and policy engagement. Further, even with the vision of shifting missions away from reliance on fossil fuels, UN policies and decision-making around energy are still segregated across agencies and missions.

Yet a fresh focus on energy practices in field missions can assist in understanding the role of energy and improving mission effectiveness. This will also support the goals set out in 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 strengthening the tracking of their energy use through data collection and embracing the benefits that renewable energy can provide across many areas for missions starting up, continuing, or drawing down.

Second, accelerating a shift toward renewable energy requires understanding and navigating the dynamics — at the Secretariat, mission and member-state levels — that sustain reliance on diesel-powered generators. They include:

- Short-term financing and mandate cycles that impede longer-term budgeting;
- High upfront capital costs of renewable energy;
- Reliance by troop and police contingents on diesel generators as an established mechanism of the self-supply of energy and standard 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 new technologies;
- Complexity in contracting for energy outsourcing;
- Limited land area available for renewable-energy projects;
- Mandates for peace operations lacking any focus on the use of energy;
- A system of robust energy data that is in the early stages of establishment; and
- Limited access to energy data, which is generally not available across operations for the full leadership team.

Third, renewable-energy transitions at scale will require a system change. This shift should take into consideration the varied experiences, incentives, and disincentives in the field, and what is adaptable to specific mission settings. Each mission has a unique story of how energy impacts its functions, as shown by the examples in the Democratic Republic of Congo, Lebanon, and South Sudan, as well as Central African Republic, Darfur, Kosovo, Mali, and Somalia, among others. Our research indicates that the laudable progress some missions are making in increasing their share of renewables often stems from bureaucratic creativity and hard-to-replicate circumstances. Capturing and learning from these experiences can help the UN determine what works, where the blockages are, where change can be catalyzed, and what new challenges will occur. For energy transitions to reach

scale, all missions will require improved support, technological know-how, and better financial solutions. The lessons learned to date suggest that system change is necessary within both the UN's internal structures around energy management, as well as among member states and troop- and police-contributing countries, with support from outside expertise and providers.

Fourth, leadership matters, and senior managers can drive change by embracing the benefits of renewable energy and creating the conditions for systemwide transformation. Accelerated adoption of the UNSCAP by key UN decision-makers within the Secretariat is required to operationalize its objectives with regard to renewable energy. Leaders in the field will understand that the UNSCAP's ambitious targets could trigger a change in how the system works. Given that ambition, the UN needs a team to lead the UNSCAP implementation plan and its combined efforts for innovation, transformation, and partnerships — a fundamental, not incremental, shift. Leaders can assure that policies follow the vision, drive change, and translate into consistent incentives for the field. Some existing challenges could be addressed by enhanced communications among headquarters, the field, and member states; other challenges will require a change in the way the UN does business across the board.

Fifth, the story of why this shift matters needs to be broadcast more effectively. The success of renewable-energy projects across UN peace operations, with localized positive impacts and benefits, is not well understood within missions or mission areas; within the broader UN; or as a matter of course within the Security Council, the General Assembly, and, more broadly, the member states. In recent years, under the leadership of Under-Secretary-General Atul Khare, the work of the Department of Operational Support's (DOS) Environment Strategy in sharing best practices with a wider group of mission stakeholders in the monthly Energy Working Group has significantly improved the internal exchange of such experience. Yet examples of successful renewable-energy transitions from outside the UN System, in both the public and private sector, are not well known in traditional circles of peace operations expert communities, or in those focused on peacebuilding, the sustainable development goals (SDGs), and climate goals. Further, the ability of renewable energy to bolster efforts to meet UN and mission-specific goals, from cost savings and improved security to local energy access and peacebuilding, is rarely considered and poorly understood. This represents an opportunity for the United Nations. Although the climate-driven need for the UNSCAP is clear, other advantages of the energy transition defined in the plan require greater advocacy.

Sixth, renewable energy is increasingly more available and practical for modernizing missions' energy use. Worldwide, renewable energy has undergone a revolution over the last decade, and it continues to grow and expand as the world greens its electricity supply. Prices for solar and wind technology have dropped by over 80% since 2010, and more than \$300 billion is invested annually in new renewable-energy projects around the world. Between 2010 and 2019, \$2.6 trillion was invested globally in renewable-energy capacity, more than triple the amount invested in the previous decade. Yet too little of that investment and technology has come to poorly electrified conflict-affected states, where peace operations deploy. The UN's encouragement of renewable-energy usage for its missions and for host nations can begin to change this dynamic and draw significant new investment and resources to these target countries.

Seventh, transforming mission energy use is ripe for partnerships across the UN, research, private-industry, member-state, and philanthropic communities. 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, host

governments, 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 UN missions.

Finally, the action is the message — and a positive story for the United Nations. Walking the talk is powerful, and this area is a chance for the UN to demonstrate leadership, innovation, and problem-solving across its priorities of peace and security, environment, climate, development, and, possibly, peacebuilding and access to energy. Transitioning UN peace operations from diesel-powered generators to renewable energy offers a significant potential win for the UN and aligns directly with other international priorities, including the SDGs — particularly energy access (SDG 7), climate action (SDG 13), and peace, justice, and strong institutions (SDG 16). The groundwork for transformation is laid in the field and across the UN; the future depends on harnessing those ambitions. Although UN peace operations are unique, there are examples of communities, from big governments and corporations to small humanitarian operations and villages, that have figured out how to transition to renewable energy. The UN can do the same.

RECOMMENDATIONS

By mapping UN policy and practices around energy provision in peace operations, this report finds that key changes can strengthen UN peace operations and help achieve the ambitious goals set out in the UNSCAP. This section makes specific recommendations to achieve that transformation. To start, the Secretary-General's office should appoint a champion for, and put together a team in support of, those leading the UNSCAP implementation plan. Additional efforts to build on progress to date and to accelerate change, strengthen partnerships, and expand outreach are also required.

This report illuminates the basis for recommendations for carrying out a transition to greater renewable-energy usage in field missions, as a pathway for achieving UNSCAP implementation as well as other related benefits.

For UN Headquarters and the Secretariat:

Demonstrate Leadership

- **The Secretary-General should appoint a high-level champion and establish a Secretariat-wide team to implement the action plan enshrined in the UNSCAP.** Leadership by this office can incorporate all the relevant Secretariat entities and empower implementation by fostering dialogue across the UN System. This team should develop a concept, strategy, and options for advancing Track 2 of the UNSCAP plan on innovation, which will require adopting new approaches in energy provision, including external partnerships and novel financial arrangements.

Build Knowledge and Lessons Learned

- **Establish a team to capture and share applicable knowledge and lessons learned** around current mission efforts on renewable-energy transitions in the field. The existing environmental staff at DOS, with support from the UN Global Service Center and Rapid Environment and Climate Technical Assistance (REACT), and the related environmental community within peace operations, should continue to set strategic direction to mission support, strengthen systems for environmental and energy management, and provide technical assistance to missions.
- The team should also continue to **collect and disseminate lessons learned and best practices.** Other stakeholders within the Secretariat, through initiatives such as the climate-security mechanism that brings together UN expertise across pillars and disciplines, can contribute to building and leveraging this body of knowledge with applicability to a diverse range of mandated UN objectives, including peacebuilding goals, national SDG targets, and climate.
- This team should work with missions to develop (and/or commission) **case studies**, foster partnerships for potential renewable-energy initiatives for a range of UN peace operations, and facilitate their dissemination and implementation.

Support System Change

- Improve the development of agile, smart, and cost-effective **systems contracts** to support missions' purchases of renewable-energy hardware, system design, installations, and maintenance, and introduce contracts that make it easy for missions to use alternative financial arrangements for energy (e.g., equipment leases, power purchase agreements), leveraging ongoing work and contracts developed by other UN entities.

- **Engage 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 various available forums.
- **Brief project and contract-reviewing committees** on the UNSCAP goals and suggested strategy involving new financial solutions and contractual arrangements for energy provision in the field missions.

Elevate Energy

- Direct **each UN mission to produce an electrification plan** by September 2021 to help identify ways to diversify energy sources and increase the use of renewable energy.
- Support missions with their reporting effort on the electrification plan by establishing a **concrete set of indicators** related to budget plans and use of renewable energy, for each mission to report against.

Support Field Innovation

- 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, or innovative financing mechanisms like the Peace Renewable Energy Credit.
- **Update the procurement and tendering processes** for energy equipment and services to favorably weight renewable-generation options, where possible.

Build Partnerships

- Develop **partnerships with philanthropic funders, research organizations, host governments, and the private sector** to identify new models, technologies, and financing options for UN missions and to help accelerate renewable-energy development, innovation, and investment.
- **Deepen research on the links between energy, conflict, and peacebuilding**; and identify opportunities for renewable energy to support communities and host nations in meeting their goals.

For Peace Operations:

Demonstrate Leadership

- **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, as appropriate, to accelerate change toward greater use of renewable energy.

Build Knowledge and Lessons Learned

- Engage with the UN Country Teams, other international organizations, nongovernmental organizations, and host-government authorities with regard to energy-related development initiatives wherein the mission can **act as an anchor client and enabler for investment in local renewable-energy** capacity.
- Work with the Secretariat to develop (and/or commission) **case studies**, foster partnerships for potential renewable-energy initiatives for a range of UN peace operations, and facilitate their dissemination and implementation.

Support System Change

- Actively explore options, through local procurement, 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.
- Update the **procurement and tendering processes** for energy equipment and services to favorably weight renewable generation options, where possible.

Elevate Energy

- Continue to develop, expand, and pursue funding for **energy infrastructure management plans**, in line with the strategic directions set out in the Environment Strategy and the UNSCAP. Continue integration of **site energy plans** in the energy infrastructure management plans developed by the missions' engineering and environment units. Determine opportunities for energy improvement of currently deployed TCC/PCC options for UN-provided energy and/or connection to local lower emission grids.
- Intensify and complete the **energy-efficiency activities by 2025** which have the highest return on investment and therefore environmental impact per dollar spent, as detailed in the UNSCAP, to achieve a substantive energy reduction and reduce the energy production capacity required.
- Continue efforts to **expand data collection** of missions' energy loads, diesel fuel usage, and energy expenses to obtain a robust baseline for design, prioritization, and monitoring purposes.

Support Field Innovation

- Continue exploring **options for local grid connectivity** of both UN and TCC/PCC permanent sites, where relevant, taking into account both price and environmental footprint of local energy grids as well as potential impact on local communities.
- Continue **identifying 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.

Build Partnerships

- 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:

Demonstrate Leadership

- Ask for briefings by the Secretary-General's office on **the UNSCAP** and benchmarks **to support its implementation**; ask the DOS for **updates on phase two of the Environment Strategy**; and request that the Department of Peace Operations (DPO) and the Department of Political and Peacebuilding Affairs provide **briefings on the energy plans of their peace operations**.
- Provide sufficient **funding for energy projects** to missions in order to reduce energy consumption as much as possible.

Support System Change

- Offer **support for phase two of the Environment Strategy**.
- Provide for better use of “**technology-contributing countries**” with the capacity for renewable energy to strengthen deployments, and implement this and other recommendations from the final report of the Expert Panel on Technology and Innovation in UN Peacekeeping. Offer to support the use of renewable-energy technology for TCCs and PCCs, including through partnerships with member states.

Elevate Energy

- **Understand UN policy options and prioritize the use of renewable-energy** technology for contingents deploying to missions.
- Ask DPO and its military planning service to brief on energy options in designing contingent and unit requirements, and to report on **measures to support contingent options for energy in the field**.

Build Partnerships

- Help link national plans with multilateral efforts in exploring **opportunities to support local renewable-energy capacity building**, including deployment of renewable-energy systems as a means to support better socioeconomic outcomes with the SDGs, and improve security, peacebuilding efforts, and/or alignment with climate goals.

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 matches its international legitimacy and credibility. To prevent conflict, UN peace operations deploy with mandates to facilitate peace processes, protect civilians, assist in political transitions, and conduct a range of peacebuilding activities in fragile environments.² The UN Secretariat and a diverse range of actors support these 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 and UN leadership, supported by a range of 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 — goals also supported by the international community. Nations have committed to addressing global development through the sustainable development goals (SDGs), which include targeted goals for greater access to energy, support for peace, and actions and interventions to combat climate change. In addition to the SDGs, member states are pressing for more effective responses to climate change, both to reduce emissions and warming, and 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-powered generators 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. A notable development came in September 2019, when UN Secretary-General António Guterres 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% reduction in greenhouse gas emissions and sourcing 80% 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, in 2018) and the UN System Strategy for Sustainability Management, a report of the UN Chief Executives Board for Coordination (CEB).⁵

The link between the Secretary-General's pledge to reduce UN emissions and UN peace operations is clear: it requires missions to shift away from diesel-powered generators to adopt renewable sources of energy for its operations. The activities of the Secretariat constitute approximately 60% of the UN System's greenhouse gas (GHG) emissions, with the largest share — about 90% — coming from its peace operations. 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 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 to embrace sound environmental policy⁶; and the dos Santos Cruz report, issued in 2017, which brought focus to improved safety and security for missions. Some reform initiatives include an environmental focus, such as the 2017 Environment Strategy for Field Missions (referred to as the Environment Strategy), which seeks to mitigate the environmental impact of UN 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.⁷ These initiatives underscore the complexity of contemporary peace operations and the desire to design and deploy peace operations that are fit for the future.

The energy profile of UN peace operations today, however, reflects the designs and realities of a different era. Peace operations are typically deployed as emergency measures intended to address urgent crises. While established as short-term missions by the UN Security Council, most operations remain in existence for more than a decade.⁸ Missions are frequently established in fragile settings, where the host country's electricity grid infrastructure is poor or nonexistent. The need for reliable power has necessitated that both the civilian and uniformed components of peacekeeping operations deploy with and rely on diesel-powered generators as the main source of electricity from the outset. Hence peace operations, particularly those deployed to off-grid locations, remain almost exclusively reliant on fossil fuels for power generation. Despite a growing number of renewable-energy projects in some peacekeeping and political missions, renewable-energy usage remains very low. The environmental scorecards of each mission from 2017-18 to 2018-19 indicate that **the average proportion of power coming from renewable sources across missions has increased from 1% to approximately 3%.**⁹

Why the UN Should Walk the Talk with Renewable Energy

As the Secretary-General has articulated and the UNSCAP lays out, there are multiple reasons for the UN to transition to renewable energy. The UN is at the forefront of efforts to tackle climate change. The influential reports of the IPCC continue to assess the science related to human-caused climate change, describe the implications, and provide options for mitigation and adaptation. 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 stewardship in this area and allows the organization to lead by example.

The UN System achieved climate neutrality in 2019, one year ahead of schedule — a notable accomplishment.¹⁰ This achievement was only possible, however, with the purchase of certified carbon credits that offset total UN emissions. Climate neutrality does not meaningfully affect the carbon-intensive nature of UN peace operations. Transforming peace operations to adopt renewable energy at a greater scale requires understanding the incentives and disincentives for such a transformation, which are not well known. This makes it difficult for member states and UN officials to implement changes in policy and practice required across the UN Secretariat, including within those departments and offices that provide capabilities to field operations.¹¹

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, are 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 transformation toward cleaner practices. Governments, corporations, and communities are increasingly aware of the negative externalities associated with fossil-fuel dependence 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 well over a trillion dollars in new investment— such that it now makes up an increasing share of the global energy mix.¹²

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 road map for member states. Those 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 Security Council-mandated tasks that support peacemaking, peacekeeping, and peacebuilding, while operating alongside emergency humanitarian relief and long-term development actors. Implementation of substantive tasks is the principal focus of senior mission leadership. The scale and complexity of modern missions necessitate that operational support is readily deployed to ensure that objectives can be accomplished. Over the last four years, with the launch of the Environment Strategy, greater priority has been given to mitigating the environmental impact of missions, which if unaddressed can pose significant risks to the local population, mission personnel, and the environment. With do-no-harm principles now mainstreamed and better data increasingly available for monitoring progress, missions are well positioned to examine their options for sourcing energy in the second phase of the Environment Strategy, with a specific eye toward increasing the share of renewables.

Crisis-response mechanisms, including peace and humanitarian operations, are designed as short-term emergency responses to often unforeseen crises. The priority of UN peace operations 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 beyond the mission's short-term financial resources.

The link between the Secretary-General's pledge to reduce UN emissions and UN peace operations is clear: it requires missions to shift away from diesel-powered generators to adopt renewable sources of energy for its operations. The activities of the Secretariat constitute approximately 60% of the UN System's greenhouse gas (GHG) emissions, with the largest share — about 90% — coming from its peace operations.

Peace operations are typically deployed as emergency measures intended to address urgent crises. While established as short-term missions by the UN Security Council, most operations remain in existence for more than a decade.

Today, however, considerations about the impact of field missions over time may facilitate the development of solutions that help to achieve mandated mission objectives while supporting longer-term peacebuilding objectives, as missions usually run for more than a decade. 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.

There has been some strong initial work looking at the design choices for missions and their impacts on the local communities, and this is an area that is ripe for greater research and investment by the United Nations.¹³

The question is how to support mission priorities and functions more effectively and enable field operations to consider new options for sourcing energy. Most peace operations are authorized with renewable, one-year mandates and 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. Are the sizable footprints of peace operations, some of which are among the largest producers and consumers of electricity in the host country, able to adopt renewable-energy capacity in some of the least electrified countries in the world? Can the introduction of renewable forms of energy enhance a mission's operational efficiency and effectiveness while also contributing to core UN objectives in the host country, including those related to peacebuilding and development? 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 UNSCAP, these questions take on added urgency, and new ways of doing business will be required for peace operations to integrate modern approaches to energy provision that are designed for the future.

Report Approach

Member states, UN leadership, Secretariat and mission staff, and the wider peace operations community are stakeholders in a system designed to meet core objectives but one which will need to evolve in order to meet the UNSCAP target of sourcing 80% renewable energy by 2030. That shift will need a concerted effort. This report looks at progress achieved to date — in terms of the evolving strategic vision laid out by senior management, as well as the innovative approaches being implemented in the field — with a view to identifying a way forward. A picture of renewable-energy sourcing in the field is emerging, with some individual successes, amid both local

and system-level obstacles to change. This report also identifies some of the costs associated with the status quo, such as the heavy transportation burden of fuel, and, in extreme cases, the link to supporting illicit economies. It further acknowledges factors that will impede energy transitions in the field, such as the challenges related to financing these projects and the lack of existing capacity to design, install, operate, and maintain new technology (such as solar farms) in the field.

This study looks at the chain of actions — from the role of the Secretary-General and peace-operation policy and planning, to the way missions are deployed and financed — in order to identify entry points for the UN to achieve its ambitious new renewable-energy goals. It takes stock of the overarching vision of the UN and its member states' roles in UN bodies; examines existing policies for key headquarters and field entities; and maps out the range of activities that sustain current mission energy-sourcing practices. The report offers findings and recommendations for the UN and its member states to maximize the use of renewable energy in a sustainable way. Throughout, the report also details examples of new arrangements in the field and argues that these models of innovation provide a basis to support achieving the new objectives laid out in the Environment Strategy and the UNSCAP.

Chapter 2, What is the Vision? looks at the broad vision across the UN System for modernizing and achieving greater efficiency in peace operations, and UN ambitions to address climate change by reducing its own emissions and increasing access to energy. The chapter also provides an overview of recent trends in renewable-energy technology and financing, while examining the links between climate and security.

Chapter 3, Aligning Vision and Policies for Operations considers how UN goals, including on carbon neutrality and renewable-energy sourcing, are translated into Secretariat-level policy and guidance, and, ultimately, practice at the field mission level.

Chapter 4, Progress and Challenges in the Field examines UN peace operations in the field and efforts to expand renewable energy, as well as the relationship to policy goals, incentives, and disincentives. This section reviews 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 theory to practice in the field, and to highlight the early success stories from missions that demonstrate innovation, and the emerging models that are supporting renewable-energy projects in different contexts. The chapter also highlights country-level goals and climate commitments for host nations, and existing efforts by peace operations and UN Country Teams to align their work — specifically on energy access — with those goals. Finally, it considers hidden costs, obstacles, benefits, and progress.

Chapter 5, Findings and Recommendations offers findings on how peace operations can diversify their energy-sourcing options and meet the Secretary-General's goals for increasing the use of renewable energy. The findings consider how renewable energy can improve efficiency, save money, reduce pollution, enhance security, kick-start local access to energy and investment, and mitigate corruption. Given the UN's unique role in organizing, deploying, and managing the largest number of peace operations worldwide — and addressing sustainability and peace — it recommends ways forward. Finally, it identifies areas for further study.

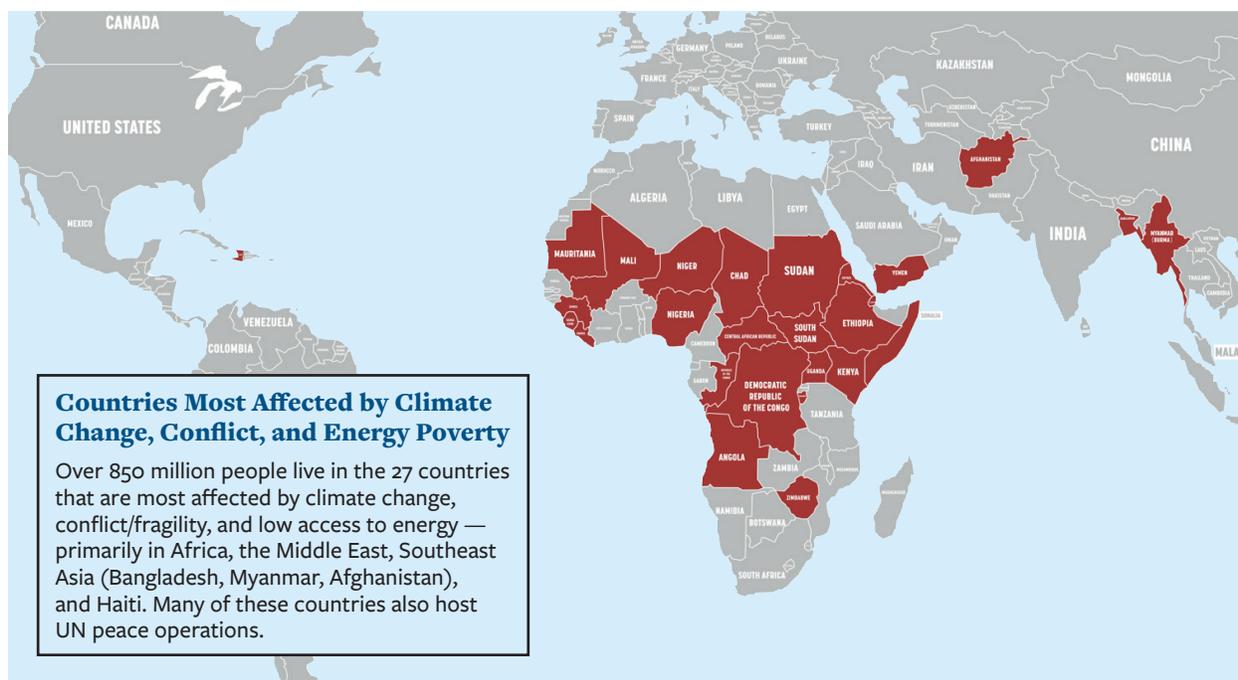
WHAT IS THE VISION?

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 Secretary-General, 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. Less focus is put on the logistics of operations, even as that impacts how missions deliver on their mandates. Many UN operations, for example, have limited energy options. Missions often deploy in remote, poorly electrified, and insecure environments with limited infrastructure and challenging logistical supply lines. These conditions were recognized in the landmark 2015 report from the High-Level Independent Panel on United Nations Peace Operations (HIPPO):

Today, a growing number of missions operate in remote and austere environments where no political agreement exists, or where efforts to establish or reestablish one have faltered. They face ongoing hostilities and parties who are unwilling to negotiate or otherwise undermine the presence of a mission by condoning or inflicting restrictions on its ability to operate. The challenge is multiplied in large, infrastructure poor countries where it becomes much harder for UN missions to make their presence felt. Logistical supply lines in vast, landlocked and often insecure operating environments are often stretched thin and left vulnerable to disruption.¹⁴

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.¹⁵ The majority of peacekeepers serve in large missions in some of the least electrified countries in the world, including Central African Republic (CAR), Darfur (Sudan), the Democratic Republic of the Congo (DRC), Mali, South Sudan, and Somalia, where the UN supports the African Union Mission in Somalia (AMISOM) enforcement mission with a logistics capacity and political mission.¹⁶



The UNSCAP marks the first time that clear, time-bound renewable-energy-related goals have been set for UN peace operations.

More generally, there is strong overlap between the countries with the highest risk of conflict, those most vulnerable to climate change, and those with high levels of energy poverty.¹⁷ The 27 countries highlighted in this graphic are most affected by these three phenomena.

The following section looks at the broad vision across the UN System for modernizing and achieving greater efficiency in peace operations, for addressing climate change, and for increasing access to energy as part of

the SDGs. The chapter also provides an overview of recent trends in renewable-energy technology and financing, while examining the links between climate and security.

Overview — What is the UN Vision for Peace Operations?

Data from the 2019 Greening the Blue report found that the Secretariat is responsible for roughly 60% of the UN System’s total carbon footprint.¹⁸ About 90% of the Secretariat’s carbon emissions stem from field missions that operate and manage their own facilities and infrastructure, with the majority concentrated across the larger peace operations.¹⁹ **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 2009 Environmental Policy for UN Field Missions, issued by the UN Department of Field Support (DFS) and the Department of Peacekeeping Operations (DPKO), followed by the 2017 Environment Strategy for Field Missions, issued by the same entities, encouraged missions to adopt renewable-energy use and increase efficiencies. More broadly, successive UN reform proposals — from the current A4P framework to the 2015 HIPPO report and the 2000 Brahimi Report²⁰— have urged adoption of new technology and approaches, increased efficiencies, and accelerated modernization. Reform proposals (such as the dos Santos Cruz report) have recognized the hazards of long fuel-supply chains and urged efforts to reduce insecurity and increase the safety and security of UN peacekeepers.²¹

In addition to these efforts to drive reform, practice and policy implementation are impacted by the leadership and vision of the United Nations and its member states, and the extent to which they see links between peace and security, access to energy, and addressing climate change with how the UN operates in the field.

The Role of UN Leaders

The Secretary-General 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 Secretary-General 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 2020.²² 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.”²³ 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.”²⁴

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 CEB developed a UN Climate Neutral Strategy, eventually coordinated by the UN Environment Programme (UNEP), asking UN organizations to estimate, reduce, and ultimately analyze options for offsetting UN GHG emissions from facilities and operations.²⁵ 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."²⁶ 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 also through footprint reductions.²⁷

From Greening the Blue to the UN Climate Action 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 2020.²⁸ These efforts were supported by the UN Environment Sustainable United Nations Facility and the Environment Management Group.²⁹ According to the 2019 Greening the Blue report, the UN Secretariat is climate neutral, and 95% of the UN System's reported 2018 GHG emissions were offset.³⁰

Since 2017, Secretary-General 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.³¹ "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% by 2020.³²

In early 2018, Guterres renewed calls for governments, businesses, and civil society to "run faster than climate change," and to keep the increase in temperature this century "below 2 degrees Celsius," the key goal of the 2015 Paris Agreement.³³ In September 2018, Guterres outlined his vision for the 2019 UN Climate Summit. Labeling climate change as "the defining issue of our time,"³⁴ 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.³⁵

In announcing the 2019 Climate Summit, Guterres focused on increasing member-state ambition to implement the 2015 Paris Agreement commitments.³⁶ Guterres called for government and business leaders to present plans to cut GHG emissions by 45% by 2030 and to achieve carbon neutrality by 2050.³⁷

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 Secretary-General ahead of the Climate Summit. Reiterating calls for member-state action, the CEB encouraged the Secretary-General 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.”³⁸ 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.³⁹

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.”⁴⁰ The strategy recognized “a very low uptake of renewable energy across the UN System due to ongoing reliance on costly and polluting diesel generators.”⁴¹ 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; and
- Consider where renewables are not available to switch to Renewable Energy Certificates.⁴²

The urgency for UN action is to “ensure that its own activities do not cause further harm.” The CEB 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% of reported UN System emissions not currently offset.”⁴³

Accelerating Changes in the Field: 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, Secretary-General Guterres highlighted it in his closing remarks. Specifically, he announced the Secretariat’s commitment to reduce GHG emissions by 25% by 2025 and 45% by 2030; and to source 40% of the Secretariat’s electricity from renewable energy by 2025, and 80% by 2030.⁴⁴ The plan would bring UN operations in line with the 2018 IPCC recommendations for what is required to limit climate change impacts 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 renewable energy.



“Secretary-General António Guterres poses for a group photo at the closing of the UN Climate Action Summit 2019.
UN Photo/Cia Pak”

The UNSCAP sets out the ambition of “transforming (UN) operations to achieve ambitious reductions in greenhouse gas emissions while generating long-term efficiencies and benefits to sustainable development efforts overall.”⁴⁵ On renewable energy, the plan encourages the Secretariat to “reduce energy consumption and transition to a significantly greater reliance on renewable energy while generating operational and financial co-benefits.”⁴⁶ 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: 1) environmental management and sustainability, and 2) 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 Secretary-General to align UN Secretariat efforts with those of the wider UN System.⁴⁷

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.”⁴⁸

With recognition by the Secretary-General and UN senior managers of the need to address peace operations, was that recognition shared by the Security Council?

The Security Council's Cautious Role

The role of the Security Council in addressing the impact of climate change is mixed and evolving, and generally does not recognize the CEB or UNSCAP goals yet. The Council has considered climate-related conflict risks, issues facing specific regions and countries, and the role of UN missions and offices. A main point of contention has been whether climate change and climate risks are impacting international peace and security, which is the basis of the Council's agenda, and whether the Council is the appropriate body to address climate change more broadly. 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, have argued that this issue is a matter for the General Assembly and the Economic and Social Council.⁴⁹ In general, the Council's consideration of climate change and climate risks is increasing, even as these issues are often treated as a set of "nontraditional" security threats, along with disease and transnational organized crime.

The first Council session explicitly examining climate risks was held in 2007. In April of that year, the United Kingdom held a ministerial-level open debate on the relationship between energy, security, and climate, with a briefing by Secretary-General Ban. While the U.K. argued that the security implications of climate change could "exacerbate some of the core drivers of conflict, such as migratory pressures and competition for resources,"⁵⁰ other states were skeptical; China described climate change as an issue of sustainable development.⁵¹ 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."⁵²

For some members, the issues were close to home. 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.⁵³

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 assessments and risk-management strategies by governments and the UN as they relate to the security effects of ecological factors in the Lake Chad Basin.⁵⁴ 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."⁵⁵ The statement argued for risk assessments and risk-management strategies by governments and the UN related to these factors.⁵⁶

Language around climate change and its risk impact is included in some Council resolutions for UN-led peace operations, including in Darfur, Mali, and the Sahel and West Africa more broadly. In 2013, the Council added an operational paragraph to the United Nations-African Union Mission in Darfur (UNAMID) mandate:

Recognizes UNAMID's efforts to manage the environmental impacts of its operations when fulfilling mandated tasks, as appropriate and in accordance with applicable and relevant General Assembly resolutions and United Nations rules and regulations, and encourages UNAMID to continue such efforts.⁵⁷

Also, in 2013, in the mandate establishing the UN Multidimensional Integrated Stabilization Mission in Mali (MINUSMA), the Council included the language below:

Requests the Secretary-General to consider the environmental impacts of the operations of MINUSMA when fulfilling its mandated tasks and, in this context, encourages MINUSMA to manage them, as appropriate and in accordance with applicable and relevant General Assembly resolutions and United Nations rules and regulations, and to operate mindfully in the vicinity of cultural and historical sites.⁵⁸

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).⁵⁹ The impact on the mission’s activities in the country were not initially clear, even as the mission began to take new approaches.⁶⁰

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.⁶¹ In July 2018, Sweden hosted a debate on understanding and addressing climate-related security risks. UN Deputy Secretary-General Amina J. Mohammed noted:

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.⁶²

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. The 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?⁶³

That open debate hosted speakers who saw a demonstrable need for better climate-risk management, as an important contribution to maintaining international peace and security.⁶⁴ 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% renewable energy by 2025.⁶⁵

In July 2020, the UAE highlighted the role of energy in UN missions during a Security Council open debate hosted by Germany on the issue of climate and security. The UAE statement noted:

Although the Middle East and Africa are promising growth markets for renewables, this region accounted for less than 6% of total climate finance last year. Sub-Saharan Africa accounted for only about 3%.

We believe in a principle of “do no harm” for Council-mandated missions. Missions should have enhanced guidance and internal controls to ensure that they are not intensifying local climate effects, such as groundwater depletion or deforestation. Renewables should also become the first consideration for mission energy supply, with the added benefit that they are cheaper than diesel in almost all multi-year deployments and create long-term infrastructure for local communities as part of a “peace dividend.”⁶⁶

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.⁶⁷ Elected members of the Council are likely to continue to press for consideration of climate change in the Council and for its missions.⁶⁸

General Assembly

The 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. In some cases, the General Assembly has called for strengthening energy access, utilizing cost-competitive renewable energy, and reporting by the Secretary-General on progress on promoting renewable energy in all UN facilities and operations. For example, Resolution 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; and

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.⁶⁹



Wide view of the Security Council meeting on maintenance of international peace and security, with a focus on understanding and addressing climate-related security risks. *UN Photo/Eskinder Debebe*

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

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 targets and indicators).

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.⁷⁰ UN missions are present in many of the least electrified countries, including CAR, the DRC, Mali, Somalia, and South Sudan.

Another UN initiative includes the Global Compact, which was launched in 2000 and is the world's largest corporate sustainability initiative. The Global Compact promotes responsible business practices and UN values among the global business community and the UN System, while taking strategic actions on broader UN goals such as the SDGs.⁷¹

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

The UN General Assembly adopted the 2030 Agenda for Sustainable Development and its sustainable development goals (SDGs) in 2015. The SDGs included a wide range of goals, including a “dedicated and stand-alone” goal on energy, SDG 7, which calls for nations to “ensure access to affordable, reliable, sustainable and modern energy for all.” The UN SDG platform highlights the interconnection between these goals on energy and climate change, noting that: “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,” (UN, <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 U.S. dollars per year starting in 2020 accountable toward 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.

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.⁷² **Between 2010 to 2019, \$2.6 trillion has been invested in renewable-energy capacity, more than triple the amount invested in the previous decade.**⁷³ In 2018 alone, the share of global electricity generated from renewables increased to 12.9% from 11.6% in 2017.

Solar and wind are the technologies most responsible for the renewable-energy boom over the past decade, attracting the most investment at \$1.3 trillion and \$1 trillion, respectively.⁷⁴ Together they accounted for 84% of annual renewable-energy growth in 2018.⁷⁵ By late 2019, they are projected to account for about 18% of global generating capacity, compared with just 4% 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 2050.⁷⁶

The story of solar is noteworthy. At the end of 2009, there were 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 one 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 of 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, tax incentives, 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%, wind by 49%, and batteries by 85%.**⁷⁷ 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.

Access to Finance. Ease of access to project finance for “bankable” projects has also supported the rapid expansion of renewable-energy technologies and projects. Like many infrastructure projects, upfront capital expenditures for solar and wind projects, in particular, far exceed the operating expenditures to sustain projects once commissioned.⁷⁸ In order to equity- or debt-finance these large upfront capital costs, project developers must demonstrate that a project will generate sufficient returns, which, in turn, are usually dependent on contracts that guarantee a price for the purchase of electricity. This is done through government-mandated incentive schemes such as feed-in tariffs, or contracting arrangements such as power purchase agreements (PPAs) with utilities or credit-worthy companies.

Power Purchase Agreements. Over the past decade, PPAs have become a favored contracting option for companies looking to increase their renewable energy usage in a way that manages volatility in wholesale

electricity markets, decreases energy costs over time, and meets corporate sustainability commitments. The volume of new corporate renewable-energy PPAs has grown dramatically in recent years, topping 19.5 cumulative GW in 2019, up 44% from the prior year.⁷⁹ The PPA represents a contractual partnership between the project developer, who provides the upfront capital to finance and build the project, and the energy offtaker(s), who commits to purchase the electricity at a set price for an agreed period of time.

Although international corporate investments tend to be limited in most countries that host UN peace operations, this PPA structure is a relevant model for UN peace missions to consider. Specifically, it provides a solution for the challenge of expensive upfront capital costs for renewable-energy projects, and would leverage the UN's energy footprint and purchasing power to serve as an anchor client for a private-sector developer to build such a project. Two recent agreements for solar projects represent the first examples of PPA-like agreements between UN field missions and private-sector renewable-energy project developers: The first involves the International Organization for Migration (IOM) in Malakal, South Sudan, and the second involves the UN Support Office in Somalia (UNSOS) in Baidoa, Somalia.

More recently, government auctions for building renewable-energy capacity have led to historically low electricity prices for wind and solar projects in many countries.⁸⁰ Other creative climate-finance solutions are also emerging that could support projects in settings that host UN peace missions, such as Green Bonds and Peace Renewable Energy Credits (P-RECs).

Finance Flows. During 2017-2018, \$579 billion was spent on global climate finance, primarily for climate mitigation, with the majority of this expenditure (58%) supporting renewable-energy generation. Of the total amount, \$326 billion came from private-sector actors, and \$253 billion came from governmental and public actors. During 2017-2018, the majority of global climate finance (61%) was used to fund projects in developing countries outside the Organization for Economic Co-operation and Development. Of these countries, China 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 6% of total climate finance last year. Sub-Saharan Africa accounted for only about 3%.⁸¹** 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 \$5 billion annually of total global electricity finance was allocated to Africa in 2018, representing a 32% 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% of total financing going into expanding electricity access. The majority of this funding is concentrated in Kenya, Tanzania, and Uganda.⁸² 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% of them 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.⁸³

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.⁸⁴ **The International Renewable Energy Agency (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.**⁸⁵

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 fault lines, 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.⁸⁶ These impacts are compounded when countries already face conflict or post-conflict challenges.⁸⁷ As noted earlier, a 2019 SIPRI study found that eight of the ten countries hosting the largest peace operations were highly exposed to climate change.⁸⁸

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 and 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.

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.⁸⁹

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 and 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.⁹⁰ Other research found that climate-related disasters have a higher risk of leading to violence in ethnically divided societies.⁹¹ 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.⁹²

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, Secretary-General Ban flagged climate change as a contributing factor to the war in Darfur.⁹³

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.⁹⁴ 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.⁹⁵ 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.⁹⁶

Water scarcity is an obvious potential risk for conflict, but energy is given scant attention in most climate-security analysis. 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). On the contrary, energy is highly relevant and a clear area for action by the United Nations, member states, 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% 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.⁹⁷

Next Steps

Given that UN peace operations are often among the largest consumers and producers of power in the fragile countries in which they are deployed, transitioning peace operations 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 locations that host UN peace operations, 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 nearly 60% of all UN emissions, with UN peace operations responsible for the vast majority, transitioning from diesel to clean renewable energy is a necessity if the UN is to meet the goals set out in the new climate action plan.⁹⁸
- **Reduced insecurity and corruption:** Diesel can often function as a scarce commodity in conflict settings. Parts of the supply chains can be controlled by conflict actors and overlap with the war economy, as seen in Lebanon, Somalia, South Sudan, Syria, and elsewhere. International humanitarian missions that rely on local diesel procurement, for example, can inadvertently channel millions of dollars to conflict actors, a dangerous dynamic that can be mitigated significantly through a transition to renewable energy.⁹⁹ 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.¹⁰⁰ A transition to renewable energy can significantly reduce a mission's fuel requirements, and in turn decrease security risks associated with fuel convoys.
- **New clean energy development to support peacebuilding:** Leveraging UN peace operation footprints to build new clean energy infrastructure in fragile settings can create entry points for peacebuilding in at least three different ways, recognizing that each solution will be context-specific.
 - **Creating future peace dividends for the post-conflict phase:** South Sudan, for example, hosts international peacekeeping and humanitarian operations that cost more than \$2 billion per year. These operations are 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 to diversify the country's energy base, reduce its near-total reliance on oil, and provide new opportunities for capacity building and economic development.¹⁰¹



Brigadier General Patrick Phelan, Deputy Force Commander of the UN Interim Force in Lebanon (UNIFIL), inaugurates a set of new solar panels at the Mission's base, during a ceremony held for World Environment Day.
UN Photo/Pasqual Gorriz

- o **Mitigating current conflict dynamics:** The Virunga National Park in Eastern DRC has benefited in recent years from the construction of several new run-of-river hydroelectric projects, which power local industry and provide energy to neighboring communities in the conflict-ridden Kivu provinces. These energy projects were designed to preserve the park's natural resources and stimulate economic development, while undercutting the economic drivers behind poaching, deforestation, and armed group recruitment. The projects aim to demonstrate the links between increased energy access and enhanced peace and security in volatile eastern DRC.
- o **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.

ALIGNING VISION AND POLICIES FOR OPERATIONS

To increase the effectiveness of UN missions and expand renewable-energy usage to meet UN climate goals, ambitions need to be translated into policy and practice. This chapter examines the UN Secretariat’s role in organizing, deploying, and supporting UN peace operations. It considers how policies, including those that precede the UNSCAP, reflect the larger goals and vision identified in Chapter 2. It assesses progress against these goals and the remaining gaps between goals and policies. This review considers major initiatives undertaken to improve the safety, effectiveness, and impact of peace operations, including ways to support more renewable-energy sources in the field in order to achieve the UN’s goals.

Secretariat Efforts in Policy and Practice

Mandated by the Security Council, peace operations 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 missions — such as in the Democratic Republic of the Congo (MONUSCO), Mali (MINUSMA), and South Sudan (UNMISS) — each comprise 15,000 to 20,000 personnel.¹⁰² Often led by civilian SRSs, these missions include civilian, police, and military components. In the field, mission leadership is responsible for managing operations and implementing mission mandates, while juggling competing priorities to deliver in the field.

Recent Peace Operation Modernization and Reform Efforts

Overall, efforts at modernization and reform in peace operations have aimed to strengthen field capacity, increase efficiency, enhance security, reduce costs, and support technological innovation. The role of energy in UN missions, however, has not been a major topic of 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 in UN Peacekeeping*, which acknowledged the challenges faced by peace operations in sourcing energy, the resulting dependence on diesel-powered generators, and the benefits offered by adopting renewable forms of 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.¹⁰³

The report argued that peace operations “should adopt as a matter of priority, the systematic integration of alternate energies across all aspects of field operations and incorporate a life-cycle approach.” It noted:

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.”¹⁰⁴

Further, it made practical recommendations for missions to “work through barriers to the procurement of basic and widely available technologies,” and to look to additional alternatives to fossil fuels, field test them, and apply

them “where possible.” The panel also recommended a “standing energy requirements board” with the role of assessing “the applications where alternate energy could replace or complement traditional generation.”¹⁰⁵

As part of the Action for Peacekeeping (A4P) initiative in 2018, which aimed to renew collective commitment to UN peacekeeping, member states 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.”¹⁰⁶ Emphasis was placed on “UN field missions to minimize risk to personnel, communities and environments in all peacekeeping missions.”¹⁰⁷ The increased sourcing of renewable energy is consistent with A4P commitments and can contribute to facilitating the achievement of A4P objectives such as more effective operational support, enhanced safety and security, and peacebuilding. The head of peacekeeping, Under-Secretary-General Jean-Pierre Lacroix, has embraced both the Environment Strategy and the full engagement of peacekeeping missions with partners to support climate action.¹⁰⁸

In addition, A4P references the importance of delivering tangible peace dividends to local communities in host countries. Related to this A4P goal, a recent UN University Center for Policy Research/Stimson Center study on the political practice of peacekeeping drew attention to host communities’ expectations of improved short-term access to basic services and economic security, and the link between delivering peace dividends and advancing political solutions.¹⁰⁹ Recent UN-commissioned reviews of peace operations, such as the 2017 dos Santos Cruz report on safety and security, have also shaped 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 DFS/DPKO 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.¹¹⁰ 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.¹¹¹

The HIPPO reforms were taken up by member states and referenced by a series of high-level summits of national leaders, kicked off by the United States, including the 2015 Leaders’ Summit on Peacekeeping, which focused on increasing offers of key capacities in short supply for UN peacekeeping.¹¹²

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 provide policy guidance to the UN Secretariat on current peacekeeping issues. In 2019, for example, the C-34 referenced the importance of the Environment Strategy and the committee’s commitment to environmentally responsible solutions in the field:

The Special Committee notes the importance of the environment strategy for field missions including through the use of mission-wide environmental action plans as a tool for planning, budgeting and accountability, and to support environmentally responsible practices in operations, including those related to mandate delivery in line with existing regulations...¹¹³

The Special Committee reiterates the shared commitment of member states to sound environmental practices and to employ environmentally responsible solutions for all operations, and to mandate delivery through, inter alia, the deployment of units trained in environmental awareness to fulfill their role in good environmental stewardship and the provision of capacity and expertise in environmental management. The Special Committee further encourages greater efforts, including through the use of renewable resources, in order to achieve more efficient use of energy and water, reduce waste production, where applicable, and improve the health, safety and security of local communities and United Nations personnel.¹¹⁴

This report builds on the 2018 C-34 reference to the environmental footprint of missions, greater use of renewable resources for missions, as well as the expected improvement in the welfare of both peacekeepers and local communities.

The C-34 report from 2018 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 Contingent-Owned Equipment (COE) Working Group and the General Assembly’s Fifth Committee to update principles in compliance with UN environmental standards.¹¹⁵ 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.¹¹⁶

In general, few member states have focused on reducing the UN carbon footprint.¹¹⁷ In February 2018, however, Italy and Bangladesh announced the creation of a Group of Friends for environmental management in the field.¹¹⁸ In his remarks at the Group’s inaugural meeting, Italy’s former Permanent Representative to the UN, Sebastian Cardi, said the following:

Italy has been at the forefront last year in drawing the attention of the Security Council on this issue: on our initiative, the UN executive body recognized for the first time in a statement the importance of an intensified endeavor of the United Nations and the Member States to minimize the impact of peacekeeping operations on the ecosystems and on the local communities in the areas where they are deployed. A strengthened cooperation among the UN, the troop and police contributing Countries and the host Countries is fundamental to achieve this objective, starting with the training and equipment of peacekeepers, two areas in which our Country has cutting edge capabilities.¹¹⁹

The Group of Friends was created to support the implementation of the Environment Strategy, and to raise awareness of the importance of the UN managing its environmental impact while deployed around the world, not only as a way to leave behind a positive legacy but also as a means to enable better mandate delivery.¹²⁰

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.¹²¹ 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 operations 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 peace operations. Overall, mission support is responsible for the logistics and infrastructure that back up operations, as well as for dealing with procurement and supply-chain issues. In particular, the COE and UNOE systems are important for understanding and mapping 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, as part of the Secretary-General's reform agenda of the UN's peace and security infrastructure, the following Secretariat offices — which oversee the organization, deployment, and assessment of UN peace operations — were created:

- **UN Department of Operational Support (DOS).** 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.”¹²² While an entirely new department, DOS absorbed the environmental efforts previously led by the DFS, including the Environment Strategy.
- **UN Department of Peace Operations (DPO).** 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.”¹²³ 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 was formed through the merging of the former Department of Political Affairs (DPA) and the Peacebuilding Support Office. It leads UN efforts “to prevent and resolve deadly conflict around the world.”¹²⁴ 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.”¹²⁵

- **UN Department of Management, Strategy, Policy and Compliance (DMSPC).** 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.”¹²⁶

The 2019 UN Reforms and Delegating Authority to the Field

Among the Secretary-General’s key reforms, which entered into force in January 2019,¹²⁷ are measures to streamline UN management through the decentralization of decision-making; simplify policies and processes; and strengthen a culture of performance, accountability, and transparency. Greater authority and responsibility were delegated to SRSGs and mission leaders who report directly to the Secretary-General. These changes may impact implementation of UN goals and policies for reform efforts, including the Environment Strategy and the UNSCAP. Understanding how operations function may not be automatic, however, with the new authorities.¹²⁸ Drawing on their 2019 study on senior leadership, 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.¹²⁹

In his vision for a new management paradigm for the Secretariat, the Secretary-General proposed that DOS:

Support the objective of effective mandate delivery and ... 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.¹³⁰

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 major UN political and peacekeeping missions — and other bodies of the UN Secretariat, consisting of nearly 100 entities around the globe, with the largest missions being peace operations.¹³¹ 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. The original agreement between the Secretariat and troop-contributing countries, however, is through the DPO’s Office of Military Affairs, which establishes unit requirements for each mission and deployment to a peacekeeping operation.

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 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 UNEP.¹³² That added role and responsibility, however, did not come with additional staff or resources.

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

In 2009, the DPKO and the DFS adopted the Environmental Policy for UN Field Missions, drafted with the support of the UNEP, under the umbrella of Greening the Blue.¹³³ 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.”¹³⁴ The policy’s focus on energy is relatively small compared to issues like water/wastewater and solid/hazardous waste management, as the guiding principle was to focus first on areas where there were potential significant environmental risks.

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.¹³⁵ 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 the Environment Strategy 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 Environment Strategy for Field Missions (referred to as the Environment 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 for the deployment of “responsible missions that achieve maximum efficiency in their use of natural resources and operate at minimum risk to people, societies and ecosystems; contributing to a positive impact on these wherever possible.”¹³⁶ The policy described how environmental management in peace operations should look by 2023. The first phase included objectives up to June 2020, across five pillars: energy, water and wastewater, solid waste, wider impact, and environmental management systems. This strategy, considered a living document, was slated for review and regular updating, mainly in the transition between the first and second phases in 2020. The policy itself is under revision, with expected promulgation in early 2021.

The energy component of the strategy aims to reduce overall demand for energy, increase the proportion of energy generated by renewables, and reduce pollution created by peace operations.¹³⁷ The approach laid out by the DFS to achieve energy objectives includes incremental introductions of “behavioral incentives and efficient infrastructure.”¹³⁸ In the initial phase, the strategy focused 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.¹³⁹



Atul Khare, Under-Secretary-General for Operational Support, speaks to staff serving with the UN Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) during a launch ceremony of the new supply chain management system for all UN field offices. *UN Photo/Sylvain Liecht*

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.”¹⁴⁰ The strategy, as detailed for the first phase, does not include concrete energy targets, but outlines three high-level 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.

During the first phase of the strategy, and under the leadership of Under-Secretary-General Atul Khare, UN Headquarters has made great strides in establishing a system for data collection and reporting to member states. For the first time, there is now visibility and accountability on the footprint of missions and where improvement is needed, including in relation to energy generation and consumption. During the first phase considerable improvements were also made to improve the efficiency of energy consumption, which require relatively minimal investment, and to require better planning and analysis of energy at the mission level through requiring the development of energy-management plans — which are now in place in most missions.

Since 2017, there have been several key developments, including the creation of an Environment Section in the Office of the Under-Secretary-General of the DFS (subsequently moved to DOS, post-management reform); the launch of the Environment Strategy which encompasses specific energy goals, including increasing the use of renewables; the establishment of an Environmental Technical Support Unit in the DOS Global Service Centre in Brindisi — with deployable engineers to support missions in improving their environmental footprint; and the establishment of a technical assistance partnership with the UNEP (Rapid Environment and Climate Technical Assistance, or REACT), to enhance the amount of deployable technical assistance available to missions.

Since the inception of the strategy, working groups have been created for each pillar, with cross-mission meetings scheduled on a monthly basis. The working groups are designed to deliver substantive coordination in the rollout of operational and strategic guidance across each pillar.¹⁴¹ They provide a forum for exchanges of best practices and innovative solutions between missions, while addressing gaps, challenges, and potential solutions. These are also a pathway to mainstream the strategy objectives and raise collective awareness.

With the promulgation of the DPKO/DFS Environmental Policy in 2009, each UN peace operation was tasked with establishing an environmental unit or equivalent, headed by an environmental affairs officer who, depending on missions, may directly report to the director or chief of mission support.¹⁴² 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, but also water/wastewater and solid/hazardous waste-related decision-making in the field.¹⁴³ 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.¹⁴⁴

These units and environmental affairs officers are a great start for missions to better integrate policy, goals, and actions on environment and energy policy. They don't “own” the infrastructure or budgets for the issues they are concerned with, however, such as waste services or fuel purchasing. Further, as concern for the longer-term impacts of climate on fragile states grows within the Security Council, these offices may be urged to also consider the impact of their work on mission mandates for peacebuilding and conflict prevention, areas currently beyond their responsibility.

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

Peacekeeping missions rely on thousands of personnel and their equipment to deploy as part of operations. While their levels have varied over the last three decades, the number of total peacekeeping personnel has stood at more than 100,000 deployed globally at one time for most of the last five years (shifting from roughly 116,000 in 2016 to 95,000 in 2020).¹⁴⁵ Multidimensional and more robust peacekeeping mandates have emphasized the role of military and police personnel, often operating in both remote and austere locations, sometimes in mobile postures. In turn, such environments still necessitate procurement, equipment, and services for those contingents 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. Additionally, TCCs/PCCs who bring their own power-generation fleet ensure they have the capacities to sustain it 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.¹⁴⁶ The cornerstone of the COE system is the MOU, "the binding agreement between the UN and the Troop/Police Contributing Country."¹⁴⁷ 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.¹⁴⁸

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 presents its recommendations to the General Assembly, along with recommendations from the Advisory Committee on Administrative and Budgetary Questions (ACABQ), for its approval.¹⁴⁹ After considering reports of the Secretary-General and the ACABQ, the Fifth Committee and the General Assembly adopt resolutions on the "triennial review of the rates and standards for reimbursement to Member States for contingent owned equipment."¹⁵⁰ Changes accepted in these resolutions are subsequently included in a new edition of the COE manual. The COE Working Group therefore represents an entry point for supporting change in the field toward greater use of renewable energy by TCCs/PCCs.

2017 Policy Evolution: Encouraging Renewable Energy

The most recent meeting of the COE Working Group was in January 2020, and the updated version of the COE manual was made public in November 2020.¹⁵¹ The Working Group agreed on a record number of recommendations, but there was no significant discussion or update on issues related to the deployment of renewable-energy capacities. France submitted an issue paper on the concept of "equipment contributing countries," which has the potential to include renewable energy, but the Working Group agreed to table the issue until it next convenes in 2023.¹⁵² In terms of generators, the 2020 Working Group recommended continued efforts to better synchronize generator banks in the field, and for the required size of generators to be determined in site energy plans.¹⁵³

The previous meeting of the COE Working Group, in January 2017, included the first recommendations concerning the inclusion of renewable-energy systems for the purpose of electricity generation.¹⁵⁴ The resulting report laid out a process for supporting the use of renewable energy and hybrid generators by TCCs/PCCs. 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.¹⁵⁵

Without a clear institutional owner for energy issues, decision-making is spread out across multiple departments, field missions, and TCCs/PCCs...The UNSCAP creates momentum and opportunities for peace operations to embrace cleaner and cheaper energy solutions, with accompanying security benefits and efficiency savings.

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.¹⁵⁶ 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.

There are various explanations for why countries have not yet deployed with renewable-energy technology. 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 this may be part of the problem. A second explanation could be that there is not enough high-level information, awareness, or emphasis on this initiative to push TCCs to change behavior and bring renewable-energy systems, especially for the more permanent TCC sites.

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.¹⁵⁷

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,¹⁵⁸ alignment of their energy production and costs, and inclusion of renewable-energy generators in the future. The paper further argued that this approach 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 to missions.¹⁵⁹ 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.¹⁶⁰



MINUSMA investigates human rights violations in Menaka region. *UN Photo/Marco Dormino*

Site energy plans are currently being integrated into the energy infrastructure management plans developed by missions' engineering and environment units. These will help determine opportunities for energy improvement of currently deployed TCCs/PCCs who are exploring options for UN-provided energy and/or connection to local lower-emission grids.

Taking Advantage of New Opportunities

The management, funding, and oversight of UN peacekeeping has a complex history, with environmental and energy practice 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 support technological innovations. As noted by the Expert Panel on Technology and Innovation in UN Peacekeeping, sometimes the challenge is in introducing “basic environmentally-friendly technologies” into systems contracts, which then stall in procurement.¹⁶¹

Without a clear institutional 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 have 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 benefits and efficiency savings.

This strategic shift also provides entry points for local communities to benefit from increased energy access and its associated economic benefits in the host countries to which peace operations 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 the sourcing of energy, and whether a concerted and systematic push to introduce renewable energy at scale will be embraced, resisted, or ignored, 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 several large peacekeeping missions and their experiences with energy in the field.

PROGRESS AND CHALLENGES IN THE FIELD

Overview: Translating Policy into Practice?

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, reduce fuel consumption, save money, expand energy options, support local power generation, increase security for the mission and personnel, and/or decrease use of personnel for convoys. In all cases, UN missions still rely heavily on diesel generators for power. Even with a growing number of successful examples of renewable-energy transitions in the field, these remain the exception rather than the rule. The systems around energy procurement and deployment have not yet evolved to facilitate larger-scale renewable-energy deployment; targeted, manageable changes will go a long way in meeting the UN's various climate goals. This chapter aims to illustrate the wide range of experience of energy provision in the field, using data from firsthand field research and interviews, and supplemented by desk research and analysis.

This exploration assesses practices of several major peace operations, including their efforts to meet current UN guidance to source electricity from renewable sources, and what obstacles they face in doing so. Certainly, the ambitions run deep — from the goals of the Secretary-General to the CEB, to the work of DOS and DMSPC, to the calls from member states and the Secretariat — yet the current pace of change and innovation is not sufficient to achieve the UN's goals.

To start understanding the data and how missions are making use of energy, this chapter considers publicly available UN information and data, including from mission budget documents and reports of the Secretary-General and the ACABQ. This information 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 chapter describes efforts in the field to adopt renewable energy in many different ways. Where available, basic information on the host nation's climate and SDG7 aspirations are included. Analysis of the findings and areas for further research are also identified, including the recognition that capturing and sharing this knowledge will improve the ability to strengthen and improve the relevant systems and processes.

Peace Operations

Increased energy efficiency and the accelerated deployment of renewable energy, in line with the Environment Strategy and the UNSCAP, offer an opportunity to reduce the Secretariat's significant emissions. With the UNSCAP's ambitious goals, where do peace operations stand in meeting those new targets and helping reduce the bulk of the Secretariat's carbon emissions? Missions operate and manage their own facilities and infrastructure, with the majority of the Secretariat's emissions concentrated across the larger peace operations in Central African Republic (MINUSCA), Darfur, Sudan (UNAMID), Democratic Republic of the Congo (MONUSCO), Mali (MINUSMA), South Sudan (UNMISS), and Somalia (UNSOS).¹⁶²

While Secretariat policies are meant to encourage an energy transition, the link between those policies and the progress in the field is still emerging. Newer Secretariat policy efforts — including greater use of data and cost-benefit analysis beginning in 2019, and the Environment Strategy kicking off phase two — have emerged as missions have begun to develop greater use of renewable energy themselves. Together, peace operations

Newer Secretariat policy efforts — including greater use of data and cost-benefit analysis beginning in 2019, and the Environment Strategy kicking off phase two — have emerged as missions have begun to develop greater use of renewable energy themselves.

energy consumption and generation is available, and what does it reveal about current energy practices? To what extent and how are missions making use of renewable-energy options? What are the incentives and disincentives for renewable-energy transitions, and how do missions assess the costs and benefits of these transitions? What type of political and technical support exists for facilitating these transitions, both within missions and at headquarters? What are the lessons learned from missions that have deployed renewable-energy projects? What changes would help the field to speed up its transition to renewable energy? This chapter seeks to answer these questions and highlight areas for further investigation.

Energy Use in Peace Operations

UN peace operations are designed 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 already experiencing significant impacts from climate change, which can further exacerbate existing or evolving conflict dynamics.¹⁶³ At the same time, many of these missions are deployed in fragile regions with limited electrical-grid infrastructure and high levels of energy poverty, which have struggled to attract renewable-energy investment. Where grid power is not an option, the UN typically deploys 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. Each mission aims to use resources efficiently and sustainably, and, to varying degrees, in line with the Environment Strategy. Resources for the management of energy infrastructure include various guidance and policies, with standard operating procedures and templates. Energy provision in the field, however, tends to be divided between sites that are powered by UN-owned equipment and those TCC or PCC sites powered by their contingent-owned generators and equipment. As a result, there has historically been no single source of information to fully address questions related to a mission's entire energy footprint and its plans for future transformation. A significant step forward is the introduction of the Mission-wide Environmental Action Plan, and the more recent introduction of a strategic planning and prioritization mechanism at the mission level in the form of the multiyear energy infrastructure management plan (EIMP).

and headquarters will face both obvious and more hidden incentives and disincentives. To date, the limited appetite for changing well-established energy practices or adopting innovations has reflected a lack of imperative to achieve the new climate goals for the Secretariat. Uniformed peacekeepers are less connected to these policy ambitions; for example, TCCs and PCCs may not be influenced by the limited economic incentives currently in place to adopt more energy-efficient generators. Some challenges could potentially be addressed by increasing the existing coordination mechanisms between headquarters, the field, and member states, while other challenges will require new approaches 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

As discussed earlier, energy-related decision-making takes place in different units, sections, divisions, and departments. The disaggregation of responsibility and information makes the task of assessing the problem accurately very challenging. Yet, attention on this issue has increased with the announcement of the UNSCAP and with the ACABQ highlighting environmental management issues and energy efficiencies in a recent report on cross-cutting issues related to peacekeeping operations. The ACABQ noted:

Upon enquiry, the Advisory Committee was provided with the individual environmental scorecards for each peacekeeping mission and was informed that, from 2017/18 to 2018/19, the average proportion of power coming from renewable sources across missions had increased from 1% to approximately 3%, mostly attributable to the connection to renewable hydro-powered grids in the DRC and Uganda.¹⁶⁴

While an average percentage of proportion of power coming from renewables across missions is useful for maintaining accountability to UNSCAP goals, each mission operates in its own context, with equally unique challenges and opportunities to incorporating additional renewable-energy capacity. The rest of this chapter examines these missions in more detail to shed light on examples, progress, and challenges in the field.

PEACE OPERATIONS: EXAMPLES FROM THE FIELD

This section looks at the experiences around renewable energy in three large peace operations, focused on areas where Powering Peace has interviewed UN personnel and conducted field research: South Sudan, the DRC, and Lebanon. In each case, we have tried to identify the level of energy use and the use of renewable sources, establish incentives and disincentives, and capture innovations and opportunities for the mission in the context of the conflict-affected country. Where possible, data also is drawn from reports to the Security Council on the mission's progress in achieving its mandates, as well as from mission leaders providing 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. Finally, each section also looks at the potential links for the UN mission and the ambitions of the host nation with regard to meeting national goals to expand renewable energy and access to energy.

South Sudan/UNMISS: Realizing Solar Potential?

The world's newest country, South Sudan, offers an extreme example of how challenges posed by conflict also impact the development of electrification infrastructure and energy access — and of a case where the UN mission has made great strides, nonetheless, for meeting its mandate and expanding its energy makeup. The UN Mission in South Sudan (UNMISS) is now one of the largest peacekeeping missions, with 18,956 deployed personnel as of August 2020 and an annual budget over \$1.26 billion.¹⁶⁵ The struggles of UNMISS with regard to energy provision reflect the broader difficulties of operating in South Sudan, a country torn along tribal and political divisions.

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 the country's independence, the Security Council authorized UNMISS, replacing the UN Mission in Sudan (UNMIS), which had helped to 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. In late 2013, however, a new civil war erupted, which has come to define South Sudan's period since independence and significantly shaped the role and response of UNMISS.



UNMISS hands over solar-powered water system to Juba community.
UN Photo/
Amanda Voisard

Background: Conflict and Energy. Cracks began to emerge in the unifying momentum from South Sudan's hard-fought independence by 2012. Internal divisions grew following the government's voluntary closure of its domestic oil production, which came amid a dispute with Sudan over the terms of the transport and processing of South Sudan's oil through Sudanese-controlled pipelines connecting to international buyers via Port Sudan and the Red Sea. The oil shutdown hastened a rapid economic collapse for the country's economy, which was 99% dependent on oil revenue, and led to a new civil war in late 2013. The conflict had a devastating effect on governance, human rights, development, and economic momentum, and deepened a humanitarian crisis across the country as civilians fled to UN sites and neighboring states.

The previous mission, UNMIS (2005-2011), headquartered in the Sudanese capital of Khartoum, was connected to local energy grids where available. Its largest footprint was across South Sudan, however, where most UNMIS personnel and operations were based and where the mission was powered primarily by on-site diesel generators. Prior to independence, South Sudan began to develop fossil-fuel-powered grids in its larger cities and planned for the construction of several large hydroelectric dams along the White Nile 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 a handful of cities.¹⁶⁶ The economic collapse and conflict that followed led to the demise of both local power production and larger project planning.

When the civil war broke out in the South Sudanese capital of Juba, large-scale fighting and destruction spread across the city and to other cities and towns 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. 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, monitor human rights, and support the peace process, 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. As of June 2020, there were still more than 181,000 IDPs residing in POC sites in South Sudan.¹⁶⁷

With regard to energy, virtually the entire international peacekeeping and humanitarian footprint in the country — as well as business, hotels, and government — has 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.¹⁶⁸ A large, insecure, landlocked country with few roads, South Sudan faced fuel scarcity and very high fuel prices in much of the country — and some of the highest electricity costs in the region — for those fortunate enough to have access to electricity.

Moving toward Renewable Energy within the Mission. UNMISS relies on Tristar Energy, a private contractor, for its fuel supply and delivery. According to UNMISS engineers, the mission's annual energy demand is reported to be approximately 25 MW, supported almost entirely by diesel generators.

Despite fits and starts, UNMISS has emerged as a leader in renewable energy among UN field missions. UNMISS has the largest UN-owned solar system to date — a 1 MW solar farm in Juba that was commissioned in March

2020,¹⁶⁹ with another 1.2 MW solar system currently under construction in Wau. The mission’s journey to develop these two groundbreaking projects included significant challenges — some internal to UNMISS, some related to broader UN procurement and contracting, and some specific to South Sudan. In addition, South Sudan is home to one of the first known examples of a renewable-energy leasing agreement for a UN field mission: a 700 kilowatt (kW) solar and battery system that was commissioned in June 2020 as a result of an innovative public-private partnership between the IOM and private-sector renewable-energy developers in the Humanitarian Hub of Malakal IDP camp.¹⁷⁰

The mission anticipates that its new one MW solar farm in Juba will meet 60% of its energy needs on its Juba base, displacing three of the five operating generators and saving approximately 3,000 liters of diesel per day.¹⁷¹ The completion of construction of the second 1.2 MW solar farm in Wau has been delayed as a result of travel restrictions related to the COVID-19 pandemic. Once the Wau system is installed, the mission anticipates that the two systems will reduce the mission’s diesel-power requirements by 10%.¹⁷² UNMISS has also 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.¹⁷³

The UNMISS transition toward greater use of renewable energy is impressive, but also demonstrates the bumpy ride missions may take to get there. In 2016, for example, 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. Four years later, the purchased solar panels have been installed and are operational for the first time, but in the interim the batteries had ceased to function.

These UNMISS solar projects offer lessons for potential renewable-energy projects and the way forward for other missions. These include:

- *Ad Hoc Efforts Should Turn into Replicable Solutions.* UNMISS was in the unusual position of being able to purchase solar-power equipment (at more than \$10 million) with end-of-year unspent funding. That temporary budget surplus allowed it to purchase the equipment outright, overcoming the high-upfront capital expenditure requirements associated with solar-power systems that are often a challenge for the missions to fund. This ad hoc scenario is not easily replicable by other missions, and likely requires a broader systemwide solution. 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.¹⁷⁴
- *Set Ambitious Targets and Make the Business Case.* In explaining their purchase motive, UNMISS officials cited a 2016 directive from the DFS for field missions to aim for 50% of their energy to be generated from renewable sources by 2020.¹⁷⁵ This directive was not included in the Environment Strategy, which came into effect in 2017, but was briefly documented in ACABQ budgetary reporting as the “2020/50 Greening Initiative.”¹⁷⁶ 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.¹⁷⁷ This example shows the importance to and impact on the field of the UN taking on ambitious targets and commitments.

- *Don't Forget Installation Contracts.* UNMISS made its purchase of solar panels before any design and installation plans had been developed. A multiyear delay followed as the mission struggled through a centrally managed UN procurement process to get the installation contract approved, without any preexisting systems contract or guidance for solar-system installations.¹⁷⁸ 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 targets to incentivize missions to use renewable energy and UN contracts for procuring — and installing — this equipment. The installation of these systems is expected to have a significant positive impact for UNMISS and for the renewable-energy sector in South Sudan.

Energy as a Service: Option to Lease Energy. Another notable development is in Malakal, at the POC site located within the UNMISS base, where the IOM-run humanitarian hub has switched from diesel generators to solar energy provided by a private-sector solar company. In April 2019, the IOM announced an agreement with private solar companies Scatec Solar and Kube Energy, to build a new 700 kW solar-plus-battery system in the humanitarian hub.¹⁷⁹ Although the project was delayed by COVID-related travel restrictions, it was eventually commissioned in June 2020.

The agreement is groundbreaking in that it marks one of the first examples of an energy-as-a-service leasing arrangement for UN agencies. Under this type of arrangement, the private solar companies finance the development and construction of the solar project, and the user of the electricity (in this case, the IOM) agrees to purchase the energy at a prenegotiated set price for a certain period of time. This type of 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.¹⁸⁰

Country-Level Goals and Commitments: Climate and Energy Access

South Sudan, as part of its commitments to the 2015 Paris Climate Agreement, set goals to meet its growing energy demand with the country's high potential for solar and wind energy. Its intended nationally determined contribution (INDC)¹⁸¹ broadly recognized that “technology transfer could be of benefit of the country for mitigation and adaption, including through renewable energy technologies.”¹⁸² A detailed analysis of South Sudan's business-as-usual emissions, the estimated cost, and the emissions-reduction goal were proposed to be laid out at a later date.¹⁸³

As mentioned earlier, South Sudan is one of the least electrified countries in the world, with only 28% electricity access.¹⁸⁴ In addition to the 2015 INDC, which has not been updated, the government produced in 2016 a National Adaptation Programme of Action for climate change. The plan was prepared with technical support from the UNEP and funding support from the Global Environment Facility. Noting that the majority of people in South Sudan depend on wood and charcoal as their primary sources of energy — which has led to the overexploitation of forest resources — the plan identifies the promotion of renewable energy as a key goal. Key activities needing additional support included promoting alternative energy sources; establishing institutions (for example, an energy research center) for promoting renewable-energy technologies; conducting

capacity-building training on renewable energies for local communities; and developing a national energy policy.¹⁸⁵ In South Sudan, the UN Country Team has developed a cooperation framework that highlights how it works with UNMISS, but the framework does not mention collaboration on challenges related to climate change and energy access.

South Sudan has seen limited investment by international organizations in the environmental sector. For example, the UN Development Programme (UNDP) has upgraded a police training academy to be powered by solar energy, and with more radio, TV, and computer access, the police are able to conduct business more effectively.¹⁸⁶ This, along with the transition of the UN House in Juba to solar panels and the impressive work done by the IOM in transitioning the IDP camp in Malakal to solar energy, shows how smart, sustainable investments can improve quality of life and address site-specific security concerns while also advancing environmental goals.

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

Democratic Republic of the Congo/MONUSCO: A Great Opportunity to Tap into Available Hydropower

The DRC hosts a large UN peacekeeping mission, the UN Stabilization Mission in the Democratic Republic of Congo (MONUSCO), with over 18,000 personnel and an annual budget over \$1 billion.¹⁸⁷ Initially deployed in 2000 to monitor the Lusaka Peace Agreement that ended the DRC's second regional war, the mission has grown 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 the 2018 national elections as an opportunity to start a transition with a reduced mission presence. The mission has been slightly downsized, with the goal of supporting civil society and the government to take on key responsibilities, laid out in a strategic mission review. The mission maintains a heavy presence in the insecure east of the country.¹⁸⁸

MONUSCO is unique among UN peace operations: **The mission has access to local electrical grids fed principally from renewable hydropower in some parts of the country.** As a result, the mission relies on a mix of energy sources to support its facilities and bases, including sites for troop and police contingents. It uses a higher share of renewables than most other field missions, though diesel generators still serve as the main source of energy. In recent years MONUSCO has begun to gradually transition specific sites in the east from diesel to local hydropower, but the process has been slow and punctuated by internal obstacles. Earlier Powering Peace research found that transitioning to 24-hour hydropower at specific MONUSCO sites could provide meaningful cost savings while supporting local clean-energy projects.¹⁸⁹ In early 2020, mission staff expressed interest in further expanding the MONUSCO transition to hydropower in and around Goma and Bukavu, in eastern DRC.¹⁹⁰ The mission has contemplated some contractual innovations to help prioritize renewable energy, and to overcome frustration at the internal resistance to change and the slow pace at which projects move within the UN.

The DRC is one of the poorest countries in the world, and among the least electrified. In 2017, the World Bank reported that less than 20% of the population had access to electricity: 49% in urban areas and less than 1% in rural areas.¹⁹¹ 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 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.¹⁹² For the 2018-19 financial period, the mission reported that it supplied and stored 43.7 million liters of petrol, including 11.4 million for generators and other facilities.¹⁹³ In January 2020, MONUSCO reported that 883 UN-owned generators were operated and maintained, a lower number than the budgeted 916 generators. The reduction, according to MONUSCO, was due to “efforts by the Mission to reduce its own carbon footprint and to the closure of eight locations.”¹⁹⁴

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 renewable sources, primarily through local hydropowered grid connections in addition to a 650 kWh solar-power farm in Goma** (which is expected to generate savings in fuel consumption of \$182,000 per year).¹⁹⁵ Meanwhile, the mission had reported in December 2018 that only 5% of its energy is derived from renewable sources.¹⁹⁶

MONUSCO’s Kinshasa headquarters is connected to the national utility SNEL’s hydropowered grid, which, it reports, provides 70% of the mission’s electricity in the capital, with the rest produced by diesel generators.¹⁹⁷ In 2019, MONUSCO’s eastern Goma headquarters and Goma airport use approximately six hours of SNEL hydropower daily, with the remaining 18 daily hours provided by on-site diesel generators. In March 2020, MONUSCO officials reported that SNEL had improved its power supply and was providing up to 20 hours of power per day. UN data suggests that SNEL now provides most of the energy to the sites connected to it in Goma.¹⁹⁸

There is an opportunity for MONUSCO to expand its share of renewables. The mission can easily increase its use of renewable energy by connecting to local hydropowered grid options in eastern DRC, where available. For example, our 2019 economic analysis found that transitioning Goma airport from SNEL hydropower (which provided six hours of grid power at the time, plus 18 hours of diesel generators) to 24 hours of hydropower from the Virunga SARL hydro project, could save the mission more than \$155,000 per year, and with similar savings if the same switch were made at Goma headquarters.¹⁹⁹ The significant improvement in SNEL’s energy delivery to Goma in 2020 will alter those cost-benefit calculations for the mission, but still underscores the significant opportunities for the mission to increase its share of renewables.

Some peacekeeping contingents are now using renewable energy in their own sites. After a long internal struggle within MONUSCO, two UN troop contingent camps in the east, Munigi and Kiwanja, have transitioned from using diesel generators to using 24-hour Virunga hydropower. This shift 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 UN troop contingent sites may also be eligible to switch from diesel generators to Virunga hydropower or other renewable-energy projects. Prior to the COVID-19 pandemic, MONUSCO staff were looking into

transitioning five or more additional UN sites in and around Goma and Bukavu from 24-hour diesel to 24-hour hydropower. This effort apparently grew out of the recommendations from an energy assessment carried out by the UN Global Service Center/REACT in 2019, which identified at least 14 additional sites in the Goma, Bukavu, Uvira, and Bunia regions which could be connected to the hydropower grid. MONUSCO staff were developing project tenders to invite formal proposals for these projects from local energy supply or distribution companies, based on standard UN project templates. Mission staff anticipated that the hydropower projects would be well placed to win the tenders based on price alone, but there was nothing in standard tender template related to renewable energy or the source of energy generation. In light of the UNSCAP commitments, and their interest in expanding the mission's use of local hydropower, **MONUSCO staff were contemplating adding criteria around renewable-energy generation to the scoring system for these new tenders.** This addition to the UN's scoring system for evaluating proposals for energy-related tenders would help the UN to put a thumb on the scale in favor of renewable solutions. **This simple adjustment to procurement procedures can be easily scaled across all UN field missions,** as a way to significantly increase the adoption of renewable energy and help the UN Secretariat meet its climate commitments under the UNSCAP.

Third, 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. This view is 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.²⁰⁰

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."²⁰¹ This effort was first proposed in the Secretary-General's report on MONUSCO from March 2018, and represents a pilot program on behalf of other field missions. In proposing the initiative, the Secretary-General 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 Secretary-General 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.²⁰²

Country-Level Goals and Commitments: Climate and Energy Access

The DRC, as part of its commitments to the 2015 Paris Climate Agreement, set goals to reduce emissions by 17% compared to a business-as-usual approach by 2030, at an estimated cost of \$21.6 billion.²⁰³ The DRC already gets around 95% of its energy from renewable sources, but its renewable-energy potential, in particular from hydropower, is far from realized, according to analysis conducted by IRENA in 2018.²⁰⁴ Further, SDG7 data from 2018 indicates that only 19% of the Congolese population has access to electricity.²⁰⁵

The DRC's renewable potential to expand energy production from renewable sources has centered on the two Inga dams (Inga I and Inga II). These dams are a major source of electricity in the DRC, running at about 30-40% capacity due to a lack of upkeep.²⁰⁶ There is significant international interest in investing in the DRC's renewable-energy sector, but security concerns and endemic corruption have prevented foreign investment from the private sector and from international organizations. The proposed Grand Inga project (Inga III) could potentially supply enough electricity for all of Southern Africa and has generated interest in funding from the World Bank, the African Development Bank, the European Investment Bank, and bilateral donors. However, little significant progress has been made, and the World Bank withdrew its funding in 2016.²⁰⁷

In 2019, the DRC hosted the UNDP “Lighting Up Central Africa” hydropower conference, inviting seven other Central African nations. The conference aimed to inform potential investors on hydropower energy potential in eastern DRC as well as encourage cooperation on electrification across Central Africa.²⁰⁸ In 2014, the UNDP worked with the Congolese Ministry of Water Resources and Electricity to create an atlas of interactive maps and comprehensive studies on renewable-energy sources, the first to be created for Africa. The atlas was created to inform policymaking on potential power sources, energy efficiency, and to reduce the DRC’s carbon emissions, as well as encourage investment from the private sector.²⁰⁹

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 reestablishing 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.²¹⁰

UNIFIL is the sixth-largest UN peace operation by annual budget (\$512.8 million for 2020-2021) and the fifth-largest by deployed uniformed personnel (more than 10,000 peacekeeping troops from 45 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 approximately 50 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 — a combination of mission personnel expertise and efforts to increase efficiency through the use of renewable power. As a result, the Secretary-General recently reported that UNIFIL will provide environmental support services to other missions in the region.²¹¹ 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).²¹²

UNIFIL operates and maintains 168 UN-owned generators and 12 small solar plants, while utilizing electricity grid connections for two offices in the capital, Beirut. The UNIFIL Beirut offices are located in government areas with priority power supplies and a stand-by generator.²¹³ The current electricity-generation capacity of UNIFIL’s mission headquarters in Naqoura is approximately four MW. This includes the mission’s total installed solar capacity of 373 kilowatt-peak (kWp), which produces 616 megawatt-hours of electricity per year.²¹⁴ **Hence solar power accounts for 5% of total electricity production at mission headquarters.** UNIFIL’s installation of solar panels in the 2017-18 and 2018-19 budget periods resulted in cost savings of \$96,690 and \$60,767, respectively, efficiency gains that have been welcomed by the ACABQ.²¹⁵ For the 2019-20 budget 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.²¹⁶

On average, the mission uses about 15 million liters of fuel annually to generate power for its headquarters and field positions. In 2018, approximately \$16 million was spent on fuel for energy production.²¹⁷ Local diesel supply, which is relatively inexpensive and readily available, is purchased locally utilizing five-year competitive fuel-supply contracts.²¹⁸ UNIFIL’s local procurement arrangement, with agreement from the Secretariat, ostensibly takes

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.

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 (i.e., UNOE) as well as for generators brought by troop contingents under self-sustainment or major equipment (i.e., COE) arrangements. UNIFIL personnel estimate that its current installed solar capacity is saving the mission as much as 14,000 liters of fuel per month.²¹⁹

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 significantly reduce the mission's need to generate power. Lebanon's power sector is infamously complex, however, and faces major 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 backup 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, and should be evaluated side-by-side with the ongoing efforts to open the currently regulated local energy market to independent power producers who bring in additional renewable-energy capacity. If UNIFIL is to move beyond incrementally increasing its share of renewable energy, more financial resources to support capital investment or innovative arrangements with the private sector will be required.

Country-Level Goals and Commitments: Climate and Energy Access

Lebanon, as part of its commitments to the 2015 Paris Climate Agreement, committed to a 15-30% reduction in emissions compared to a business-as-usual approach by 2030, as well as to generating 15-20% of power and heat demand by renewable sources by 2030.²²⁰ The ranges account for unconditional and conditional targets in Lebanon's NDC. According to data from the World Bank and the International Energy Agency, the share of renewable energy in Lebanon's total energy consumption has hovered between 3% and 5% in recent years.²²¹

Lebanon is unable to meet its electricity demand.²²² The country's 2018 voluntary national review of its SDG commitments identified greater use of renewable energy as a prominent goal, even as it identified major obstacles.²²³ Hydropower is the most prominent source of renewable energy, accounting for 4.5% of the country's electricity consumption.²²⁴ Yet the country faces chronic power cuts and high dependence on a separate network of diesel generators despite the government's annual subsidy to the national utility to cover its budget gap, and the existing grid infrastructure is in a poor state. There has been significant international investment in Lebanon's energy sector in an attempt to diversify the current near-total dependence on oil.²²⁵ The UNDP's Sustainable Energy for Security project directly connects security concerns with the energy sector; the project aims to improve

the energy independence of the Lebanese Armed Forces in the northeast border region to make the bases more self-sufficient, reducing the security risks of transporting materials and fuel to the region.²²⁶ The UNDP's CEDRO 5 project aims to help Lebanon reach its NDC as well as foster the growth of small and medium-sized businesses.²²⁷

PEACE OPERATIONS: EXAMPLES FROM REPORTING

This section includes overviews and snapshots of energy and renewable-energy usage by several peace operations, including Kosovo (UNMIK), Sudan (UNAMID), Somalia (UNSOS), Mali (MINUSMA), and Central African Republic (MINUSCA). This section is based on desk research, interviews, and analysis of publicly available budget documents; no research in the mission areas was undertaken.²²⁸

Kosovo/UNMIK: Leading on Renewable Energy

The UN Interim Administration Mission in Kosovo (UNMIK) was authorized 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.²²⁹ Since the declaration of independence by the Kosovo authorities and the entry into force of a new constitution in 2008, UNMIK's mandated tasks have shifted to the promotion of security, stability, and human rights initiatives.²³⁰ With less than 400 personnel and an annual budget of \$37.25 million, UNMIK is much smaller than the other missions discussed here.²³¹ Even with a limited physical footprint, however, UNMIK has sought to increase energy efficiency and reduce its reliance on diesel generators.

During the 2018-19 financial period, UNMIK implemented a missionwide environmental action plan in line with the Environment Strategy.²³² The mission operated and maintained 13 UN-owned generators at five locations and 1,368 solar-power panels in addition to electricity services contracted from local providers.²³³ The Secretary-General 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."²³⁴ UNMIK completed the installation, as well as low-consumption lighting systems on all premises, "to increase the proportion of renewable energy."²³⁵ In 2017 the mission also embraced an initial goal of meeting 50% of its electricity from renewable sources, which it appears to have achieved.²³⁶ It is unclear how the mission settled on the goal of 50% renewable-power generation, but it likely stems from the same 2020/50 Greening initiative that was referenced by UNMISS in South Sudan.²³⁷

Country-Level Goals and Commitments: Climate and Energy Access

Kosovo is not a signatory to the Paris Agreement and has not set an NDC for 2030.²³⁸ While UNMIK has been a leader on renewable energy, Kosovo as a nation is lagging in its energy profile.

Kosovo relies heavily on nonrenewable energy for energy production, with nearly all of the country's electricity coming from two antiquated coal power plants.²³⁹ While 100% of Kosovars have access to electricity, far more than in most other case studies in this report, only 4.3% of the electricity comes from renewable-electricity production, mostly from a few small hydropower installations.²⁴⁰

There has been limited investment by both the government and international organizations in Kosovo's energy sector. The government of Kosovo signed the European Energy Community Treaty in 2009 and pledged to reach 30% consumption of energy from renewables by 2020, a goal which has not yet been reached.²⁴¹ The World Bank previously committed to funding the renovation of one of Kosovo's coal plants to increase efficiency and replace the second plant with a renewable-energy source. In 2018, however, the World Bank pulled out of this



Peacekeepers of
MONUSCO South African
contingent on patrol.
UN Photo/Michael Ali

commitment, and the project was abandoned.²⁴² In 2019, the European Bank of Reconstruction and Development committed an 18 million euro loan to build a wind farm in eastern Kosovo, addressing the issues of frequent power outages and pollution from coal power plants.²⁴³ Kosovo's energy sector requires a significant overhaul to fall in line with sustainability and renewable energy goals.

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 mission deployed to support a peace agreement and protect civilians after extreme violence 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. UNAMID is currently winding down, to be replaced by a newly formed political mission, UNITAMS, which is overseeing Sudan's civilian-led political transition following the peaceful popular uprising in Sudan in 2019 and the removal of President Omar al-Bashir and much of the old regime. In spite of this transition, the experiences of UNAMID with regard to energy remain instructive.

According to budget performance documents from the mission, power outages featured consistently among UNAMID's many challenges. The supply chain required overland travel from Port Sudan; UN convoys face delays and insecurity, and the mission was regularly harassed by visa delays and car-jackings. Civilian displacement and humanitarian needs have been consistently high. As a result of COVID-19, on June 3, 2020, the Security Council adopted Resolution 2525 to extend UNAMID's mandate for an additional three months, through December 2020, to complete its drawdown. Mission sites in South Darfur²⁴⁴ had been formally handed over to the government of Sudan on November 19, 2019.²⁴⁵ 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 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% of the expected power generation.²⁴⁶ Of the 700 panels maintained, 70 were not operational, and two systems were not properly maintained.²⁴⁷ 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.”²⁴⁸ In November 2018, the mission acquired a 50 kW solar electric system unit for its headquarters in El Fasher.²⁴⁹ 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.²⁵⁰

Country-Level Goals and Commitments: Climate and Energy Access

Sudan, as a signatory to the 2015 Paris Climate Agreement, has set goals for environmental progress in the categories of energy, forestry, and waste. The estimated cost of implementation of these goals by 2030 is estimated at \$12.88 billion.²⁵¹ Sudan has both a large need for the expansion of electrification and energy access in the country as well as significant potential for renewables not currently being harnessed. There is potential for wind, geothermal, and solar energy, but Sudan currently has little diversification in electricity generation, with almost all

electricity coming from hydropower and oil.²⁵² Roughly 59% of Sudan has access to electricity, with the percentage far lower in rural areas.²⁵³ The challenge is to expand that energy and electricity production to reach all Sudanese citizens in a sustainable way.

Sudan is the site of promising international investment in the energy sector. The UNDP has partnered with the Sudan Ministry of Energy to expand access to wind and solar in rural areas, with the aim of easing access to irrigation for farmers.²⁵⁴ The Canadian Climate Change Adaptation Facility, in partnership with the UNDP, funds the Building Resilience in the Agriculture and Water Sectors to the Adverse Impacts of Climate Change in Sudan project, which aims to improve water management and reduce food insecurity for small-scale farmers and pastoralists.²⁵⁵ Sudan has significant potential for renewables, a sizable population, and expanding demand for electricity and energy consumption. The November 2020 announcement that the U.S. will remove its designation of Sudan as a state sponsor of terrorism, and the lifting of associated sanctions, will allow for significant new international investment in the country, including in the renewable-energy sector.

Somalia/UNSOS: Innovative Private-Sector Solutions, Supporting Local Energy Access

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 Somali Federal Security Institutions. 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.²⁵⁶ 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 has recognized the need to diversify energy options for the people of Somalia. In 2017, SRSG Michael Keating co-hosted with the Somali government a conference on renewable-energy development in Somalia, and visited local renewable-energy projects.²⁵⁷ In March 2018, the Security Council broke new ground 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 UNSOM.²⁵⁸ The impact on the mission’s activities and approach in the country were not initially clear, even as the mission began to take new approaches.²⁵⁹

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%) as being purposed for use by generators and other facilities.²⁶⁰ In 2014, there were six reported incidents of fuel theft from the UN-supported mission in Somalia.²⁶¹ Two years later, nine AMISOM soldiers were jailed for selling the mission’s fuel to civilians in Mogadishu.²⁶² 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.²⁶³ 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.²⁶⁴

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 and more recently developed an EIMP.²⁶⁵ Most activities focused on reducing the mission’s demand for energy, such as installing more efficient lightbulbs, measuring devices to control power consumption, and timers on air conditioning units, as well as synchronizing generators.²⁶⁶ 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,²⁶⁷ as well as introducing more pooled transportation.²⁶⁸ 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.²⁶⁹ The mission 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.²⁷⁰

In late 2020, UNSOS awarded a PPA to private-sector solar-project developer Kube Energy, among the first PPAs signed by a UN agency anywhere in the world. According to UNSOS, the project will generate approximately 10 MW of solar power initially, four MW of which will be supplied to the UNSOS-supported African Union-UN camp in the Baidoa sector hub, with the remaining energy supplied to local communities in Baidoa. The arrangement will enable UNSOS to transition the Baidoa site to almost 100% renewable energy, reduce annual fuel consumption by 900,000 liters, and outsource plant maintenance and operations. The mission will pay USD 0.48 per kWh for renewable electricity, which decreases after five years to USD 0.30 per kWh — a rate that is 20% less expensive than self-generation and that will result in significant mission cost savings.

Use of a PPA by UNSOS is groundbreaking and demonstrates one of several innovative models emerging in field missions. The agreement with UNSOS, as the principal anchor client, enables private-sector financing of the capital costs associated with building the solar plant. The project will be situated on the base, thus benefiting from the security of the mission. It also highlights the role that UN missions can play in managing their own energy transitions and concurrently supporting projects that supply cleaner, more reliable, and affordable power to host communities and increasing renewable-energy capacity in those communities. Notably, ownership of the plant will be transferred to the South-West state after 15 years of operations.

Country-Level Goals and Commitments: Climate and Energy Access

Somalia, as part of its commitments to the 2015 Paris Climate Agreement, did not include specific emissions-reduction goals, but instead focused on the country's renewable-energy potential, specifically solar.²⁷¹ There is a clear opportunity and need in Somalia — only 35% of the country has electricity access, with that number falling to 14% in rural areas, where there is enormous solar- and wind-energy potential. Somalia has the highest onshore wind-power potential of any country in Africa.²⁷²

Somalia has a more dynamic energy sector than many other fragile states, including significant foreign investment through the Somali diaspora. In addition, there has been substantive investment in Somalia from regional and international organizations in the renewable-energy sector. The World Bank, the UNDP, the UNEP, the United Nations Children's Fund (UNICEF), the Organization of the Petroleum Exporting Countries (OPEC), and the UAE's Smart Gulf Solar have all invested in various renewable-energy projects in the country. A few projects include a joint UNEP-, UNDP-, and OPEC-funded plan to provide clean energy to civil service offices across Somalia to aid the functioning of the Somali state; a UNICEF plan to provide solar-powered water-supply systems to rural Somalis; and a World Bank project to expand electricity from renewable-energy sources.²⁷³ International investment in Somalia has shown promising results; it must now be combined with steady future funding and progress in Somalia's security situation.

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

The UN Multidimensional Integrated Stabilization Mission in Mali was established in 2013. The operation deployed 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 an 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.²⁷⁴ 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.²⁷⁵

MINUSMA relies on fuel as its main source of energy, with the amount used growing steadily by about five million liters per year over the last four years.²⁷⁶ The 2019-2020 budget request broke this trend, remaining relatively consistent with the request during the 2017-2018 cycle.²⁷⁷ 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.²⁷⁸

MINUSMA currently uses only a limited amount of solar energy, and instead “relies heavily on generator power for most of its operations.”²⁷⁹ 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.²⁸⁰ Internal reporting found that solar energy is used mainly as a backup and not for general energy supply, and that “MINUSMA does not have in place adequate renewable energy systems for any accrued monetary impact.”²⁸¹ MINUSMA has pursued several projects to increase its renewable energy, installing some solar panels and hybrid power systems in the north in 2018.²⁸² In 2017, the mission aspired to connect all air-conditioning units for equipment rooms to renewable-energy grids,²⁸³ although progress on this commitment has not been documented.

Mission staff recognize the strategic value of transitioning to renewable energy in order to reduce the frequency and size of resupply convoys. Progress has been slow, however. The mission is currently working with a private Danish company on a solar-plus-storage pilot project in Bamako, which grew out of the UN Technology Fair in Valencia in 2017. If successful in Bamako, the mission hopes to expand this technology to MINUSMA’s other field sites, while also increasing the grid interconnection within field sites in order to reduce the number of generators being used.²⁸⁴ The mission’s environmental priority has been to improve its waste- and wastewater- management systems (where potential environmental risks are higher). Mission reporting on using more renewable energy garnered less attention and was more aspirational. There are indications that this is changing. Reporting is becoming more specific — for example, the mission went from pledging to “continue to rely on solar panels” in 2016²⁸⁵ to committing to use solar panels to generate power “for all existing equipment rooms” in 2017,²⁸⁶ to reporting that MINUSMA uses solar panels as a power backup for the information and communications technology infrastructure, and aims to replace its older generators with hybrid generators in 2019.²⁸⁷ 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 efforts to increase energy efficiency and reduce its environmental footprint, MINUSMA’s demand for diesel grew steadily in the first five years of its deployment. This increased fuel demand may reflect the fact 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.²⁸⁸ In his February 2019 budget report, the Secretary-General 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.”²⁸⁹

Country-Level Goals and Commitments: Climate and Energy Access

The Malian government, as a signatory to the 2015 Paris Climate Agreement, prioritized limiting and decreasing Mali's negative environmental impact. The NDC calls for a 21% reduction in emissions compared to a business-as-usual approach by 2030, at an estimated implementation cost of \$39.88 billion.²⁹⁰ The NDC focus is on preventing deforestation, increasing renewable-energy production, reducing emissions from agriculture, and expanding rural electrification.²⁹¹ Mali has made good progress on renewables, with 61.5% of its energy consumption coming from renewable sources.²⁹² Only 51% of Mali's population has access to electricity, however, with a far lower access rate in rural areas.²⁹³ There are clearly significant opportunities to improve electrification in Mali in a sustainable manner.

The Malian Ministry of Energy and Water, working through the Mali Renewable Energy Agency, has partnered with IRENA to assess Mali's readiness to scale up use of renewable energy. In September 2019, as part of this partnership, IRENA published a renewable readiness assessment for Mali which indicated that hydropower and thermal-power stations are the main energy-generation sources at the national level. While hybrid (solar/diesel) and small-scale decentralized solar photovoltaic systems have been increasingly installed since 2011, the share of renewable energy remains low.²⁹⁴

According to IRENA's assessment, the Malian National Renewable Energy Action Plan has set objectives for both grid and off-grid systems:

For a connected system, installed capacity by 2030 for renewables, including large hydro, should reach 1,416 megawatts (MW); that is, a nine-fold increase compared to 2010. For off-grid renewables, installed capacity should increase from 20 MW in 2010 to over 600 MW by 2030, a thirtyfold increase over the period. Ambitious targets have also been set for ethanol and biodiesel.²⁹⁵

Mali has been the site of significant regional and international investment in renewable energy. The West African Economic Monetary Union, composed of eight West African states who share a customs and currency union, has the goal of reaching 82% of electricity from renewables by 2030 and has identified sites for large solar-power plants across Mali.²⁹⁶ There have also been multiple UN projects established in Mali focusing on energy and electricity access, specifically as a method of empowering women and vulnerable communities. The Promotion of Renewable Energy for the Empowerment of Women project, a joint project between the UNDP and the Malian government, has expanded electrification, increased renewable-energy sources, and empowered women financially in rural Mali. The program has reached 30,000 people in 300 villages across Mali.²⁹⁷ Another project, run by the Canadian Climate Change Adaptation Facility with funding from the UNDP, aims to create climate-resilient water-management and agricultural practices that empower women and children in the face of the negative effects of climate change.²⁹⁸ These initiatives provide a look into how renewable energy can increase sustainable futures and improve the lives of vulnerable communities simultaneously.

Central African Republic/MINUSCA: Recognizing Security and Political Benefits

The UN Multidimensional Integrated Stabilization Mission in the Central African Republic is a 14,700-person peace operation first authorized in 2014 to protect civilians and support transition processes in the country. The mission took over from 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.

MINUSCA budget documents from 2016 to late 2019 indicate a general trend toward more robust efforts to mitigate the mission's environmental footprint. In 2016-17, MINUSCA implemented an environmental management program to support implementation of its environmental action plan, which has been operational since September 2015.²⁹⁹ 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 between the mission and local communities. For example, in 2017, the report of the Secretary-General found 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.³⁰⁰

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.³⁰¹ 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 2018-2019.³⁰²

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 solar projects 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."³⁰³ The mission has articulated the potential security and environmental benefits of using scalable renewable-energy equipment such as low-capacity hybrid (diesel-solar 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."³⁰⁴ One former mission leader suggested that the UN had an opportunity to link its work on energy with its efforts to support peacebuilding in CAR.³⁰⁵

Country-Level Goals and Commitments: Climate and Energy Access

Central African Republic, as part of its commitments to the 2015 Paris Climate Agreement, laid out a goal of 5% emissions reductions by 2030 and 25% reductions by 2050 in its 2015 NDC.³⁰⁶ The NDC targets hydropower and solar energy as the primary areas of expansion and improvement in renewable energy. Similar to other countries in this report, CAR faces significant challenges in energy and electricity access; only 32% of the country has access to electricity.³⁰⁷ With CAR's hydropower and solar potential, there is a clear opportunity to expand electrification in the country through renewable means.

Despite the national potential for renewables and the need for significant expansion of electrification, there has been relatively little investment in CAR's energy sector from regional and international organizations. The World Bank's Emergency Electricity Supply and Access Project, which started in 2019 last year, aims to expand the construction, transmission, and distribution of solar photovoltaic energy.³⁰⁸ The UNDP also has promoted small-scale hydropower projects.³⁰⁹ Outside of these relatively small-scale UNDP and World Bank projects, CAR has not been the focus of investment in the renewable-energy sector.

SEEING THE BIGGER STORY: HIDDEN COSTS, OBSTACLES TO CHANGE, AND EXAMPLES OF BENEFITS AND PROGRESS

Hidden Costs of Relying on Fossil Fuels

UN missions rely on fuel to power their vehicles and diesel generators for operations and facilities. This near-complete dependence on diesel fuel reflects a long culture of using diesel and its wide accessibility. Diesel has played a valuable role in helping peace operations function; it enables mission contingents and offices to be mobile and self-sufficient, which is vital in situations where there is little chance of a national grid or local source of energy. This section explores the ways in which the reliance on diesel fuel impacts UN field missions and objectives, including challenges around safety and security, supply-chain transportation requirements, and fuel theft. It also 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 peace operations have identified the need for missions to adjust to a variety of environments. For example, a 2017 report led by former MONUSCO Force Commander retired Lieutenant General Carlos Alberto dos Santos Cruz, looked at increased challenges to the safety and security of UN personnel in modern missions. The risks to missions included threats to its supply convoys that support remote locations, 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.³¹⁰

Transporting fuel to remote parts of peacekeeping missions' areas of operations can be extremely costly and a time-intensive endeavor that offers more opportunity for convoys to be targeted. In Mali, fuel convoys of 50-80 vehicles can take up to three weeks to deliver fuel and food rations to remote bases.³¹¹ In CAR, it can take as long as three weeks for MINUSCA to supply fuel to its remote base in Obo.³¹² 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.³¹³

The challenge of fuel convoy safety is exemplified in northern Mali, where, in late 2015, improvised explosive devices hit roughly 66% of MINUSMA convoys operating between Anefis and Gao, and 80% of convoys between Gao and Ménaka.³¹⁴ 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."³¹⁵

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.³¹⁶

In addition, the dos Santos Cruz report noted the human resources required to support the logistics and provide escorts, sometimes at the expense of other mission objectives:³¹⁷

... 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.³¹⁸

Diesel will continue to play a key role, of course, in supporting peacekeepers and mobile capacity. Forward-deployed contingents or temporary operating sites, for example, will not be able to access renewable resources either on-site or use a grid.

Delivery of Diesel and Related Transport Costs. The costs related to the 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 an UNMISS fuel barge traveling to Renk, confiscating all 55,000 liters of fuel and temporarily holding mission personnel hostage.³¹⁹ According to a former senior UNMISS official, this incident led to barge-rental transport costs for the mission spiking from between \$1 million to \$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.³²⁰

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.³²¹ 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.³²² In Mali, peacekeepers allegedly “colluded with fuel attendants to illegally withdraw money from preloaded fuel cards.”³²³ In 2014, there were six reported incidents of fuel theft from the UN-supported mission in Somalia.³²⁴ Two years later, nine AMISOM soldiers were jailed for selling the mission’s fuel to civilians in Mogadishu.³²⁵ 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.³²⁶

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 2014.³²⁷ 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 \$70,000.³²⁸ 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 to sustain those groups' 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.³²⁹ 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.

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 objective of achieving 80% renewable energy by 2030.

Obstacles to Change

As demonstrated by the examples of innovation in the field and the variety of uses of renewable energy discussed in this section, missions are not consistent in their practices or in demonstrating results in the field. The policies and guidelines from headquarters offer some support for renewable energy in the field, however, and technical assistance is available to missions through DOS per the Environment Strategy. Even with this support, the pace of change is far below the level required to meet the Secretary-General's goals as articulated in the UNSCAP. 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 objective of achieving 80% renewable energy by 2030. These include troop- and police-contingent practices, the financing constraints related to short-term mandates and funding cycles, the capacity to engage with the private sector including via energy-as-a-service models, and systemwide support for energy transitions at scale.

Changing TCC/PCC Behavior. As discussed earlier, the uniformed contingents make up the majority of personnel in UN peace operations, and thus represent the largest group of energy users in a mission. Emissions could be reduced if more TCCs and PCCs transition to renewable energy. There are various ways to bring about this shift, including by TCCs and PCCs making use of locally available energy where applicable (e.g., local hydropowered grids in the DRC), or of energy provided by or through the UN mission.

Another option is the deployment of diesel-solar-battery hybrid generators to missions, for which the UN now offers reimbursements. To date, no nation has yet come forward to take up this option. Conversations with UN officials indicate a variety of reasons for this. First, thus far no contributors have said they would like to provide solar or hybrid power-generation equipment.³³⁰ Second, old habits are hard to break. Diesel generators are the norm for experienced TCCs and PCCs in peacekeeping, and some have served for several decades. Those with existing processes and well-established deployment rotations may naturally rely on approaches and equipment they already have in place.

Path dependency does not fully explain the lack of TCC/PCC deployment of reimbursable renewable energy in the field, as there are other potential factors. First, the reimbursement rates for hybrid generators are reportedly too low to cover the cost of the technology, and contributing countries may not be sufficiently incentivized to switch from diesel generators.³³¹ 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.³³² Second, there has not been a high-level

Efforts to reduce reliance on diesel have quickly shown benefits, including cost savings, greater data collection and planning guidance, and impactful leadership. Several operations have introduced solar-energy capacity, and a smaller number of missions have managed to connect to the grids of their respective host countries, including some examples of clean grids. Together, these developments provide some basis for wider system change.

know-how of experienced mission personnel. UN peace operations are intended 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 upfront capital costs and savings that are realized over a period of years.

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 high electricity costs, compounded by temporary infrastructure and long, expensive diesel supply chains, the payback from a solar system may take as little as two to three years in locations with high fuel costs (often remote locations) given current market prices for this technology. Cost-benefit analyses and multiyear strategies are key assessment areas and expected outcomes of the EIMPs, which define a prioritization strategy for energy projects based on payback time using the levelized cost of electricity as the main assessment parameter to evaluate alternative options.

Difficulty in Engaging the Private Sector, Energy-as-a-Service Model. One way to accelerate the adoption of increased renewable-energy options is through private-sector investment and development of renewable-energy

emphasis on this initiative in order to push TCCs/PCCs to change behavior. For example, there appears to be limited information or awareness about this initiative among member states. 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 and can provide the technology and those deploying contingents could make sense.

Changing this dynamic will require a concerted effort to engage member states, and specifically the TCCs/PCCs, on multiple levels to understand how renewable-energy generation can be made more 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 dependent on the bureaucratic

systems anchored by core clients, such as UN sites. This is a promising solution for UN peace operations: 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. Sometimes called a PPA, this type of arrangement has been key to the growth of renewable energy around the world. As discussed in Chapter 2, the PPA represents a contractual partnership between a private-sector project developer, who funds and builds the project, and the energy off-taker(s), who commit to purchasing the energy at a set price for an agreed period of time. In the UN field mission context, the PPA model provides a solution to the challenge of expensive upfront capital costs for renewable-energy projects by providing the private-sector developer with a creditworthy anchor-client counterparty — the UN mission — to make the renewable-energy project economically viable.

Field missions are not currently designed to enter into 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 lease with a pair of private-sector solar developers, Kube Energy and Scatec Solar. The 700 kW solar system will support the IOM-run humanitarian hub at the POC site, located within the UNMISS base in Malakal. The private-sector companies funded and built the solar and battery system, which was commissioned in June 2020, and they sell the energy to the IOM at a prenegotiated set price. This is similar to the PPA arrangement that UNSOS has recently initiated in Baidoa, Somalia, as described above, which will also result in the delivery of renewable power to local communities and the eventual transfer of the power plant to the local authorities. This model offers a promising solution for field missions, especially for locations that are likely to host peacekeepers for several 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 development. Policy reforms may be required in some host countries to help attract and enable private investment as many fragile countries' energy sectors are still state monopolies.

Examples of Benefits and Progress

Some missions are already adopting limited use of renewables. In those peace operations, efforts to reduce reliance on diesel have quickly shown benefits, including cost savings, greater data collection and planning guidance, and impactful leadership. Several operations have introduced solar-energy capacity, and a smaller number of missions have managed to connect to the grids of their respective host countries, including some examples of clean grids. Together, these developments provide some basis for wider system change.

Cost Savings. A number of missions are reporting 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. As noted earlier, MONUSCO has connected some of its facilities to regional electricity grids in the DRC and the surrounding region. The ACABQ estimated that MONUSCO's connection to the national grid would save the mission \$1,362,040 in reduced fuel costs during the 2018-2019 budget cycle.³³³ To support the UNSCAP, more attention to energy-transition success stories in the field — and the specific ways to accelerate those transitions — could further expand efficiencies and savings.

Increased Data Collection and Planning Guidance. EIMPs and energy project plans, as envisaged in the standard operating procedure put forth by DOS and the DPO in January 2019, are a major step forward for greater data collection and planning. This standard operating procedure should be welcomed and applauded, as it provides a mechanism through which UN peace operations can translate broader energy goals into actionable projects in the

field. EIMPs are intended to set out the missionwide multiyear plan to define the strategy for a mission's energy transition, including the evaluation of projects' payback times and therefore prioritization.

In order to facilitate improvements in energy performance and project rollout, energy project plans have been designed to allow missions to further detail complex projects. In the 2020 overview report on the financing of peacekeeping operations, the Secretary-General noted that data collected by missions through their missionwide environmental action plans "reflect considerable advancement in completing a detailed assessment underpinned by data rather than anecdotal evidence."³³⁴ These planning mechanisms are meant to inform the missionwide environmental action plan that generates DOS environmental-management scorecard to be reported in each mission's performance report on the results-based budget.³³⁵

Leadership Makes a Difference. A growing community of UN leaders appears interested in greater efficiency and effectiveness from using a diversity of energy sources; they 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.

Earlier, the short-lived 2020/50 greening initiative was announced internally in 2016, encouraging missions to pursue 50% renewable-energy usage by 2020. That directive had an impact. UNMISS officials cited this initiative 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. While the initiative was not continued (reportedly, it was not based on modeling),³³⁶ it demonstrated the impact and importance of setting policy goals. That impact is a useful lesson for the follow-up and support that will be necessary to implement the UNSCAP and phase two of the Environment Strategy, for example.

One approach is to build off the respective mandates of key headquarters offices, along with strategic leadership and vision on the UNSCAP from the Secretary-General's office. This approach could maximize existing roles, such as that of DMSPC, which has a role in implementing the UNSCAP and which could establish a governance framework for implementation and reporting. Likewise, DOS provides operational support to Secretariat entities (including peace operations), and also supports the UNSCAP. The UNEP could maintain the proactive strategic role it has played in the development of the UNSCAP. DPO, in collaboration with DPPA, can further enhance understanding of climate impacts on conflicts and the risk of future disruption, as well as policy measures to strengthen field missions and better drive peacebuilding. Together, these offices can support missions' effectiveness and innovation given the challenges in the field.

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.³³⁷ The 2020 COE negotiations, however, did not focus as much on issues related to energy and increasing renewable-energy capacity throughout missions. 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.

While climate action data across the various peacekeeping host countries is thin and inconsistent, there are examples of cooperation already happening. In Mali, the government has welcomed the assistance of IRENA to



Women in Abu Shouk Camp for internally displaced persons (IDPs) near El Fasher, North Darfur, attend English classes conducted by volunteer teachers and facilitated by the police component of the African Union-United Nations Hybrid Operation in Darfur (UNAMID). *UN Photo/Albert Gonzalez Farran*

produce a renewable-energy readiness assessment that will guide future efforts to deploy more solar capacity. In Somalia, UNSOM has a mandate to support the host nation's SDG agenda through working closely with the UN Country Team, directed by the operative paragraph in the mandate:

Support Somalia's efforts to advance 2030 Agenda for Sustainable Development, working closely with the United Nations Country Team, provide strategic advice to institutional capacity building in line with the Somalia National Development Plan, collaborate with the international financial institutions to support the mobilisation of economic and development assistance, and ensure effective and integrated cooperation of United Nations agencies, funds and programmes and promote cooperation with relevant partners, with a view to making maximum use of development financing in Somalia, including in response to flooding, locusts and the COVID-19 pandemic.³³⁸

This type of direction to coordinate — specifically on energy access — offers a way forward for missions and represents a critical entry point for peace and security actors to line up their efforts with those in the development community. If the broad ambitions of the UN Country Team, the host-country government, and the peace operation are already in alignment, how can these entities better work together to accomplish their goals? This is a question that requires further investigation.

CHARTING A WAY FORWARD: FINDINGS & RECOMMENDATIONS

As the world mobilizes 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, 2019³³⁹

Aligning the UN's goals and practice to achieve 80% renewable-energy usage by 2030 is highly ambitious. UN peace operations make up the vast majority of UN Secretariat greenhouse gas emissions, accounting for roughly 90% of emissions primarily from mission facilities and infrastructure. Those missions currently use renewable energy on a tiny scale — accounting for only 3% of energy use in 2019 — and are heavily dependent on diesel-powered generators. To meet the UN Secretariat Climate Action Plan (UNSCAP) targets, UN policies and peace operations in the field will need to accelerate change and embrace innovation.

The vision put forward by the Secretary-General in September 2019 built on important, decades-long initiatives. Early work such as Greening the Blue and the 2009 Environmental Policy first recognized the importance of mitigating the environmental impact of peace operations. More recently, the UN Department of Operational Support (DOS), under the leadership of Under-Secretary-General Atul Khare, formulated new policy by launching phase one of the Environment Strategy in 2017 to press for change, and is now kicking off phase two, which is likely to put greater attention on the energy pillar of the strategy. These efforts could come together, along with increased member-state interest and opportunities in the field, to accelerate transformation.

Therein lies the good news: Transforming energy use by UN peace operations could enable the UN to reach its climate-related emissions-reduction goal — as well as to meet mission mandates in line with current policies for peace operations, including on the environment (outlined in the Environment Strategy), reform and modernization (the Action for Peacekeeping initiative and the HIPPO report), safety and security (the dos Santos Cruz report), and technology (the Expert Panel on Technology and Innovation in UN Peacekeeping). Such transformation is also in line with goals embraced by the policies of key UN groups (e.g., the Special Committee on Peacekeeping Operations, or C-34) and budget committees (e.g., the Advisory Committee on Administrative and Budgetary Questions, or ACABQ, and the Fifth Committee) that emphasize efficiency and smart budgeting. Further, potential benefits *extend beyond* aligning with policy goals to deliver on them. Transformation offers missions an opportunity to improve their effectiveness in the field.

The benefits for the missions are manifold: Decrease expenditures and increase efficiency, reduce supply-chain dependencies and associated impacts, and address risks related to fuel transport in remote and insecure locations. In some cases, using renewable energy may enhance the security of UN operations, reduce local pollution, and even support peacebuilding efforts. To offer a greater peace dividend, the expansion of renewable-energy use by missions can bolster local economies and harness UN purchasing power to support local renewable-energy projects, thereby increasing access to clean, sustainable energy. This further reduces GHG emissions. Shifting to renewable energy can further align the UN's own practices with the Sustainable Development Goals (SDGs) and the ambitions set by host nations and other member states to reduce global emissions, encourage more climate-friendly energy production, and support communities and governments that host UN operations.

Innovation in the Field. Looking forward, the challenges to implement UN mandates, embrace the Environment Strategy, and meet the goals of the UNSCAP can be overcome, but will require innovation and change. This is already happening to some degree, with different models emerging in the field. In the DRC, MONUSCO has connected to local electricity grids, which source most of their power from the country's hydroelectric-power resources. In doing so, the mission has increased its share of renewable energy, demonstrated the financial viability of the approach, and supported the local energy sector. In South Sudan, UNMISS has installed the single-largest solar-power plant currently operating in a peace operation, while the IOM has entered into a leasing arrangement that has facilitated the transition to solar by transferring the upfront capital expenditure requirements to the private sector. In Somalia, UNSOS has entered into a power purchase agreement (PPA) with a private-sector developer, which will deliver cost-saving renewable energy for the mission and improved energy access for the local community. In Lebanon, UNIFIL has procured as much renewable-energy equipment as it can each year and is eager to deploy more, while concurrently exploring connection to the national grid. In Mali, MINUSMA and private-sector partners are collaborating on the design of a pilot solar-and-battery storage system, financed by third parties, in order to increase the mission's energy independence and enhance security.

UN peace operations make up the vast majority of UN Secretariat greenhouse gas emissions, accounting for roughly 90% of emissions primarily from mission facilities and infrastructure.

These efforts should be studied and built upon to facilitate the transition to renewable energy in peace operations, in order to more fully align the machinery of the UN with the commitments to prioritize renewable energy in the field. Certainly, diesel-powered generators have enabled missions to operate with mobility worldwide and will remain valuable. Yet new options may prove to be more efficient and cost-saving, while delivering benefits to local economies and longer-term energy solutions. By adopting new approaches, leveraging modern technology, and employing creativity, missions may receive support from the communities and nations they are deployed to serve if these undertakings align with national climate commitments and the SDGs, particularly energy access (SDG 7).

Current UN Leadership on Energy and Environment in Peace Operations.

The picture that emerges from this research is a complicated one around energy management in UN missions. Historically, decision-making is spread across and within departments and missions. A positive development is that leadership on this issue in peace operations has grown significantly since 2017, both from UN Headquarters and from mission leaders in the field. With the first phase of the Environment Strategy, the UN has made strides in establishing a system for data collection and reporting to member states, improved efficiency of energy consumption, and established better planning and analysis at the mission level through the development of energy management plans — which are now in place in most missions. To meet the ambitions of phase two of the Environment Strategy over the next three years, which include more efficient energy generation and increased use of renewables, there will need to be more commitment from member states, the development of new and creative partnerships, and sustained strategic focus on this issue from all stakeholders, particularly mission leaders who are now — post-management reform — ultimately accountable for implementation of the actions required.

Broad Findings: Energy in Plain Sight

The transformation required for UN peace operations to reduce emissions is complex. Successful renewable-energy transitions in peace operations have grown, but they remain the exception rather than the rule. The system as a whole is not yet designed to support renewable energy in the field at scale — and the missions listed above have overcome internal obstacles to deploy renewables. This report finds that certain areas need change and that targeted, manageable measures will go a long way in meeting mission goals and UN climate targets. Several key findings should be considered.

First, energy issues within UN peace operations remain largely hidden despite energy’s critical role as an enabler. Effective system transformation requires enhanced visibility of the role of energy in peace operations among a broader set of stakeholders. 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 core activities of the missions, and energy serves as a critical input for facilitating achievement of those mandated goals and mission functions. Beyond a small subset of subject-matter experts on the support side, energy is less familiar and less understood than other elements of logistics (e.g., air assets or engineering units) despite being a major component of the missions. Its role is not a frequent area for research and policy engagement. Further, even with the vision of shifting missions away from reliance on fossil fuels, UN policies and decision-making around energy are still segregated across agencies and missions.

Yet a fresh focus on energy practices in field missions can assist in understanding the role of energy and improving mission effectiveness. This will also support the goals set out in 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 strengthening the tracking of their energy use through data collection and embracing the benefits that renewable energy can provide across many areas for missions starting up, continuing, or drawing down.

Second, accelerating a shift toward renewable energy requires understanding and navigating the dynamics — at the Secretariat, mission and member-state levels — that sustain reliance on diesel-powered generators. They include:

- Short-term financing and mandate cycles that impede longer-term budgeting;
- High upfront capital costs of renewable energy;
- Reliance by troop and police contingents on diesel generators as an established mechanism of the self-supply of energy and standard 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 new technologies;
- Complexity in contracting for energy outsourcing;
- Limited land area available for renewable-energy projects;
- Mandates for peace operations lacking any focus on the use of energy;
- A system of robust energy data that is in the early stages of establishment; and
- Limited access to energy data, which is generally not available across operations for the full leadership team.

Third, renewable-energy transitions at scale will require a system change. This shift should take into consideration the varied experiences, incentives, and disincentives in the field, and what is adaptable to specific mission settings. Each mission has a unique story of how energy impacts its functions, as shown by the examples in the Democratic Republic of Congo, Lebanon, and South Sudan, as well as Central African Republic, Darfur, Kosovo, Mali, and Somalia, among others. Our research indicates that the laudable progress some missions are making in increasing their share of renewables often stems from bureaucratic creativity and hard-to-replicate circumstances. Capturing and learning from these experiences can help the UN determine what works, where the blockages are, where change can be catalyzed, and what new challenges will occur. For energy transitions to reach scale, all missions will require improved support, technological know-how, and better financial solutions. The lessons learned to date suggest that system change is necessary within both the UN's internal structures around energy management, as well as among member states and troop- and police-contributing countries, with support from outside expertise and providers.

Fourth, leadership matters, and senior managers can drive change by embracing the benefits of renewable energy and creating the conditions for systemwide transformation. Accelerated adoption of the UNSCAP by key UN decision-makers within the Secretariat is required to operationalize its objectives with regard to renewable energy. Leaders in the field will understand that the UNSCAP's ambitious targets could trigger a change in how the system works. Given that ambition, the UN needs a team to lead the UNSCAP implementation plan and its combined efforts for innovation, transformation, and partnerships — a fundamental, not incremental, shift. Leaders can assure that policies follow the vision, drive change, and translate into consistent incentives for the field. Some existing challenges could be addressed by enhanced communications among headquarters, the field, and member states; other challenges will require a change in the way the UN does business across the board.

Fifth, the story of why this shift matters needs to be broadcast more effectively. The success of renewable-energy projects across UN peace operations, with localized positive impacts and benefits, is not well understood within missions or mission areas; within the broader UN; or as a matter of course within the Security Council, the General Assembly, and, more broadly, the member states. In recent years, under the leadership of Under-Secretary-General Atul Khare, the work of the Department of Operational Support's (DOS) Environment Strategy in sharing best practices with a wider group of mission stakeholders in the monthly Energy Working Group has significantly improved the internal exchange of such experience. Yet examples of successful renewable-energy transitions from outside the UN System, in both the public and private sector, are not well known in traditional circles of peace operations expert communities, or in those focused on peacebuilding, the sustainable development goals (SDGs), and climate goals. Further, the ability of renewable energy to bolster efforts to meet UN and mission-specific goals, from cost savings and improved security to local energy access and peacebuilding, is rarely considered and poorly understood. This represents an opportunity for the United Nations. Although the climate-driven need for the UNSCAP is clear, other advantages of the energy transition defined in the plan require greater advocacy.

Sixth, renewable energy is increasingly more available and practical for modernizing missions' energy use. Worldwide, renewable energy has undergone a revolution over the last decade, and it continues to grow and expand as the world greens its electricity supply. Prices for solar and wind technology have dropped by over 80% since 2010, and more than \$300 billion is invested annually in new renewable-energy projects around the world. Between 2010 and 2019, \$2.6 trillion was invested globally in renewable-energy capacity, more than triple the amount invested in the previous decade. Yet too little of that investment and technology has come to poorly electrified conflict-affected states, where peace operations deploy. The UN's encouragement of renewable-energy usage for its missions and for host nations can begin to change this dynamic and draw significant new investment and resources to these target countries.

Seventh, transforming mission energy use is ripe for partnerships across the UN, research, private-industry, member-state, and philanthropic communities. 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, host governments, 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 UN missions.

Finally, the action is the message — and a positive story for the United Nations. Walking the talk is powerful, and this area is a chance for the UN to demonstrate leadership, innovation, and problem-solving across its priorities of peace and security, environment, climate, development, and, possibly, peacebuilding and access to energy. Transitioning UN peace operations from diesel-powered generators to renewable energy offers a significant potential win for the UN and aligns directly with other international priorities, including the SDGs — particularly energy access (SDG 7), climate action (SDG 13), and peace, justice, and strong institutions (SDG 16). The groundwork for transformation is laid in the field and across the UN; the future depends on harnessing those ambitions. Although UN peace operations are unique, there are examples of communities, from big governments and corporations to small humanitarian operations and villages, that have figured out how to transition to renewable energy. The UN can do the same.

The Way Forward: Recommendations

By mapping UN policy and practices around energy provision in peace operations, this report finds that key changes can strengthen UN peace operations and help achieve the ambitious goals set out in the UNSCAP. This section makes specific recommendations to achieve that transformation. To start, the Secretary-General's office should appoint a champion for, and put together a team in support of, those leading the UNSCAP implementation plan. Additional efforts to build on progress to date and accelerate change, strengthen partnerships, and expand outreach are also required.

This report illuminates the basis for recommendations for carrying out a transition to greater renewable-energy usage in field missions, as a pathway for achieving UNSCAP implementation as well as other related benefits.

For UN Headquarters and the Secretariat:

Demonstrate Leadership

- **The Secretary-General should appoint a high-level champion and establish a Secretariat-wide team to implement the action plan enshrined in the UNSCAP.** Leadership by this office can incorporate all the relevant Secretariat entities and empower implementation by fostering dialogue across the UN System. This team should develop a concept, strategy, and options for advancing Track 2 of the UNSCAP plan on innovation, which will require adopting new approaches in energy provision, including external partnerships and novel financial arrangements.

Build Knowledge and Lessons Learned

- **Establish a team to capture and share applicable knowledge and lessons learned** around current mission efforts on renewable-energy transitions in the field. The existing environmental staff at DOS, with support from the UN Global Service Center and Rapid Environment and Climate Technical Assistance

(REACT), and the related environmental community within peace operations, should continue to set strategic direction to mission support, strengthen systems for environmental and energy management, and provide technical assistance to missions.

- The team should also continue to **collect and disseminate lessons learned and best practices**. Other stakeholders within the Secretariat, through initiatives such as the climate-security mechanism that brings together UN expertise across pillars and disciplines, can contribute to building and leveraging this body of knowledge with applicability to a diverse range of mandated UN objectives, including peacebuilding goals, national SDG targets, and climate.
- This team should work with missions to develop (and/or commission) **case studies**, foster partnerships for potential renewable-energy initiatives for a range of UN peace operations, and facilitate their dissemination and implementation.

Support System Change

- Improve the development of agile, smart, and cost-effective **systems contracts** to support missions' purchases of renewable-energy hardware, system design, installations, and maintenance, and introduce contracts that make it easy for missions to use alternative financial arrangements for energy (e.g., equipment leases, power purchase agreements), leveraging ongoing work and contracts developed by other UN entities.
- **Engage 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 various available forums.
- **Brief project and contract-reviewing committees** on the UNSCAP goals and suggested strategy involving new financial solutions and contractual arrangements for energy provision in the field missions.

Elevate Energy

- Direct each **UN mission to produce an electrification plan** by September 2021 to help identify ways to diversify energy sources and increase the use of renewable energy.
- Support missions with their reporting effort on the electrification plan by establishing a **concrete set of indicators** related to budget plans and use of renewable energy, for each mission to report against.

Support Field Innovation

- 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, or innovative financing mechanisms like the Peace Renewable Energy Credit.
- **Update the procurement and tendering processes** for energy equipment and services to favorably weight renewable-generation options, where possible.

Build Partnerships

- Develop **partnerships with philanthropic funders, research organizations, host governments, and the private sector** to identify new models, technologies, and financing options for UN missions and to help accelerate renewable-energy development, innovation, and investment.
- **Deepen research on the links between energy, conflict, and peacebuilding**; and identify opportunities for renewable energy to support communities and host nations in meeting their goals.

For Peace Operations:

Demonstrate Leadership

- **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, as appropriate, to accelerate change toward greater use of renewable energy.

Build Knowledge and Lessons Learned

- Engage with the UN Country Teams, other international organizations, nongovernmental organizations, and host-government authorities with regard to energy-related development initiatives wherein the mission can **act as an anchor client and enabler for investment in local renewable-energy capacity**.
- Work with the Secretariat to develop (and/or commission) **case studies**, foster partnerships for potential renewable-energy initiatives for a range of UN peace operations, and facilitate their dissemination and implementation.

Support System Change

- Actively explore options, through local procurement, 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.
- Update the **procurement and tendering processes** for energy equipment and services to favorably weight renewable generation options, where possible.

Elevate Energy

- Continue to develop, expand, and pursue funding for **energy infrastructure management plans**, in line with the strategic directions set out in the Environment Strategy and the UNSCAP. Continue integration of **site energy plans** in the energy infrastructure management plans developed by the missions' engineering and environment units. Determine opportunities for energy improvement of currently deployed TCC/PCC options for UN-provided energy and/or connection to local lower emission grids.
- Intensify and complete the **energy-efficiency activities by 2025** which have the highest return on investment and therefore environmental impact per dollar spent, as detailed in the UNSCAP, to achieve a substantive energy reduction and reduce the energy production capacity required.
- Continue efforts to **expand data collection** of missions' energy loads, diesel fuel usage, and energy expenses to obtain a robust baseline for design, prioritization, and monitoring purposes.

Support Field Innovation

- Continue exploring **options for local grid connectivity** of both UN and TCC/PCC permanent sites, where relevant, taking into account both price and environmental footprint of local energy grids as well as potential impact on local communities.
- Continue **identifying 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.

Build Partnerships

- 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:

Demonstrate Leadership

- Ask for briefings by the Secretary-General’s office on **the UNSCAP** and benchmarks **to support its implementation**; ask the DOS for **updates on phase two of the Environment Strategy**; and request that the Department of Peace Operations (DPO) and the Department of Political and Peacebuilding Affairs provide **briefings on the energy plans of their peace operations**.
- Provide sufficient **funding for energy projects** to missions in order to reduce energy consumption as much as possible.

Support System Change

- Offer **support for phase two of the Environment Strategy**.
- Provide for better use of “**technology-contributing countries**” with the capacity for renewable energy to strengthen deployments, and implement this and other recommendations from the final report of the Expert Panel on Technology and Innovation in UN Peacekeeping. Offer to support the use of renewable-energy technology for TCCs and PCCs, including through partnerships with member states.

Elevate Energy

- **Understand UN policy options and prioritize the use of renewable-energy** technology for contingents deploying to missions.
- Ask DPO and its military planning service to brief on energy options in designing contingent and unit requirements, and to report on **measures to support contingent options for energy in the field**.

Build Partnerships

- Help link national plans with multilateral efforts in exploring **opportunities to support local renewable-energy capacity building**, including deployment of renewable-energy systems as a means to support better socioeconomic outcomes with the SDGs, and improve security, peacebuilding efforts, and/or alignment with climate goals.

Future Research

In researching this report, the authors identified areas for further inquiry. First, implementing renewable-energy transitions is part of a larger discussion on how peace operations will need to adapt to a security landscape that is increasingly impacted by climate change. Eight of the ten countries hosting the most multilateral peacekeeping operations personnel in 2018 were located in areas highly vulnerable to climate change.³⁴⁰ The implication is that the peace operations of the future will require more climate-sensitive interventions on the substantive and support sides of the mission.

Second, this report notes that peace operations can be among the largest producers and consumers of electricity in host countries that are among the least electrified in the world. This provides a unique opportunity to introduce new renewable-energy capacity, including in the form of legacy assets at mission drawdown. More study is required, however, to understand the mechanics and impacts of implementing such initiatives. The development economics around transferring the use of energy assets to communities and what makes them sustainable is not fully explored here.



UN Peacekeeper Lt. Colonel Ella Van Den Heuvel interacts with a local community member while patrolling in Rmeish, South Lebanon. *UN Photo/Pasqual Gorriz*

Third, more research and analysis are required to understand to what extent renewable energy generally, and UN peace operations' renewable-energy interventions specifically, provide an opportunity for mitigating conflict and promoting peace in host countries, including by advancing universal access to electricity (SDG 7) and climate action (SDG 13).

This report is the beginning of an expanded conversation about peace operations, conflict-affected countries, the impact of energy, and the potential to better support peacebuilding, the SDGs, and climate goals. That discussion is worth having.

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- environmental objectives of the mission as directed by the Director of Mission Support” (<https://careers.un.org/lbw/jobdetail.aspx?id=117613>). Many of these responsibilities are paralleled in a job description for the UN Assistance Mission in Iraq (UNAMI) for an environmental affairs officer, at <https://careers.un.org/lbw/jobdetail.aspx?id=116772>.
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