DOS ENVIRONMENT STRATEGY FOR PEACE OPERATIONS

Phase Two: July 2020 – June 2023

With a formal launch on 19 March 2021, this is a living document, periodically updated to reflect evolving approaches and priorities. Please contact dos-ousg-envs@un.org to obtain the latest available version.

Latest Update: 04 February 2022

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DOS ENVIRONMENT STRATEGY FOR PEACE OPERATIONS

EXECUTIVE SUMMARY

Phase Two: July 2020 – June 2023

The DOS Environment Strategy for Peace Operations is a six-year strategy (2017 to 2023) to achieve 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."** The strategy encompasses the field operations of Peacekeeping Operations and Special Political Missions, recognising that these missions comprise the largest footprint and environmental risks for the Secretariat. It responds to existing – and accompanies evolving – mandates from the membership of the United Nations that stress the importance of environmental management, and it embodies part of the shared commitment to this issue set out under paragraph 23 of Action for Peacekeeping.

OBJECTIVES

The strategy is built on five priority pillars, in pursuit of the following objectives (updated for Phase 2):

ACHIEVEMENTS OF PHASE ONE

Phase 1 of the strategy ran from January 2017 to June 2020. It saw the introduction of global systems to support planning, performance and risk management, as well as a concerted effort within individual missions to address or integrate environmental considerations on the ground.

- An extensive data collection and verification system was established, providing – for the first time – a reliable picture of the environmental footprint of UN peace operations down to the site level, with issuance of an annual 'scorecard' for each mission that increases visibility as well as identifies priorities and gaps.
- Capacity was strengthened both in missions and at HQ to support progress on environmental management, including both civilian and uniformed components. Strong communities of practice have been established with regular exchange of information and good practice across missions.
- A risk assessment methodology was developed and applied for both wastewater and solid and hazardous waste management, resulting in the elimination of almost all significant risk in these areas within the three-year period.

- Missions developed of multi-year plans in the areas of energy infrastructure management, waste management and environmental impact assessment, following promulgation of SOPs that provide a more coherent and holistic approach to these core operational requirements while taking environmental considerations into account.

- Technical guidance, training and awareness raising was rolled out on a wide array of topics, ranging from the role of individual uniformed peacekeepers in environmental management to how missions can safely dispose of hazardous waste, and from how to commission waste- water treatment plants to how to calculate costs savings on energy projects. On-ground and remote technical assistance was provided on request to 19 missions, constituting some 900 days, and resulting in more than 340 follow-up actions, with dedicated specific assistance provided to missions drawing down.

- Tangible progress was achieved across all pillars, with mission scores steadily increasing across the board and many examples of concrete steps taken to improve performance. For instance: synchronization of generators increased from 22% to 55%, installation of LED lighting from 37% to 63%, use of alternate water sources (e.g., harvested rainwater) from 8% to 23%, and installation of oil/water separators from 42% to 67%, as well as many other examples. Meanwhile, new approaches on waste, wastewater, renewables have were tested to inform strategic directions for the second phase of strategy implementation.

KEY PERFORMANCE INDICATORS[1]

At the start of Phase 2, following three years of gradually improving data collection, baseline strategy-level key performance indicators (KPIs) were provided – against which it is anticipated that steady progress can be measured going forward.

Strategy KPI	2017/18	2018/19	2019/20	2020/21
Range of mission environmental management scores	N/A-80	N/A-87	N/A-88	N/A-89
Proportion of data measured (not estimated) (percentage)	46%	30%	65%	75%
Proportion of sites where environmental assessments were conducted	50%	67%	91%	88%
Generators fuel consumption (UNOE and COE) (L/cap/day)	4.51	4.88	4.46	3.95
Proportion of renewable energy	3%	3%	3%	5%
GHG emissions (TCO2eq/cap/year)	7.8	8.3	7.8	7.4
Freshwater use (L/cap/day)	121	127	146	124
Sites where wastewater assessed to pose a minimum risk (%)	33%	47%	64%	70%
Sites that use some alternative water sources (e.g., treated wastewater, collected rainwater) (%)	8%	18%	27%	25%
Generation of solid waste (kg/cap/day)	1.70	1.60	1.64	1.70
Sites where waste assessed to pose a minimum risk (%)	9%	20%	23%	16%
Share of waste with preferred disposal methods	20%	32%	40%	43%

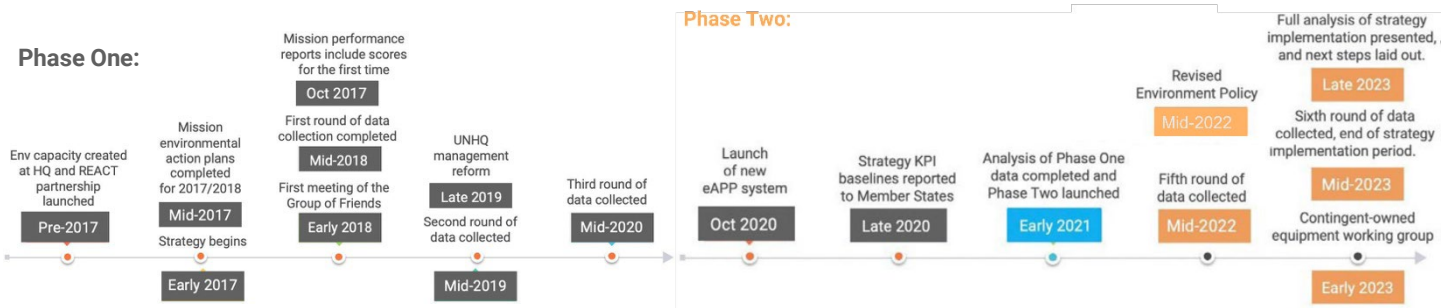
[1] KPIs were recalculated to address the modified scope of missions covered by this strategy (including peacekeeping and special political missions that have operational control of their energy, water and wastewater, and waste infrastructure, excluding AMISOM and UNGSC) and updated in January 2022.

STRATEGIC APPROACHES AND PRIORITIES FOR PHASE TWO

Phase 2 of the strategy, running to June 2023, is building on the foundations and structures put in place during Phase One, in order to advance progress on the ground. There is a particular focus the introduction of renewable energy and on exploring opportunities to leave a positive legacy through the physical footprint of peace operations.

- Environmental performance and risk data and reporting will continue to be strengthened – including through increased use of remote monitoring methods that facilitate verification. The link between data analysis, planning and budgeting is being strengthened through better software and processes.
- An updated environment policy will be promulgated that includes clear expectations and standards for compliance, based on lessons learned and expertise gathered during the implementation of Phase 1.
- Category management strategies are being implemented in relation to energy, waste and water and wastewater to provide to missions a suite of solutions that can be tailored to their specific needs while taking into consideration opportunities to leave apositive legacy for host communities.
- Efforts are being made to minimize waste through analyses of sourcing to identify the potential for reduced packaging, improved material use for recycling, reuse or disposal, and upgraded standards to improve quality of supplied goods for improved longevity. Takeback solutions for specific products are evaluated on a case-by-case basis with the aim to relieve missions of future waste stockpiles.
- Missions are being supported to budget for, and implement, ambitious, well-argued and achievable multi-year plans in accordance with SOPs on waste, energy infrastructure and water and wastewater management plans. Missions will also be assisted to ensure Environmental Impact Assessments are routinely implemented.
- Approaches based on the development of waste management yards and on built-in-place infrastructure for wastewater management will be prioritized, as proven and pragmatic solutions appropriate to the contexts in which peace operations are deployed.
- Emphasis on efficiencies in the use and consumption of energy will continue, covering both UNOE and COE, while innovative solutions to increase the use of renewables are being pursued through outsourcing, leasing, partnership and other options.
- Ongoing needs for capacity development among both civilian and uniformed components are being met through scoping and delivery of tailored guidance and training, while advances in building community and culture around strong environmental performance in peace operations is maintained through working groups, communications, and regular exchange of good practice.
- Centralized technical assistance will continue to be made available to missions, ensuring that they are able to access specialized expertise when required. Long term solutions are being explored to ensure these needs are met beyond the implementation period of the strategy.

TIMELINE



1. INTRODUCTION

The Environment Strategy for Peace Operations was publicly launched by Under-Secretary-General Atul Khare at the end of 2016 at Columbia University in New York, setting out the first phase of a six-year strategy to address the environmental footprint of UN peace operations, from Jan 2017 to Jun 2020. Initially launched by the Department of Field Support (DFS), it has - since the UN management reform in 2019 - become a critical focus for the implementation of the Department of Operational Support's (DOS) role in enabling environmental management across the UN Secretariat.

Following the completion of Phase 1 of strategy implementation in June 2020, detailed analyses of data and experiences have been conducted in order to take stock and to elaborate strategic approaches and priorities going forward. Phase 2 of the strategy, with a formal launch in early 2021 to the Member State Group of Friends for Leading Environmental Management in the Field (LEAF) formed during Phase 1 to support implementation, will have an implementation period to June 2023. A full analysis of data and progress will be undertaken in late 2023 and appropriate follow up actions determined.

This Phase 2 strategy document sets out the context within which DOS is providing operational support to peace operations in managing their environmental risk and performance, summarizes the achievements and remaining gaps from Phase 1 of implementation, provides an analysis of the data available, and sets out strategic priorities and approaches for the delivery of DOS support during Phase 2 of implementation.

The document will be annexed to a wider DOS strategy for Environment and has been formulated to maintain a specific focus on peace operations, given their size and circumstances - under which peace operations currently account for the vast majority of risk in the areas of waste and wastewater management, as well as around 80% of the greenhouse gas (GHG) footprint of the UN Secretariat. Given the unique context of their deployment, peace operations are subject to specific mandate language from Member States on environmental management. Implementation of the strategy is closely accompanied by an active LEAF, formed and co-chaired by Italy and Bangladesh, providing valuable guidance and support in driving forward progress.

1.1. Mandate

The Environment Strategy was launched to support implementation of General Assembly mandate A/RES/70/286[1], in which the Fifth Committee "*Requests the Secretary-General to continue his efforts to reduce the overall environmental footprint of each peacekeeping mission, including by implementing environmentally friendly waste management and power generation systems, in full compliance with the relevant rules and regulations, including, but not limited to, the United Nations environmental and waste management policy and procedures.*" (para 31).

This continues to be core mandate language guiding the UN's work to improve environmental management; however, Member States have monitored progress closely during the course of Phase 1 of the Environment strategy and have provided additional guidance, with the 74th session of the Fifth Committee in 2020 providing specific language in most individual mission budget resolutions noting "*the progress made in the implementation of the multi-year environmental strategy to reduce the footprint of peacekeeping operations, and requests the Secretary-General to enhance measures for the implementation of the strategy in all peacekeeping missions, in line with the five pillars of the strategy, in accordance with particular conditions on the ground and in full compliance with the relevant rules and regulations, and to report thereon in the context of his next overview report.*"[2]

[1] United Nations General Assembly, A/RES/70/286 (2016), available at https://undocs.org/en/A/RES/70/286.
[2] Example taken from UNIFIL's resolution in A/RES/74/292

Also, during the 74th session, the Special Committee on Peacekeeping Operations (C34) in A/74/19[3] noted "...*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*." (para 34).

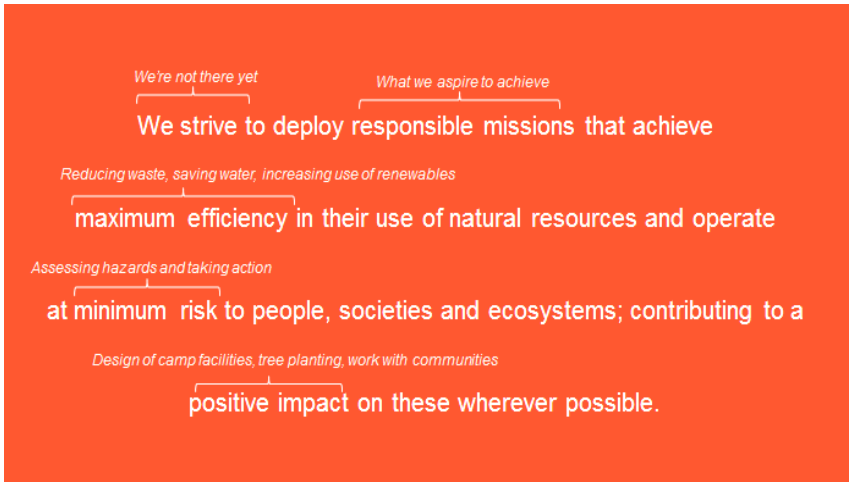
The Special Committee also reiterated "*…the shared commitment of Member States to sound environmental practices and to employ environmentally responsible solutions for all operations and mandate delivery through, inter alia, the deployment of units trained in environmental awareness to fulfil their 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*." (para 43).

The Security Council has continued to mandate consideration of environmental impact for several missions, including MINUSCA, MINUSMA, MONUSCO, UNSOS, UNAMID. For example, in S/RES/2531(2020) [4]
the Council mandates MINUSMA to "*…consider the environmental impacts of its operations when fulfilling its mandated tasks and, in this context, to manage them as appropriate and in accordance with applicable and relevant General Assembly resolutions and United Nations rules and regulations." (para. 59).*

In the "Action for Peacekeeping" (A4P) declaration[5], endorsed by 154 Member States, environmental management has been set out as one of the top priorities on which stakeholders (including Member States, the Security Council, host countries, troop- and police- contributing countries, regional partners, financial contributors and the United Nations Secretariat) will work together in support of UN peacekeeping. Through this declaration, stakeholders commit "*to sound environmental management by implementing the United Nations Environmental Policy for UN field missions, and to support environmentally-responsible solutions to our operations and mandate delivery*". (para. 23).

1.2. VISION

In late 2016 the UN Secretariat set out a vision "to deploy responsible missions" by 2023, through implementation of the Environment Strategy.



[3] United Nations Report of the Special Committee on Peacekeeping Operations 2020 substantive session (New York, 17 February–12 March 2020), General Assembly Official Records, Seventy-fourth Session Supplement No. 19 (2020), available at https://undocs.org/en/A/74/19.
[4] United Nations Security Council, Resolution 2531 (2020), available at https://undocs.org/en/S/RES/2531(2020).
[5] Secretary-General's Initiative on Action for Peacekeeping, available at https://www.un.org/en/A4P/

1.3. CONTEXT AND SCOPE

There were a number of changes to organizational context and scope during Phase 1.

First, UN reforms resulted in the creation of DOS, effective January 2019. This broadened the scope of United Nations Head Quarter's (UNHQ) administrative and logistical support services to the UN Secretariat (as opposed to the "field" in the former DFS). The reform also places greater delegated authority, accountability and responsibility to the field for a range of operational aspects, including the environment.

Second, the UN operates in challenging and dynamic field settings and there are continual changes to the operational footprint. This can range from day-to-day adjustments to the locations and sizes of UN sites and positions, to the drawdown and closure of entire missions. For example, during Phase 1, the UN mission in Haiti, MINUSTAH (a medium sized peacekeeping operation housing uniformed troops), transitioned to MINUJUSTH and finally to BINUH (a small office-based political mission). A comparable transition is underway in UNAMID, one of the UN's largest operations.

Third, like all organizations, the COVID-19 pandemic throughout 2020 impacted operations. Initially, this restricted the rotation of troops and staff to/from missions and, temporarily, some internal movements. However, in contrast to other UN Secretariat entities whose operational footprint is primarily commercial air travel (significantly reduced) and offices (with most staff on a work from home basis), the on-ground operational footprint of large missions was maintained, and with it, the environmental footprint. Facilities continued to operate (requiring power, water and waste services) and military and police operational movements by and large continued (requiring vehicle and aviation fuel). The main impact of COVID-19 was felt in diminished ability to service equipment and facilities and to assess on-ground environmental issues through reduced civilian movements. In fact, for field missions, environmental impacts may slightly increase, due to increased use of water (hand washing) and generation of waste (personal protective equipment/PPE) due to COVID-19, whereas the rest of the UN Secretariat will see a significant decrease in footprint in 2020/21.

Despite the reforms, the strategy remains focused on field operations of Peacekeeping Operations (PKOs) and Special Political Missions (SPMs), owing to their unique operational footprint, size and mandates and various supporting structures that are distinct from other Secretariat entities. It applies to PKOs and that have operational control of their energy, water/wastewater and/or waste utility infrastructure7. The concept of operational control is determined by whether the mission has authority over the procurement, operation or disposal of a site, facility, or infrastructure, noting that the level of operational control can vary depending on many parameters including local regulations, the specific contractual arrangements with service providers/building owners, location of the asset/facility (e.g., whether on a UN site or off site), ownership, and safety and security requirements. The missions that have been included in the strategy are: MINUJUSTH (closed in 2019), MINURSO, MINUSCA, MINUSMA, MONUSCO, UNAMA, UNAMI, UNAMID (closed in 2021), UNDOF, UNFICYP, UNIFIL, UNIOGBIS, UNISFA, UNMIK, UNMIL (closed in 2018), UNMISS, UNMOGIP, UNSMIL, UNSCO, UNSOS, UNTSO, and UNVMC. The interchangeable terms mission, field operation, and peace operation may be used throughout this document to refer to missions within the scope of the strategy. Peace operations not included in the strategy are generally small office-based entities, often in leased premises, more akin to other Secretariat facilities. They do fall under business-as-usual processes, including appropriate assessment of environmental aspects, and like the remainder of the Secretariat will benefit from the mainstreaming of good environmental practices in HQ support functions that arise from the strategy for Peace operations.

[7] Energy, water/wastewater or waste utility infrastructure is defined as follows:
Energy: the provision of prime electrical power. Backup generation and supplementary solar photovoltaic installations is not considered to meet the definition of operating energy utility infrastructure.
Water/wastewater: Extraction and treatment of water. Supplementary rainwater harvesting for non-potable uses is not considered to meet the definition of operating water utility infrastructure. Treatment of wastewater through active systems, i.e., wastewater treatment plants. Small scale (less than 100 person) septic tank / soak pit systems are not considered to meet the definition of operating wastewater utility infrastructure.
Waste: On-site or offsite operational control of the waste disposal (incineration or landfilling of waste or treatment of hazardous materials). Waste segregation and/or composting is not considered to meet the definition of operating waste utility infrastructure.

1.4. ROLES AND RESPONSIBILITIES

All pillars of the Department of Operational Support (DOS) have a role to play in supporting missions to achieve the vision set out above through implementation of this strategy, and to meet their obligations under the Environmental policy for the United Nations Secretariat (ST/SGB/2019/7). Overall leadership in this is provided by the Under-Secretary-General, who monitors progress regularly and provides strategic direction, holding 'monthly meetings' that bring in relevant DOS Pillar Heads and operational colleagues as needed. He is also provided, bi-annually, with advice and insights about the priorities and challenges on the ground by the Field Advisory Committee on Environment (FACE), a group of six mission Chiefs / Directors of Mission Support (C/DMS) that chair cross-mission working groups for each of the strategy pillars. The Senior Leadership Team, comprised of Directors across the Department, are provided with regular updates about progress with strategy implementation overall, and direct the work of their teams in support of strategy implementation.

At the working level, an "Environment Core Team" brings together colleagues within DOS that are dedicated full-time to environmental issues, with ad hoc participants from DOS pillars that are involved in integrating environmental considerations into their broader operational support functions to missions and the wider UN Secretariat. This group meets at least twice per month, typically with representation from the Procurement and Logistics Divisions of the Office of Supply Chain Management (OSCM) on a monthly basis. Members of this 'core team' plan and facilitate a monthly working group for each pillar of the strategy, bringing together relevant staff from across missions to exchange information and good practice.

The Environment Section (EnvS) in the Office of the Under-Secretary-General (USG) coordinates implementation of the strategy, determining priorities, identifying opportunities and threats, providing a link between operational activities and strategic deliberations from both UN leadership and Member States, and guiding the overall design of systems, structures and processes to support environmental performance and risk management. This team works closely with the Environmental Technical Support Unit (ETSU), based within the Global Service Centre, which leads in the provision of technical advice and assistance to both HQ and missions – providing hands on technical assistance, developing technical guidance and training materials, and advising on appropriate technology across the three technical pillars of the Environment Strategy (waste, water/wastewater and energy). Both teams are supported through the Rapid Environment And Climate Technical project/facility (REACT), a partnership initiated with the UN Environment Programme (UNEP) that now continues with the United Nations Office for Project Services (UNOPS), to make available dedicated technical expertise to missions and HQ across all areas of strategy implementation.

In addition to the core technical assistance function performed by ETSU described above, the Office of Supply Chain Management (OSCM) has a crucial role in establishing systems contracts to support the implementation of mandates for environmental management, and in ensuring that category management strategies take into account efforts to reduce the footprint in accordance with UN rules and regulations. OSCM is also responsible for developing and implementing policies and procedures related to the framework of reimbursement to troop-and police-contributing countries - and for negotiating memoranda of understanding to support deployments - that take the environmental footprint of missions into account. Also, within the remit of OSCM, the Global Service Centre has a hands-on role in planning coordination for new missions as well as the liquidation of mission assets - activities with a clear and direct impact on their net environmental footprint.

The Office of Support Operations (OSO) provides important assistance in managing rosters for environmental staff in missions as well as ensuring that ensuring that environmental expertise is integrated into other staffing areas as relevant. OSO also supports the development, design, coordination and delivery of operational support training and capacity development initiatives in this area and ensures that environmental guidance is widely distributed and socialized.

The Division of Special Activities (DSA) ensures that environmental considerations are integrated into planning and liquidation procedures and activities and supports the establishment of collaboration with partners. Support officers from DSA are embedded within the Department of Peace Operations (DPO) and can provide a useful link on environmental issues to relevant mission desks. The Office of Information and Communications Technology leverages technology and innovation to support implementation of the environment strategy in a variety of ways, including supporting the development and roll out of data platforms and the use of geographic information systems (GIS) technology for remote sensing. Finally, the Division of Administration (DOA) provides financial services that facilitate key partnerships in support of the strategy for peace operations, as well as integrating environmental initiatives into headquarters facilities.

DOS also works closely with other Departments across the Secretariat on the implementation of this strategy, including the DPO and the Department of Political and Peacebuilding Affairs (DPPA). This includes partnership on key areas of policy that intersect with environment issues, as well as collaboration on guidance materials (such as the Environment Policy for Peace Operations and the Environmental Management Handbook for Military Commanders in UN Peace Operations led by the Office of Military Affairs within DPO. Other partners within the Secretariat include the Executive Office of the Secretary General (EOSG), who lead the Secretary General's initiatives on climate action, the UNEP which plays a coordination and communication function across the UN system on "greening the blue", and the Department of Management Strategy, Policy and Compliance (DMPSC) which provides the policy framework for the environmental performance of the Secretariat and consolidates indicators on the performance of senior managers in peace operations in advancing this strategy.

1.5. STRATEGY OBJECTIVES

The strategy sets out broad objectives under five pillars, in order to achieve the overall vision. These objectives have been updated for Phase 2 to move beyond what was primarily a focus (in technical pillars) on engineering aspects, and to include wider sourcing and systemic considerations:

EMS:	To introduce and maintain a system to mitigate adverse environmental impacts and enhance environmental performance in line with the UN's objectives.
Energy:	To reduce overall demand for energy through efficiencies; increase the proportion of energy sourced from renewables; and reduce the level of GHG emissions.
Water & Wastewater:	To optimize the use of resources for water and wastewater operations while managing risk to personnel, local communities and ecosystems.
Waste:	To minimize solid and hazardous waste generation and improve waste management, reducing the level of risk to UN personnel, local communities and ecosystems.
Wider Impact:	To ensure that operational requirements are met in a way that takes account of environmental impact and to increase the extent to which the footprint leaves a positive legacy.

2. PHASE ONE ANALYSIS

2.1. SYSTEM LEVEL PROGRESS AND GAPS

The following section provides an overview of progress and gaps in system-level support to implementation of the objectives set out for each pillar in Phase 1 of the strategy.[8]

ENVIRONMENTAL MANAGEMENT SYSTEM

Progress in Phase One

Situation at the inception of the Environmental Strategy

A broad Environmental Management System (EMS) "gap analysis" was performed with HQ and mission counterparts at the outset of Phase 1. In brief, the situation at that time could be summarised as follows:

- A relatively complex organizational setting, with the EMS scope encompassing multiple entities that interrelate with each other at various levels. For example, civilian and uniformed components have separate chains of command, likewise the "support" and "substantive" civilian functions. HQ is both a "stakeholder" communicating the "top down" expectations to the missions, while also providing a support function from "bottom up" requests from missions. The result is that high levels of communication and consensus is required on a range of issues rather than command and control type approaches.
- Relatively low environmental risks (the UN does not operate industrial production/manufacturing processes). However, there is the potential for quite significant health and/or reputational risks owing to wastewater treatment, the use of a standard range of hazardous materials, and greenhouse gas emissions. The complex organizational setting and fragile operating context results in both the elevated likelihood and consequence of significant impacts.
- Demonstration of appropriate levels of top management commitment, engagement and leadership, but no established frequency of monitoring, reporting and management review of performance and a lack of uniform measurement indicators that could inform Results Based Budgeting (RBB) in a defined and consistent manner.
- Good, though variable, levels of understanding amongst personnel that environment is an important issue, with a general willingness to improve, but tempered by competing mandate priorities (of very high risk/importance). Good engagement on environmental initiatives, including the uniformed components (e.g., environmental clean-up days, tree planting etc.).
- Many bottom-up environmental initiatives, from small-scale Troop/Police Contributing Country (T/PCC)-initiated projects at camps, through to major investments such as large solar photovoltaic (PV) installations. Though a general lack of mainstreaming of environment in budgeting, engineering design and procurement processes. Budgeted projects not always completed due to a range of operational constraints and priorities.
- Relatively well staffed and competent environmental officers in the majority of missions. But no community of practice amongst environmental counterparts within missions, creating "silos" with little sharing of best

[8] Due to the delay in the availability of the Phase 1 data (owing to collection, verification and analysis processes), this document discusses achievements and status up to the time of issue but may characterise some activity as Phase 2 even though it is already underway or has been recently completed, in order to align activity with the reported results.

practices and lessons learned. Variable capacity and capability for site assessment, data management and oversight of environmental initiatives.

- Lack of consistent guidance specific to key functional areas such as environment and engineering. Among the large number of guidance documents governing operations, only some had integrated environmental considerations or requirements, and where they did, statements were generic rather than specific and actionable by personnel on the ground
- No standardised tools for information collection and reporting at HQ: varying systems and tools used, none allowing for aggregation of data to give a complete picture across missions. (Similar issues are experienced beyond environmental parameters, in relation to data pertaining to personnel, sites, assets and stock levels.)

Context and Scope

Significant changes in operational context that occurred during Phase 1 are described in the Introduction, though the EMS scope remains broadly the same. Entities within the scope of the strategy (i.e., field missions listed under the "Context and Scope" section of this strategy and the DOS supporting functions) are covered by the EMS and it encompasses all UN units and functions (including outsourced on-site activities) as well as uniformed components. Entities outside of the strategy scope may voluntarily adopt the EMS system elements developed, noting that these elements may not always be fit for purpose (i.e., likely "over-engineered" for entities not accommodating personnel and operating energy, water and/or waste utilities).

Leadership and Policy

Ultimate responsibility and accountability for environmental performance rests with the Secretary General. The delegated authority and organizational structure for delivering UN mandates in the field results in environmental leadership (or, in EMS terms, "top management") comprising of the Special Representatives of the Secretary-General and Assistant-Secretaries-General/Heads of Missions at field missions. Given their role in directing the mission support functions and delegated financial control over resources, the Directors/Chiefs of Mission Support are also considered top management. As aspects of the EMS include DOS support functions, the Under-Secretary-General and Assistant-Secretaries-General for DOS can also be considered top management in the EMS context.

Top level commitment is demonstrated by the Secretary General in his 12 May 2020 Memorandum to All Heads of Peacekeeping Missions and Special Political Missions (HOMs) on *Our shared commitments to achieve environmental sustainability in the United Nations Secretariat's peace operations*. In September 2019 the SG endorsed the *United Nations Secretariat's Climate Action Plan* (UNSCAP) and issued *The Environmental policy for the United Nations Secretariat* (ST/SGB/2019/7). These join an array of UN Mandates, Rules and Regulations, Policies and other measures that together constitute UN Environmental Policy. DOS leadership was instrumental in significantly boosting environmental capacity through the establishment of an Environmental Section in the Office of the USG (HQ) and the Environmental Technical Support Unit in UN Global Service Centre (UNGSC). DOS and missions also supported the establishment of the Rapid Environment And Climate Technical project/facility (REACT) in addition to in-mission environmental officers (usually with a direct reporting line to the D/CMS).

In Phase 1 of the strategy, processes were established to include leadership in the review and endorsement of environmental action plans and performance. Environmental performance reporting is now included in the Results Based Budgeting framework (for relevant entities) and in Senior Management Compacts, which are a key element of the accountability system used by the Secretary-General to communicate the priorities of the organization and of individual senior managers.

Planning

Planning encompasses the review of significant environmental issues and risks, the UN's obligations and expectations and the opportunities for improvement. These were analysed and discussed in the 2017 Strategy document and a mission environmental action plan template was developed to track the planning and budgeting of key interventions. Priority actions were agreed with mission engineering and environmental counterparts in a workshop in May 2017 after detailed analysis of environmental processes and operational controls. Detailed feedback on missions' plans was provided in dedicated face to face sessions and have been annually reviewed thereafter, with feasibility, justification and budgetary support provided as necessary.

At the strategic level, work was undertaken to derive the expected demands for key environmental infrastructure to feed into the procurement processes for long-term agreements (systems contracts). For example, detailed modelling and mission surveys were completed to establish the case for centralised procurement of waste management equipment (bulb crushers, incinerators, balers, shredders). Such activities are discussed in more detail in the relevant chapters.

Support (Resources, Competency, Awareness, Communication and ICT)

Although EMS is crosscutting, the key human resources for successful implementation of the EMS elements are the environmental management officers and teams in mission and environmental personnel in HQ that support the DOS functions. In missions without an environmental officer, this gap was initially addressed through the provision of visits and assessments by the REACT facility until resources were in place (UNISFA, UNDOF) or processes were deemed appropriate (UNFICYP – requirements integrated with existing processes with periodically outsourced specialised support). At HQ, an Environment Section was established in the Office of the USG, and an Environmental Technical Support Unit in UNGSC. The resource requirements to support pillar activities, and by extension the broader strategy, are discussed in the relevant pillar sections of this document. Resources to support the EMS are currently deemed largely sufficient, with the exception of posts currently being sought in UNFICYP and ETSU.

Environmental Officers have the key role to play in briefing uniformed components on environmental obligations. Recognising that they have the technical background, but not necessarily a training background, a 2-day face-to-face "Train the Trainer" course was provided in May 2019. An Infantry Battalion Commander Course has also been developed. DOS co-ordinated the establishment of an EMS working group, creating a global community of practice of some 20-30 environmental and engineering colleagues. Working groups were also created across the technical pillars of the strategy (water, wastewater and energy), aimed at supporting collaboration and community across missions. Meetings were held monthly, covering technical topics, mission best practice sharing and regular roundtables. The groups were an important vehicle by which HQ updates were shared and discussed and provided a mechanism for Strategy initiatives to be "field tested" for feedback from end-users. Senior leadership of missions are involved through the working group Chairs, a volunteer group of C/DMSs who lead the discussions in the groups and in turn form a Field Advisory Committee on the Environment, providing advice to DOS leadership. Regular communication has also taken place from Under-Secretary-General Khare to Heads of Mission and to C/DMSs, through both email, code cable, and in-person briefings, and a Peace Operations Environment Community email list of around 500 mission and headquarters staff was used to provide regular updates on progress and developments globally. Regular uniformed focal point videoconferences (VTC) are also conducted to increase competency and awareness of environmental issues. Two face to face workshops involving environmental officers and chief engineers to discuss technical topics, communicate on activities and share best practices were held in Brindisi (2017 and 2019).

An awareness campaign was developed and disseminated in 2019. The campaign distilled the Environmental Strategy into actions easily initiated by civilian and uniformed personnel. Stickers and posters in support of the campaign were distributed to missions in the key languages of the troop contributing countries (French, Arabic, Amharic, Hindi and Spanish). A "Duties of Peacekeepers" pocket card for uniformed components in various languages was developed and issued in 2020.

A dedicated Microsoft "Teams" environment was created for internal communication and information management in early 2019 and VTCs switched from the Cisco system to Microsoft (MS) Teams. As a result, environment colleagues were early adopters of these technologies, and seamlessly switched to online systems during COVID-19. There was a marked increase in informal communications (chat, video calls) between environmental and engineering colleagues and remote techniques were used to gather data for reporting during the 2020 reporting periods.

Communication and engagement with Member States was chiefly through the formal mechanisms of the legislative and budgetary committees, with an annual update provided through the Overview Report as well as regular formal and informal briefings to the Fifth Committee, the Special Committee on Peacekeeping (C34) and the Advisory Committee on Administrative and Budgetary Questions (ACABQ). Regular engagement is also conducted with the Group of Friends on Leading Environmental Management in the Field (LEAF), with briefings at both the Permanent Representative and Expert levels on different aspects of strategy implementation. In terms of external audiences, the strategy was initially launched to a public audience and updated information about strategy implementation is provided on a public-facing website. There is regular participation in UN-wide fora to discuss these issues, and ad hoc briefings are provided at seminars or events intended for a range of interested parties.

A major Phase 1 task of supporting data management involved three years of spreadsheet development. While this allowed for "agile" development (involving continuous feedback from mission counterparts) as data collection processes matured, it was recognised that the system of mission spreadsheets and SharePoint files was not fit for purpose and in 2020 a specific environmental action planning and performance platform—the eAPP— was developed internally by the Office of Information Communications and Technology (OICT) and the Service for Geospatial, Information and Telecommunications Technology (SGITT)/UNGSC to manage the data collection processes as efficiently as possible. The development leveraged the existing work such that it was delivered in record time, enabling the final data collection for Phase 1 (Jan-Jun 2020) to be completed in the new system. The new system provides a wide range of benefits: linkage to other systems, including smart meters; controlled submission, verification, assurance/review and endorsement processes; automated error checking/validation; and data analytics and infographic capabilities.

Operation

Environmental considerations continue to the mainstreamed into established UN Policies and Guidance, processes and functions. Environmental considerations have been incorporated into a number of documents, ranging from the Contingent Operated Equipment (*COE) Manual* to *Guidelines for Senior leadership on Field Entity Closure* and the *Mission Start up Guide*. Examples of environment-specific guidance issued in Phase 1 include:

- Standard Operating Procedure (SOP) on the Development of Energy Infrastructure Management Plans.
- SOP on the Development of Waste Management Plans.
- UN Environmental Management Handbook for Military Commanders in UN Peace Operations (in progress).
- Guidelines for Field Verification and Control of COE Management of Memoranda of Understanding/MoU (1 January 2021).
- Technical input into the "Smart Camp" white paper.
- 2021 Generic TCC/PCC Guidelines (in progress).
- Statement of Unit Requirements template (in progress).
- Various scope of works/requirements for both global (systems) and local contracts for engineering and environmental infrastructure.

Performance Evaluation

At the start of Phase 1, there was scant information on environmental performance. While data was collected for fuel, there was little water, waste or electricity information—crucial for understanding both demand and generation efficiency. Data was most often estimated and not collected at site level, making it impossible to determine the site-specific requirements for infrastructure upgrades and other interventions.

Information needs were agreed on with mission engineering and environmental counterparts in a workshop in May 2017. The data points selected were considered the most relevant for driving environmental performance: either information about processes and activities that would be expected to result in outcomes (e.g., installation of efficient equipment, risk mitigation activities, assignment of appropriate levels of human resources to critical areas), or direct measurement of environmental outcomes themselves (reductions in fuel, greenhouse gases/GHG, water and waste risk levels and so on). These indicators were then combined into a "scorecard" which provides a transparent and consistent assessment of progress against the environmental strategy objectives.

Through a concerted effort from a wide range of HQ, mission and site personnel, data is now collected at all sites across a range of key indicators. To give perspective, datapoints grew from around 300 (20 data fields for 15 missions annually) to over 100,000 (150 data fields for over 400 sites every six months)— which are increasingly being automated. Significant efforts have been made to improve data quality through provision of a data collection instruction manual and establishing central error checking and verification processes. While error checking, review, verification and endorsement processes are increasingly being imbedded into the information technology (IT) systems, these processes still require central capacity to co-ordinate, and to provide oversight and assurance over the information reported.

Environmental performance evaluation is now integrated into established accountability frameworks, such as the RBB and senior management compacts. Annual submissions are reviewed and endorsed at Special Representative of the Secretary-General (SRSG) level with feedback provided by the USG, DOS.

Improvement

Missions (environmental officers) conduct regular site inspections and the rate of assessment has continually increased since the start of the strategy. Environmental officers successfully switched to remote techniques in 2020 due to COVID-19 restrictions on movement. Guidance and training on improving assessment to these officers, is ongoing. Proactive engagement with the Office of Internal Oversight Services (OIOS) and the Board of Auditors (BOA) counterparts resulted in environment aspects being a key audit theme and briefings were provided to the BOA and to HQ and field OIOS counterparts on the Environmental Strategy to facilitate audit planning and focus.

BoA Recommendations During Phase One

Given the important audit role performed by the Board of Auditors (BoA), an overview of key recommendations made during Phase 1 is provided here. The key recommendations from across the management letters of MINUJUSTH, MINURSO, MINUSCA, MINUSMA, UNAMID, UNFICYP, UNISFA and UNSOS for the financial period ending 30 June 2020 are outlined below, by pillar:

- **EMS**
  - The Board noted the central role of the action planning process built into the Mission-wide Environmental Action Plan (MEAP) / environmental Action Planning and Performance (eAPP) and recommended that missions accelerate the implementation of projects with environmental benefits so as to achieve the General Assembly (GA) mandates on environment.

- **Energy**
  - Take concrete steps in energy demand reduction through intensifying the installation of energy saving aspects such as light-emitting diode (LED) lights, insulation, low energy consumption air conditioning, as well as the implementation of energy metering systems.
  - Accelerate the transition to renewables.
- **Water and Wastewater**
  - Improve wastewater management infrastructure.
  - Increase the proportion of alternative water sources.
  - Conduct regular water quality testing.
  - Expand water metering to address system losses, increase water-use efficiencies and reduce wastewater generation.
- **Waste**
  - Accelerate the implementation of waste management yards to improve on composting, personal protective equipment disposal, incineration and the full range of improved disposal methods.
  - Centrally procure appropriate waste management equipment to address inadequacies in local procurement and delays in installation.
  - Implement preventive measures to address petroleum pollution and soil contamination and take early bioremediation action.
  - Enhance inventory management to avoid excess accumulation of materials. Noting issues during the recent liquidation efforts, particular emphasis was placed on the management of hazardous materials and the need to proactively dispose of all such materials during the mission's sustainment phase.

These recommendations underpin the Phase 2 priorities presented throughout in this document.

Gaps to be Addressed in Phase Two

Policy

In the unique regulatory environment of the UN, UN policy takes on outsized importance when compared to traditional organizations in the establishment of compliance obligations. While there are numerous instruments, including policies, constituting the UNs expectations, these tend to be high-level statements of intent that do not adequately state the expectations for compliance, or the means by which this is to be demonstrated. The *Environmental Policy for Field Missions* (2009) is overdue for review and needs to account for emerging doctrine and expectations from the Secretary General. Revision to the *Environmental Policy for Field Missions* will build on lessons and experience gathered from the implementation of Phase 1 of the strategy. It should clearly outline what constitutes compliance and establish the norms and procedures for transparently reporting on whether compliance obligations and performance objectives have been met.

Planning

While endeavours have been made to align wherever possible with existing processes (e.g., budgeting and demand planning), there is always ongoing scope for improvement, particularly as planning processes and tools have been subject to change due to management reforms and IT system projects (e.g., Umoja) during Phase 1 of the strategy. Phase 2 will continue to align and mainstream environmental planning actions with DOS and mission processes, including pursuing opportunities in the new Umoja Demand Planning and Supply Network Planning (DP/SNP) solution.

Awareness

While Phase 1 introduced awareness campaign tools and communication platforms, it is recognised that improving and maintaining staff awareness is a continual process. Particular attention is required on the "upstream" processes, ensuring proactive interventions on root cause prevention over the "cure". The EMS has focused on Processes and Structures of the organization, and some attention in Phase 2 will be required on the other key aspect, strengthening the (environmental)culture. Measurement, to both gauge the prevailing culture, and to measure the strategy's impact on improving culture could also be improved using industry best practices. With the intent is to ensure the organizations culture (i.e., the set of attitudes, beliefs or norms) supports the environmentalobjectives of the UN and the expectations of the global community.

Internal communications

Linked to the above is continual work to improve internal communications. While the existing working groups have been successful at bringing technical counterparts together there is a risk of creating "silos" within the pillars, and more broadly between environment and engineering and other functions within the organizations. One approach to be adopted is a "nexus" on specific topics, for example, plastic water bottles involving Water and Wastewater and Waste working groups. Numerous examples of such topics exist for collaboration across working groups and DOS functions. Improved and more regular communication on policies and guidance has also been requested from missions.

In addition to environmental officers, Chief Engineers are important mission stakeholders. While their participation at the two Environment Strategy implementation workshops, and some engagement in the pillar working groups, has had clear benefits to progress, more is needed. As implementation of management plans will rely heavily on the support and direction of and resource allocation by C/DMSs and the Chief(s) of Supply Chain and Service Delivery, effective communication and co-ordination Senior Leadership will be a critical success factor for Phase 2.

Support on data / Information Communications and Technology

The first version of the "eAPP" software was launched in July 2020. Over the course of 2021, further enhancements to the platform are required to address current gaps:

- **Mobile data collection**: missions have requested the ability to collect data on an ad-hoc basis (e.g., off a meter during a site visit) rather than in the current 6-month periods. Enabling this also addresses a gap in direct measurement of meters: while the field remote infrastructure monitoring (FRIM) project will gradually increase the numbers of smart meters, this requires the installation of large numbers of monitoring devices. In the interim, manual readings could be taken in a controlled manner through an enhancement to eAPP.
- **Database integration**: integration with other databases would reduce the need for manual data entry (with accuracy and labour-saving benefits). While linkage to FRIM is already included, integration of other UN platforms such as the electronic fuel management system (EFMS) and Umoja could also be explored.
- A new module for **environmental action planning** needs to be developed to allow for closer integration of the planning, justification and budgeting processes.
- Building on the Power BI platform that now provides mission "scorecards" and Strategy KPIs, **a suite of standardised reporting products** tailored to the various functions and levels are needed. These could include:
  - Annual Environmental Performance Statement endorsed by SRSG.
  - Data analysis module allowing selection and analysis of specific indicators.
  - Dashboard at mission and site level (e.g., for contingents).
  - Planning dashboard showing action priorities.
- Ensuring appropriate resources are in place to maintain the system post strategy period.

Addressing these gaps would fully mainstream the eAPP, requiring little ongoing support other than verification and oversight processes, though some specialised support will be required to implement changes where significant adjustments to the performance framework are made (e.g., adjustments to the indicators or objectives). The manual data entry burden on missions is also be expected to fall as increased smart metering is rolled out and integrated.

Operation

The promulgation of the revised *Environmental Policy for Field Missions* will precipitate ongoing mainstreaming of the policy requirements into relevant operational procedures and guidance. This will be ongoing as documents come up for revision and will involve effective communications to end users on any changes.

Out of the three key operational functions of DOS (support to Operations, including human resources, health-care management and capacity-building; Supply Chain Management; and Information and Communication Technology), Supply Chain is a significant area of focus and collaboration (both across functions and between missions and HQ). While good progress has been made, there are still a number of issues to be addressed in relation to sourcing, at both Global and Local levels, including:

- Total cost of ownership has not always adequately considered, resulting in some situations in "lowest price" selection not "best value". This type of analysis has been successfully applied in cost benefit assessment of energy investment (Levelized Cost of Energy) and can be usefully applied elsewhere.
- The above can be exacerbated if there are inadequate specifications for equipment leading to low quality products that are not fit for purpose in the difficult operating contexts of missions. This can result in increased turnover of equipment and wastage, ultimately at greater cost to the UN.
- Use of aggregators for a variety of equipment. While this can enable efficiencies, they have some constraints in that some elements of the contract may become technologically out of date. Such contracts need to include the flexibility to update specifications/products, as has been successfully demonstrated in the air conditioning contract: after negotiation with the vendor, the UN was successful in upgrading the efficiency of AC units at no cost to the UN; similarly, a PV contract was amended to include a power plant manager and manual panel cleaning systems. This approach can be applied in other areas to ensure the best technologies are available (e.g., medical waste incinerators). In highly technical areas, it could be beneficial to engage directly with manufacturers to leverage their expertise on what are the most appropriate solutions.
- There is an opportunity to shift from a "procure and build", to an outsourced "design, construct and commission" mindset, which better takes advantage of existing capacity and capability of UN resources, particularly in highly technical areas. There is considerable potential for investigation and adoption of approaches such as leasing arrangements and "takeback" options.
- Packaging materials do not currently consider the limited recycling options at missions. Use of alternative materials, particularly substitution of styrofoam and polystyrene for paper, would be beneficial. More stringent product specifications that foster ease of disassembly of electronic equipment can assist in re-use and more efficient resource extraction of high-value components and treatment of hazardous materials. Certain hazardous materials should also be eliminated from the supply chain through tighter product specifications.

EMS Assessment

A common issue is effective closure of corrective actions raised with uniformed counterparts. Recognising that environmental officers are subject matter experts, but do not necessarily have auditing and negotiating skills, an auditing training course, tailored to the UN context and environmental strategy, would help improve the uptake of recommendations made by the environmental officers. These skills will increasingly be required as environmental data collection is mainstreamed, i.e., reported and "owned" by those responsible for the activity, gathered by

site (uniformed) focal points, or through remote means. Although advice and guidance has been provided in the Instruction Manual, additional verification and assurance skills training can be deployed.

Building from this, an EMS Internal Audit schedule will be developed to enhance competency development of Environmental Officers and share best practices and lessons learned in order to improve the EMS. This would involve mission counterparts joining small assessment teams to review management system processes in neighbouring missions, under an audit team lead from the REACT project (EMS Specialist). This process will then be mainstreamed from July 2023 as a standard requirement of maintaining an effective EMS.

ENERGY

Progress in Phase One

Electricity production in peace operations is the largest GHG emission source, accounting for almost half of emissions (Figure 1). The one-year budget cycles, small investment cost of diesel generators, and general lack of host country energy infrastructure, are all factors which have led to a predominantly fossil fuel-based energy production system. As there has been significant investment in this infrastructure over long period of time, it will take a number of years to move to predominantly renewables. It will require a multi-year approach by missions across some 400 sites.

At the start of the strategy there was no systematic approach to reducing the environmental impact of energy production. Energy upgrade projects were mostly part of routine "fleet maintenance", executed without systematic assessment of potential economic and environmental benefits of individual projects or in master planning of energy infrastructure across the mission.

Several missions had installed stand-alone solar PV systems to power ICT centres, radio towers and lighting, while a few missions (e.g., UNIFIL) had installed hybrid solar PV-diesel generator systems and had started synchronising some of the diesel generators. However, these efforts were relatively fragmented, and on too small a scale to significantly impact energy costs and improve self-sustainment. Moreover, due to existing gaps in energy data, designs were sometimes "oversized" and not optimised.

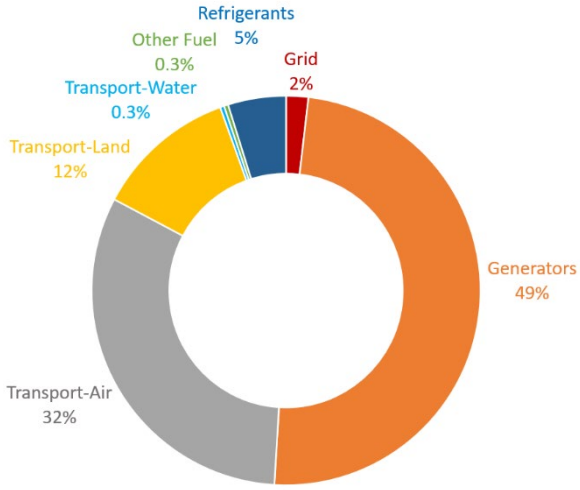


Figure 1 Mission Sources of GHG emission

Therefore, a large proportion of the work conducted in Phase 1 focused on a systematic approach to equip missions with suitable planning tools and technological knowledge to enable roll out of energy upgrade projects at pace and with optimised designs. Addressing chronic gaps in electricity metering was also a priority.

Energy Infrastructure Management Plans (EIMP)

In order to support missions to prioritise energy investments based on economic, environmental and other mission specific factors, the SOP on Energy Infrastructure Management Plan (ref: 2020.6) was promulgated in December 2018, including a template EIMP and Energy Project Plan (EPP). The EIMP template provides a guided path towards establishing a suitable set of energy upgrade opportunities, starting from an analysis of the mission context and host country energy infrastructure, followed by a data collection process on energy infrastructure (both on power production and power consumption), an analysis on where the biggest opportunities for improvement lie, and ending with an approved list of interventions to be carried out in within a multi-year execution period based on the mission's staffing and budget resources.

The EIMP process establishes a standard model for comparatively assessing energy projects using the Levelized Cost of Energy (LCOE). In summary, the LCOE for a defined system consists of all the forecast lifetime costs (initial investment, operations and maintenance, cost of fuel, cost of capital), divided by forecast energy generation: the higher the LCOE the greater the opportunities for cost savings through energy efficiency and renewable energy projects. Therefore, the LCOE allows missions to assign a priority ranking to planned upgrade projects and spread them throughout various financial years, focusing first on the activities that have the highest economic return. This multi-year strategy ensures missions can minimise the cumulative energy costs throughout the EIMP implementation period.

The SOP was amended in March 2020, to emphasise two additional aspects:

- Recognising the EIMPs importance as the main planning vehicle to achieve the missions' contributions to UN's internal greenhouse gas emission targets[9]
- The need for the EIMP analysis to be extended to the T/PCC sites, for example to identify potential MOU amendments in order to improve the generating efficiency of COE power production.

Since the promulgation of the SOP, support was given to all missions to develop these plans, resulting in 14 EIMPs, of which six[10] have been signed by the respective C/DMS.

Energy data

A separate DOS initiative (preceding the strategy) involved the deployment in missions of an electronic Fuel Management System (eFMS) to track fuel delivery to the point of the asset. This system is designed to track Fuel, not to measure efficiency, and although eFMS incorporates the ability to record kWh, due to the lack of meters (both analog and digital), data is patchy, particularly for COE. So, although fuel records are available, in many cases the missions are not able to determine the efficiency of power generation or the consumption of electricity. Gathering of kWh was initiated early on in the strategy. The emphasis was on ensuring kWh readings were reliably gathered and reported where available (primarily analog meters) to support both the strategy and development of EIMPs. On a project by project basis, some energy meters were deployed by REACT technicians to execute engineering designs of five projects spread across MONUSCO, MINURSO, MINUSMA. In the latter part of Phase 1, the Field Remote Infrastructure Monitoring project began roll-out which will involve the wholesale installation of electronic meters across mission in a common analytical platform, representing a significant advancement in this area.

Training and Guidance Notes

To facilitate the planning and engineering design of upgrade projects, a range of training events and guidance notes were delivered on energy metering, LED lighting and diesel generator synchronisation. Template business cases to support EIMP calculations and budget requests were also developed and training provided. Energy Working Group meetings and four dedicated technical discussion meetings ("EIMP clinics") organised in early 2020 were used as a platform to promote the content of the guidance materials. These events often involved presentations from missions to include experiences from the field.

Technology Improvement

In parallel with the development of suitable planning tools, effort was dedicated towards ensuring ready access to the equipment to execute energy upgrade projects. Based on aggregation and demand analysis of the EIMPs and a mission survey, it was concluded that two additional global system contracts were required: LED lighting

[9]UNSCAP targets include absolute and per capita GHG emission reduction of 25% by 2025 and 45% by 2030; per capita electricity consumption reduction of 20% by 2025 and 35% by 2030; and share of renewable energy of 40% by 2025 and 80% by 2030.
[10] MONUSCO, UNMISS, UNAMA, UNAMI, UNDOF, UNMIK

and energy meters. Specifications were made available to support mission's local procurement while a global contract is developed (award anticipated in Q1 2021).

As the cooling/heating load is the most significant load in missions (estimated at roughly 50%), priority was placed on finding new solutions that could lead to energy improvements above those already achieved through the inverter type compressors units included in the existing split Air Conditioning (AC) system contract. A new statement of requirements (SOR) was developed that included split AC and variable refrigerant flow (VRF) units using a refrigerant with a low global warming potential. This included the requirement for an integrated occupancy sensor, to limit unnecessary operation of the units (likely to account for a large proportion of energy consumption). The target for award is Q3 2021. Until then, in order to provide missions with a suitable contract allowing them to start implementing the planned EIMP projects, the existing split AC system contract was amended so that the systems most widely used in missions now has 28% lower energy consumption, resulting in an estimated replacement payback time of less than 2 years. UNSOS has already purchased more than 800 of these new units, which will result in roughly 200,000 litres of fuel saved per year and other missions including UNMISS, UNIFIL, MONUSCO are expected to do the same by 30 June 2021.

Many sites experience a high load variability due to both daily variations in occupancy and seasonal weather patterns (in particular due to cooling/heating). In such scenarios, the use of non-synchronised generators leads to oversizing to meet the peak loads, resulting in a low average load factor and therefore low generating efficiency (i.e., low amount of energy produced per litre of diesel fuel consumed). This is exacerbated by missions' common energy infrastructure set up, formed of small islanded grids of non-synchronised generators, which multiplies the inefficiency. Based on analysis and results in missions (see *Mission level status and gaps* section), and the relatively low-cost investment of this activity (investment regained within 3-4 years, as almost 90% of the energy costs from diesel generated power over a significant sample period is OPEX), generator synchronisation was a key area of focus in Phase 1.

As for renewable energy, the SOR for the new system contract for solar PV systems that includes lithium ion or similar energy storage instead of the previous lead-acid batteries was finalised with contract award expected for Q3 2021. The contract SOR includes provision for an energy management system, ensuring power production stability and remote control and troubleshooting to support mission engineers in the operation and maintenance of the systems. Given the significant decrease in renewable energy market prices (almost 50% in the last 10 years), the new contract will make it much more economically viable for missions to execute renewable energy projects. Meanwhile, the current contract was amended to include enhancements such as a "power plant manager", and manual panel cleaning systems.

Building Infrastructure

Missions operate in countries with the highest solar insolation in the world, leading to excessive heating of the building envelopes. For logistical reasons, there is a high reliance on prefabricated buildings resulting in significant use of "active" cooling through energy demanding AC units. Improvements to building infrastructure are therefore an important opportunity to reduce energy consumption. During Phase 1 the global systems contract for the prefabricated units became available to missions. The new units are specified to be thermally more efficient, with double glazed windows and better wall insulation. Optionally included were double roofing systems, and some missions also implemented low-cost solutions (e.g., sails and tree planting). Investigations into the extent by which these improved characteristics have been realised in the challenging operational contexts of missions is ongoing in order to inform the next generation contract for such units.

Contingent Owned Energy Equipment

Energy delivered by T/PCCs though their own equipment represents a high share of the total energy use. Despite the small proportion of this energy which is metered, estimates from fuel consumption and from available metered

readings suggest that this makes up more than 30% of the total, and that production is generally less efficient than for UN owned equipment. This is largely due to the electrical set up of T/PCC camps, often having 2-3 internal grids serviced by small (less than 100 KVA) non-synchronised generators.

Conditions to stimulate improvements in contingent-owned energy infrastructure were introduced, mainly through the development of issue papers for the 2017 and 2020 amendment of the COE manual, where improved reimbursement rates for low penetration renewable energy systems and for more efficient diesel generators, were added. Uptake by T/PCC was slowly underway in 2020 (e.g., Bangladesh in MINUSCA and South Africa in MONUSCO) but could be greater. Based on assessed opportunities for improvement, some missions, in close collaboration with their T/PCCs, have initiated discussions on their energy infrastructure management plans in order to transition to more sustainable energy sources in line with the MOU. Such opportunities can include swapping COE for United Nations Owned Equipment (UNOE) (or connecting to grid), with COE retained as backup, or transition of COE equipment to more efficient or renewable equipment. Examples of these already underway are provided in the discussion on mission progress section of this document.

A closer collaboration with the Uniformed Capabilities Support Division (UCSD) was established to improve support to the planning and specification of contingent owned energy infrastructure, before and during troop deployments, including through MOU and statement of unit requirements (SUR) amendments and benchmarking of T/PCCs across missions on energy performance parameters.

Transport

A significant source of fossil energy use is transport, accounting for roughly 40% of the total greenhouse gas emissions, split between road (13%) and air (31%). Air travel is further divided between commercial (2%) and mission aviation (29%) – i.e., to and from missions, and within missions, respectively. Both are relatively stiff to change with little flexibility over the requirements in response to mandate and operational needs. There is a strong cost incentive to rationalise use at all times and occupancy statistics are continuously monitored by MovCon.

Fuel use in road transport can be split between UNOE (42%) and COE (58%), with little flexibility over the COE component (in either the types of military vehicles, or their use for mandated activities). UNOE vehicles are actively managed and monitored through a system called Carlog. Idling policies are in place, and statistics monitored, to reduce fuel consumption. The HQ promulgated transport manual promotes a more efficient use of transport resources in order to be more environmentally friendly and cost-efficient. The manual provides a strong strategic push towards diversifying and right-sizing the global vehicle portfolio, i.e., moving away from sport utility vehicles(SUVs) to is light-duty vehicles (LDVs) where possible in order to achieve fuel efficiencies of up to 40%. During Phase 1, Hybrid vehicles have been introduced in a few missions including UNFICYP and UNMIK.

Other GHG emission Sources

As part of a broader UN effort to report on its environmental footprint, field missions have been reporting on GHG emissions for some 10 years. However, a number of gaps were identified and addressed in Phase 1. For example, while fuel records formed the basis of GHG reporting, the use of grid electricity (although small) was not consistently reported. Refrigerants were included but were pro-rated on a per capita basis using an analysis done in 2010. In 2019, thorough examination of refrigerants was completed and reported. While the volume of refrigerants used in missions is much smaller than the fuel consumed for both energy production and transport, the extremely high global warming potential (GWP) of refrigerants commonly used for active cooling causes emissions from this source to account for roughly 9% of the total greenhouse gas emissions. The biggest

contribution is from air conditioning units, which presently use either R22[11] or R410A, and reefer/fridges which mostly use R134A, all of which have high GWP. As noted elsewhere in the strategy, a new SOR was developed that specifies a low GWP of less than 675 for AC systems, and the existing split AC system contract was amended so that the systems most widely used in missions are now available with a low GWP refrigerant (R32). These specifications are available for use in local procurement and policy requirements are being updated to ensure compliance. An under-explored area of GHG emissions is methane from landfill. As some missions bury wastes, cursory analysis on the GHG footprint has been completed. This indicates that GHG from landfill (i.e., methane asa result of anaerobic decomposition) may range between 1 and 5% of a missions GHG footprint. Thus, while not significant, it is not insubstantial. All of the above has resulted in a robust basis on which to report missions' environmental impacts and offset GHG emissions in line with the UN Secretary General's commitment on climate neutrality by 2020.

Deployment of Renewable energy

The renewable energy share of missions increased slightly in Phase 1 and more detail is provided in the mission-specific section of this document. Overall, on-site solar photovoltaic (PV) increased, but it still remains a small component of just under 2% of electricity supply. Grid connections to national/local grids with a share of renewable energy provided another 3%, though activities in this area are heavily constrained by the availability of local renewable energy grid infrastructure. Two missions, UNSOS and MINUSMA, have explored new ways to overcome some of the limitations discussed in the strategy through the piloting of outsourced renewable energy supply ("energy-as-a-service"), with contracts expected for implementation in Phase 2.

Gaps to be addressed in Phase Two

While significant progress has been made in Phase 1 to introduce robust planning mechanisms to support mission development of an energy upgrade strategy, further assistance is required to support the implementation of the projects in Phase 2.

EIMPs and Energy Project Management

Although the SOP on EIMP includes a template Energy Project Plan (EPP), given the number and geographic dispersion of projects missions need to manage and execute, there is a clear opportunity in Phase 2 to expand on the EPP concept by strengthening project management in order to allow missions to readily plan, approve, monitor and keep records of projects executed. This would support mission's efforts to report back to budgetary committees on implemented project costs and the associated savings and environmental benefits measured through a range of parameters including fuel consumption before and after. As a small number of EIMPs were completed prior to the promulgation of the *United Nations Secretariat's Climate Action Plan* (UNSCAP), some review and update may be justified to ensure alignment with the Secretary-General's aims. EIMPs could also more explicitly address contingent owned equipment.

Energy data

Despite significant advances in improved tracking of fuel since 2018 (particularly in diesel fuel in vehicles), analysis of recent fuel data still reveals discrepancies. This requires further investigation so that progress on the implementation of the strategy can be conclusively demonstrated in Phase 2. (The sources of the inconsistencies are still being investigated but are most likely to be caused by scope issues, e.g., fuel used by hosted UN entities).

[11] As the most widely used hydrochlorofluorocarbon (HCFC), R22 has been replaced in new equipment with R410A and R134A hydrofluorocarbon (HFC) refrigerants in accordance with the Montreal protocol. The Kigali Amendment to the Montreal Protocol (1 January 2019), established a phase out of HFCs by developed countries by 2020 and by developing countries by 2030.

The current roll out of energy meters will support significant improvement in the measurement and analysis of electricity production. As roll out is anticipated to take time (likely to at least the end of the strategy period, as it requires the installation of thousands of meters), existing systems such as eFMS will still be the main source of data until then. Both the FRIM (Field Remote Infrastructure Monitoring) and the eFMS platforms are complementary, and work is underway to ensure they are integrated, and functionality not duplicated. Strategic planning of FRIM roll out is required to prioritize the locations where data metering will most usefully drive environmental improvements. Standardization of parameters to ensure that mission engineers run energy infrastructure more optimally (e.g., allowing remote monitoring of diesel generator parameters) is also required, with work already underway (e.g., the recent FRIM workshop in February 2021 which engaged more than 140 participants from a range of entities, who represented various technical areas towards this effort). In addition, future solicitations of equipment should include compatibility requirements for electronic meters.

Deployment of Renewable energy[12]

The focus in Phase 1 on renewable energy has been mostly on "inside-the-fence" projects. Progress has been hindered by various factors summarized in the *Mission level status and gaps* section. The main constraint at the system level is the current high installed unit cost of the solar PV systems (~US$3,000/kWp) purchased through the global systems contract (due to the relatively low scale, the tender process attracted resellers and not manufacturers). In addition, because RE technologies are advancing quickly, the current contract models are not effectively/flexibly designed to capture the advances in market.

Fit for purpose sourcing solutions are already a considerable area of focus for DOS. The ongoing work on Category Management focuses on developing a forward-looking, strategic view on goods and services, as well as the new contract solutions needed by field missions and other UN entities. The core objectives are to obtain competitive prices, leverage economies of scale, reduce risk and liabilities and accelerate project execution so that the benefits can be realized as early as possible. There are successful examples within the UN in the use of pre-qualified turn-key contractor LTAs, such as by the United Nations Development Program (UNDP). These should be examined, and potentially leveraged through the office of Supply Chain Management promulgated guidance *Acquire through Cooperation with UN Organization*, effective January 2021, which recognises that cooperation in procurement among organizations of the UN System can bear significant benefits due to economies of scale, reduced transaction costs, agility and improved relations with contractors.

Some "inside the fence" energy use is outside of the UN's operational control. For example, the Food Rations Warehouses are managed by a contractor and are usually powered through diesel generators, likewise canteens.

[12] Provided here is a brief explanation of various terminologies relating to electricity supply:

Grid vs Off-Grid: Readers will be familiar with electrical grids: generally large national or regional networks that connect electricity generation (usually from multiple sources) to users, through a transmission network. In most cases the transmission is high voltage to reduce network losses. Due to their scale, grids are generally built, managed and regulated by governments, but there is increasing use of private providers in the provision of both power generation and customer services. In most of the countries where missions operate, such a network is either entirely absent, or unreliable, and most missions generate their own power, off-grid. The simplest off-grid networks are a single power source with multiple users. However, in large "super camps" the UN may operate a "mini-grid", connecting a number of generation sources. In some missions, medium voltage transmission is being investigated to reduce system losses, like in a national grid.

Inside-the-fence vs outside-the-fence: This refers to the physical location of the power source, not the way in which it is connected. While off-grid generation is usually inside-the-fence, and the grid outside-the-fence, this is not always the case. For example, the mission could have an external service provider generate and deliver electricity from outside of the camp (e.g. due to space constraints), without the power plant being connected to the grid. Likewise, a power source inside the camp could be connected to the grid. A common example is where self-generated PV is supplementing a grid supply. In these situations, there are advantages in connecting to the grid, so that it may take excessive supply (sometimes attracting a feed in tariff, or payment, for the supply).

Outsourcing: There are a range of outsourcing models. The simplest is the engagement of a local contractor to assist with the construction and sometimes operation of a UN installation. More complex engineer, plan, build and construct models, leave much of the work to the contractor. "Energy- as- a- service" models generally allow for the contractor to maintain ownership of the infrastructure, with the UN Client paying regular service fees only, thus mitigating budget constraints for the high capital costs of owning the infrastructure. There are several models such as Power Purchasing Agreements (PPA) and leasing arrangements, for example. Outsourcing can take place inside-the-fence or outside-the-fence, and off- or on- grid, though the latter is subject to the regulatory conditions of the local utility market.

Future contracts will specify the use of renewable energy, though this will likely require some technical investigation and support to requisitioners to ensure there are no unintended consequences to energy supply.

Phase 1 demonstrates that there is substantial scope for outsourced, "outside-of-the-fence" initiatives to reduce the missions' cost of energy (particularly capital expenditure) and greenhouse gas footprint. They also reduce the burden missions experience at drawdown having the potential secondary benefit of anchoring renewable energy capacity that could be sustained after the departure of the mission. In addition, these project types may be combined with projects that provide local communities with an immediate sustainable source of energy and/or leave a positive legacy. These a currently relatively novel to the UN, with complex contractual arrangements that may include multiple project parties (UN, private sector, government) or multiple bilateral contracts, and/or multi-year contracts with guaranteed payments to vendors (e.g. "take-or-pay" clauses typical for energy supply contracts). In order to increase the pace and scale of implementation of these projects and avoid repetition of work across missions, there is an opportunity to explore the central development of standard SORs and contractual templates for energy outsourcing projects, including necessary conditions vetted by the Office of Legal Affairs (OLA), and to find solutions to optimise project implementation timeframes.

Building Infrastructure

A range of competing priorities and constraints have led to cases of extended use of TCC-sustained tentage beyond the six months of T/PCC deployment. Such instances need to be minimised to improve efficiency (tents are still airconditioned, but with very poor insulation). While efficiency enhancements were made to the systems contract for prefabricated buildings, there is an opportunity to explore new solutions, addressing shape and materials used, among other factor, through consultation with third party specialists (e.g. national defence/military specialists, sustainability architecture firms and/or academia). Introducing durable, efficient building infrastructure solutions would reduce disposal volumes (especially at mission liquidation) and potentially provide structures that could be utilized by the host government after the mission's departure.

Contingent Owned Energy Equipment

Greater emphasis could be given to individual T/PCC energy performance indicators (e.g. fuel consumption per capita) using existing fora (e.g. CMMRB meetings, COE performance framework) to identify opportunities and generate enthusiasm for improvement. The "T/PCC fuel challenge" pilot currently ongoing in UNMISS, for example, could be replicated across missions. Metering and monitoring of COE equipment would need to be improved to assist energy audits of T/PCC sites within the mission's EIMPs and to prioritise execution of energy upgrade projects.

Maintenance is one of the key factors affecting diesel generator operating efficiency, but presently this is not thoroughly checked through COE inspections (inspection is generally limited to analysing spare parts availability for maintenance).

On the renewable energy front, despite the inclusion of reimbursement rates in the COE manual, no renewable energy solutions were deployed by T/PCCs. This needs further discussion with T/PCCs to understand reasons, but may be due to:

- Unsuitable payback time of initial investment through the current reimbursement rates.
- Uncertain duration of T/PCC sites.
- Lack of previous experience in operation and maintenance of this equipment.

The first issue would require further engagement with T/PCCs to explore adequate incentives, which could be introduced either through amendment of the COE manual at the 2023 COE working group (WG) or by using specific contractual agreements such as letters of assist (LOAs). The last two issues may be able to be partially resolved

by introducing containerized ready to use turnkey solutions which can be easily redeployed, following the example of the range of mobile products currently developed and deployed by SGITT/UNGSC.

WATER AND WASTEWATER

Progress in Phase One

At the beginning of the strategy, review of key performance indicators introduced under this pillar revealed a shortage of data and inconsistency of assessment. Per capita water measurements were not consistently in place and reported, and where provided, it was largely based on planning per capita assumptions sourced from the Engineering Support Manual (1998) and/or the Mission Start-up Field Guide (2010) rather than actual consumption figures. Reporting of wastewater risks was inconsistent, requiring significant work on the definition of a methodology. What was clear however, was that significant risk was present in several missions.

In 2015 the Logistics Division (then Logistics Support Division) initiated a baseline study across all missions on wastewater management. With the support of the Global Service Centre, an early model of the current wastewater assessment methodology was developed and tested through dedicated field visits to ONUCI, UNMIL, UNISFA, UNSOA/UNSOS, MINUSCA, MINUSMA. The strategy introduced Interim Risk Mitigation Plans in response to the findings of these site-level assessments, providing structure to the priority mitigation of these risks.

The overall situation included reliance on four system contracts for water treatment plants, wastewater treatment plants, pumps and plumbing materials; reliance—in some instances—on wastewater disposal through outsourcing to unknown or inappropriate locations, and water and sanitation teams dependent on individual contractors in most missions. Additionally, water and wastewater quality monitoring was, and remains, non-uniform in its application. The situation on the ground now across all missions is very different, however. DOS' insight across these topics at site, mission and global levels has increased, even though the engineering solutions continue to be a work in progress. With this greater knowledge of the realities in the field, Phase 1 has ensured that the definition of what is expected has been developed, consulted, and endorsed, in close collaboration with field subject matter experts, in the draft Water and Wastewater Guidelines that will be promulgated in Q1 2021.

Risk Mitigation Plans

Addressing wastewater risk has been a major priority during Phase 1 of the Environment Strategy due to the potential gravity of impact on local populations, staff and the reputation of the UN. Risk Mitigation Plans (RMPs) were developed for six (6) missions early on in the strategy implementation period (UNSOS, MINUSMA, UNISFA, ONUCI, UNMIL, and MONUSCO). The aim of the RMPs was to urgently mitigate all cases of significant risk in wastewater management as a top priority through either:

- Control of the source (e.g., closure of camps, removal of sewage elsewhere, etc.)
- Management of the pathway (e.g., add infrastructure capacity, improve drainage, etc.)
- Protection of the receptor (e.g., erect physical barriers, notify communities that water not safe to drink, etc.)

A template was developed in 2018 to provide consistency and clarity to missions on minimum expected content where significant wastewater risk had been identified and reported. Missions were then able to modify the elements to suit specific contexts and supported with technical assistance. All six (6) risk mitigation plans have been implemented. Significant risk was subsequently identified in two (2) further missions during Phase 1 (UNMISS and MINUSCA). At the end of the 2019-2020 cycle, all but one mission had fully implemented the risk mitigation plans.

Risk Assessment Methodology

The risk assessment, built into the eAPP, is conducted using a site-level methodology that identifies the level of risk as significant, moderate or minimum with respect to potential exposure to untreated human waste, using a source-pathway-receptor model.

The site level risk assessment provides information at two key points of the wastewater management process, within the camp and at a downstream point if wastewater is discharged beyond the camp boundaries. A site is defined by consideration of:

- Physical and operational boundaries i.e., the scope/extent of an entity's control;
- Ownership (e.g., TCC/PCC) and/or operational use (e.g., civilian offices/accommodation, contractor operational area (e.g., fuel storage), waste disposal yard, etc.);.); and
- Integrated camps and the need to assess based on the individual sites comprising the larger camp.

The overall outcome of the site-level methodology provides responses to the critical questions (a) is there a source of pollution from this camp that can migrate, and (b) what is the level of internal controls? At the downstream point, where wastewater may be disposed off-site, the assessment is based on licencing, the engineering on the site as well as its location in relation to the surrounding environment and communities, among other considerations. The risk is classified as significant, moderate or minimum based on a pollutant linkage in the source-pathway-receptor model i.e., all three must exist for there to be risk.

The process of risk assessment is owned by the Mission and included as indicators in the eAPP. Where there is black or greywater discharges and possible linkage to a receptor identified, GSC then initiates an analysis to establish if there is a pollutant linkage. This assessment leverages remote sensing technology and satellite imagery available through GIS to add a level of accuracy to the initial site assessment by taking the local/surrounding environmental conditions into consideration and applying existing scientific analysis. Through GIS remote sensing, it is possible to establish/confirm if there is a receptor (community/crops/animals) and the likelihood that there is a pathway from the source of pollution to the receptor. The likelihood depends on population at the camp, proximity to the receptor, topography (determines the direction in which surface and groundwaters flow through modelling), weather and geology.

This process is captured in an SOP on the determination of significant wastewater risk and reporting for field missions, which will be formalized in Q2 2021.

Practical mission approaches in Wastewater Treatment and Sludge Management

Since the launch of the strategy, two water and wastewater trainings have been centrally organized to support missions. The first was hosted in Brindisi in 2018 and focused on water and wastewater quality to reinforce risk management. The second was hosted by UNIFIL in 2019 and aimed at investigating alternatives to the traditional modularized treatment plants. The 5-day training was attended by 28 participants from across 16 missions. The five-day programme exploited a variety of training formats such as speaker presentations, site visits, group discussions and games to engage participants and share knowledge. Key topics included UNIFIL case studies, wastewater treatment plant design theory and alternative technologies; operation and maintenance best practices vs. challenges; sludge management and disposal; water and wastewater guidelines; planning and budgeting including case studies from UNIFIL and MINUSMA; Umoja and global system contracts; internet of things solutions, including geographic information systems (GIS) for risk assessment and Field Remote Infrastructure Management (FRIM) for wastewater treatment plant monitoring.

Prior to the strategy, as well is during Phase 1, there were also training events organized through the range of global systems contracts available (in individual missions and/or centrally across missions, in Brindisi, or at the manufacturer's location). These were supplemented by additional training on commissioning and water quality testing by a REACT technician at numerous missions.

Wastewater Treatment Solutions

In Phase 1, significant activity was conducted by both missions (summarised in the *Mission level status and gaps* section) and via the REACT support mechanism (summarised in the *Technical assistance* section) to repair existing, and commission new, modularised Wastewater Treatment Plants (WwTPs). Via direct systemic support, this effort resulted in 64 plants receiving maintenance (regular and extraordinary), 14 plants commissioned, 101 staff trained in operation and maintenance of WwTPs, 8 staff trained in water quality and effluent laboratory testing, and 21 staff trained on monitoring of WwTPs and recommended daily and monthly reporting. But much more was completed by missions (both preceding and during the first phase of the strategy), such that by the end of Phase 1, 374 WwTPs were operational with a further 10% more to be commissioned.

Technology Innovation

To optimise the requirements of the eAPP reporting against mission resources, a risk assessment App (Environmental Risk Assessment for Wastewater/ERAw^2), derived from the risk assessment methodology, was developed during 2018/19 with the support of the Client Solutions Delivery Section (CSDS/SGITT). The main objective was to help field personnel capture the bulk of the data during the assessment itself and therefore reduce the time and effort needed to report following the site visit. The App is linked to the Common Operational Geospatial Information (COGI) database. It can georeference site information, allow for photos to be uploaded and enable all questions in the risk assessment methodology to be answered in the form of in-built dynamic checklists. The other benefit is that as soon as the data is uploaded, any risk triggers can be added to the mission's action plan and flagged for possible technical assistance. This data is linked to the eAPP, and the application will be leveraged to provide mobile assessments and data readings across all pillars in Phase 2.

Another cost-effective solution that was developed to support missions in wastewater risk assessment includes the use of GIS remote sensing techniques in the form of both spatial (change over distance) and temporal (change over time) analysis. The approach was used in support of UNISFA, UNMISS and UNAMA and served in each of these cases to determine proximity to a possible receptor, topography (determines the direction in which surface and groundwaters flow through modelling), weather and geology. Remote sensing is now an established, effective and efficient approach for routine analysis of surface water quality that can be integrated with conventional in-situ measurements. The technique reduces costs by providing continuous coverage of target environmental processes.

The connection of wastewater treatment plants to the Field Remote Infrastructure Monitoring (FRIM) platform in UNISFA, and more recently in MINUSCA, has enabled the limited human resource numbers in these missions to increase their effectiveness. Alerts that can be viewed from anywhere and anytime have reduced response times and increased the missions' abilities to prevent incidents. The use of extended and augmented reality (through the use of 3D glasses) is also increasing remote support and oversight within the mission.

Other initiatives that are underway include the installation of smart water meters (currently available through two global systems contracts), the piloting of smart water and wastewater quality technologies in UNISFA, MINUSMA and UNIFIL, and the introduction of smart groundwater monitoring solutions.

The Water and Wastewater Guidelines

In 2013, the Logistics Support Division (now the Logistics Division) established a task force to develop a water policy for field missions. At the same time, the waste management policy, promulgated in 2015, was under development. The task force included mission representation from UNAMID, UNIFIL, UNMIL, and from GSC. A draft was completed in August 2014 and was thereafter in informal circulation. Two debates persisted however,

(1) if the guidelines/guidance is not policy, how can it be considered mandatory, how can it be enforced, and how can compliance be assessed or realized, and (2) what about wastewater?

The drafting of the complete water and wastewater guidelines began in February 2020, pulling on elements of the earlier water guidance and developing the wastewater objectives from scratch. This effort was centrally led as a key Environment Strategy output, necessary to support missions to achieve the infrastructure and practice expectations that have been established in the eAPP. The process incorporated the efforts of a dedicated task force and stakeholder consultation throughout the process.

Regarding water supply, the overall principle is to move away from a supply-based attitude towards an integrated supply and demand management approach which incorporates the value of multiple uses of water, as well as demand management, to sustainably meet the needs of peacekeeping operations. In terms of wastewater management, the overall policy directive remains that there shall be no discharge of wastewaters directly into streams, rivers or other bodies of water without prior treatment. Further, there are strengthened requirements for risk management so that missions can operate at minimum risk to personnel, local communities and ecosystems, leaving a positive legacy wherever possible.

The Water and Wastewater Guidelines are set for promulgation in by mid-2021.

Communications and Competency Development

For the duration of Phase 1, there was proactive engagement with, and positive feedback from, a crosscutting spectrum of mission and HQ stakeholders. These communities of practice provided a platform to coordinate, advance and reinforce development of engineering and environment best practice and sharing. The working group met monthly, averaging 10 meetings per year and discussed, *inter alia*, the following topics:

Experience sharing from Missions on various technical topics:

- Air to Water generator pilot project (MINUSCA)
- Outsourcing Water and Wastewater Management services (MINUSMA, UNSOS)
- Wastewater Risk Mitigation Plan implementation (UNISFA)
- Wastewater risk assessment and Risk Mitigation Plan (UNMISS)
- Environmental Risk Management in the context of COVID (UNAMID)
- Decentralized Wastewater Treatment Systems (UNAMA)
- Built in place wastewater treatment facilities projects (MINUSMA, UNISFA, UNMISS)
- Guidelines on Contingency Planning in the context of COVID (UNMISS)
- Water and Wastewater Management improvement in Zalingei (UNAMID)

Technical presentations:

- Remote monitoring in Wastewater management: FRIM, Smart Sensors, IoT
- ERAw2 mobile application for wastewater risk assessment
- Wastewater risk assessment methodology revision
- MEAP / eAPP performances for the pillar
- Water and Wastewater guidelines development
- SSU online database presentation
- Water and Wastewater sourcing solutions questionnaire (Category Management)
- Demand planning process

Water consumption data and reporting

Concerted efforts to gather and report on water consumption across some 400 sites has been a significant achievement. Fortunately, many extraction sites (predominantly groundwater boreholes) had analog meters with straightforward readings being able to be taken, often by contingents themselves. Although sub-metering is less common, missions have been able to report on system losses (particularly from water treatment), which can be significant in areas of saline groundwaters. While some missions had already initiated best practice in groundwater monitoring (e.g., in UNAMID), this was the exception, rather than the rule.

Gaps to be Addressed in Phase Two

Water and Wastewater Management Planning

The Water and Wastewater Pillar targeted wastewater risk during Phase 1, from its definition/identification through to assessment and reporting. Risk mitigation plans that were developed and implemented in response to such risks were intended only for urgent risk mitigation to eliminate potential exposure to untreated human waste, via a source-pathway-receptor model.

Having made good progress on establishing this Risk-based decision making (RBDM) process, Phase 2 is focused on transitioning the considerable proportion of sites operating at moderate risk to minimum risk, and supporting missions upgrade of wastewater treatment infrastructure to more appropriate technologies and systems, such as built-in-place conventional activated sludge plants. An SOP to guide missions on the development of Water and Wastewater Management Plans would provide missions with a solid and practical tool. This tool will also define the specific considerations that may need to be addressed where the cost-benefit analysis points towards a shift to built-in-place wastewater treatment systems e.g., consultation with local authorities.

Shift to Built-in Place Wastewater Treatment Systems

The strategy brought some of the inadequacies in on- and off-site wastewater management to the forefront.

Much of the immediate response to the acknowledged wastewater risks (including in the period preceding the strategy) was to install modular wastewater treatment plants though a central systems contract. The UN has since spent more than US$100 million in the cost of goods alone (of this spend, 36% has been on spares and consumables; this is a portion of the operational cost that excludes power and manpower). However, missions have faced challenges that include the need for hands-on operation by skilled operators, which is more demanding for remote sites; the need for 2-3 shifts of operators to keep the plants running; the disproportionately high operational costs – up to 30% of equipment cost is used for spare parts and consumables annually; structural failure in ageing plants and the high level of attention and effort required to organize personnel, records, spare parts, etc. All our biggest missions are relying solely on package wastewater treatment systems with an estimated design life of ten (10) years and the existing large fleet of modular wastewater treatment systems will be ending their working life. Costly breakdowns and extensive workovers are becoming more regular to keep them operational.

At least three of the biggest missions, MINUSMA, UNMISS and UNISFA, are now working towards a shift in their approach to wastewater treatment; from package systems to built-in place conventional activated sludge systems. This approach is based on experiences shared by UNIFIL where similar infrastructure has provided sustained wastewater risk management since 2008, treating significant volumes of wastewater at a small fraction of the capital and operational cost associated with package systems. The built-in-place conventional systems also have the advantage of being appropriate technology for handover or gifting upon site closure and mission liquidation.

Where appropriate, transition to new larger capacity, low complexity, effective wastewater treatment systems that are also able to be handed over at mission closure will require DOS technical input into the mission Water and Wastewater management plans and support the budget proposals across peace operations for multiple years. This will require ramping up engagement with Engineering Sections to facilitate project development and implementation. Template scope of requirements and tender packages for these systems will be needed from the Office of Supply Chain Management.

With increased emphasis on cost-effective solutions based on site-specific contexts, substantial technical assistance in the Water and Wastewater Pillar during Phase 2 will be required on design and engineering of built-in place systems, upgrades/troubleshooting/optimization of existing treatment systems, and cost optimization. In addition to this specialist skillset, support is required to missions in broader areas including, project and risk management, sustainability, conservation, pollution prevention and monitoring.

Expand the Catalogue of Goods and Services

For the range of camps that are more suited to prefabricated solutions, a wider catalogue of modules and sizes is required to allow water and sanitation specialists to meet demands and discharge requirements through greater choice. The Category Management Strategy is already working towards the provision of an expanded catalogue of goods to provide missions with a suite of equipment through global systems contracts.

Water and Wastewater Quality Assurance and Control

Quality management and assurance is a core part of providing water and wastewater services and the Water and Wastewater Guidelines will provide information on parameters and the frequency and methods for testing. However, there is currently no standardized reporting process.

Efforts can be made to transition from laboratory equipment that depends on, and generates, toxic waste. A good example of this is the Chemkey used by HACH. All chemicals and processes are entirety contained inside the Chemkey and after use it can be safely disposed of as plastic. There are also an increasing range of tests that can be achieved through probes (rather than test tubes and chemicals). Designing out these hazardous wastes is feasible. Many smart/intelligent probes are also becoming available, an example of this is the Proteus wastewater quality sensor, for which a series of pilots are underway in UNIFIL, UNISFA and MINUSMA. Real-time quality data will enable Water and Sanitation teams to respond better, to first focus on where the risks are greater, and to have an independent record of wastewater discharges; all within the constrained staffing envelope.

With greater treatment efficacy confidence through quality assurance we will benefit from a broader range of options to ensure effluent can be safely reused. This potentially provides opportunity for local/community initiatives, such as for irrigation. Close engagement with the UNCT (UN Country Team) and local development actors like FAO (Food and Agriculture Organization) will be key to realizing these additional benefits. On the other hand, real-time drinking water monitoring will provide much needed reassurance to support a sustained transition to less plastic for non-emergency drinking water requirements, increasing bans in some cases.

Alternative Water Sources

Where appropriate, separate collection of greywater for reuse will be promoted. Increasing the use of alternate water sources will require technical guidance within the SOP on the development of Water and Wastewater Management Plans. Where justifiable kits that can be centrally procured will be considered, including possible piggybacking on other Secretariat contracts. The push for water-efficient fittings can also be made to reduce demand. With FRIM and near real-time consumption monitoring, virtual billing could support behaviour change and increased sensitization.

Groundwater Mapping

Although good progress has been made in some missions on groundwater mapping and monitoring, these can be extended in the context of the management plan, in close collaboration with the Client Solutions Delivery Service in SGITT. The building and maintaining of a database of such initiatives can strengthen regional and local communities' capacity for sustainable monitoring and equitable utilization of groundwater resources. This data can also be passed on to host nations, helping to contribute to a positive legacy by peace operations.

Environmental Impact Assessment

Anchoring the Environmental Impact Assessment (EIA) SOP in the Water and Wastewater Pillar will be a key wider impact initiative. With the shift to built-in-place systems, more emphasis on the legacy of such infrastructure will be required and a much greater range of projects that have been subject to an EIA process with better documented outcomes and best practices established. The availability of a dedicated resource funded by Italy as Phase 2 of a project to “Get the balance right for UN peace operations” will be instrumental in delivering on this objective.

Technical Training

Capacity development of technical teams will be necessary to sustain the improvements beyond the strategy implementation period and will be a critical area for attention during Phase 2. A recent survey across all missions, as part of the work on Category Management, revealed gaps in awareness on fundamental business process including procurement, demand and integrated business planning, contract management, and so on. Enabling technical teams to drive, implement and sustain projects with operational efficiency and risk benefits will require a focus on training that extends beyond what is currently available through global systems contracts, which is limited in scope to equipment only. Engineering teams need the capability to identify the appropriate solutions and to justify, budget, plan and implement effectively.

Category Management

The implementation of an endorsed Category Management Strategy for Water and Wastewater Management aimed at enabling an optimized, integrated and robust, supply chain to deliver on the short- and long-term objectives of the Environment Strategy, for both goods and services, will be a cornerstone of the Phase 2 work. The implementation of this strategy will enable missions to meet the expectations set out in the Water and Wastewater Guidelines, in the Standard Operating Procedures to guide Wastewater Management Planning and in the Environmental Policy, all of which will provide a solid framework to support sustained wastewater management for peace operations, where the biggest Secretariat risks need to be carefully managed.

SOLID WASTE

Progress in Phase One

When the strategy commenced, at least 14 out of 20 missions were relying on disposal at unsecured and un-engineered external dump sites, many of which are prone to waste picking and open burning. These practices carry negative environmental and social impacts, including air and groundwater pollution, greenhouse gas emissions, long term land use legacy issues, and various health risks from poor air quality, decomposing food, and in some cases, physical risks to local communities due to poorly sited landfills (physical subsidence). In addition, some missions were relying on the use of dump sites at great distances from the waste generation source leading to financial and security implications as well as increases in transportation-related fuel and greenhouse gas emissions. In many cases, lack of volume minimisation (separation, shredding, compaction), increased hauling inefficiencies. On the positive side, hazardous wastes were found to be relatively well

segregated (i.e. prevented from entering the general waste stream), though this often led to stockpiles of materials due to lack of treatment/disposal options, which then became an acute problem at mission drawdown.

Since the launch of the strategy notable progress has been achieved in the improvement of solid and hazardous waste management across UN field missions as outlined in the following sections.

Approach

The REACT/ETSU waste technical team completed 16 technical assistance visits to the larger missions to assess waste management practices in order to provide mission-specific opportunities for improvement and to inform the strategic approach. The visits allowed for observations and direct staff consultations with a wide range of critical mission personnel (e.g., Property Disposal Unit (PDU), Environment, Engineering, Procurement, TCCs, Medical) as well as external vendors (e.g., service providers/contractors) to better understand the waste management issues, resource constraints, and challenges. As with all environmental technical assistance provided from HQ, immediate priorities identified during visits were provided to the missions in the form of a Technical Assistance Summary Action Plan (TASAP). Concurrently, common best practices and key interventions were provided in the form of generic actions in the Mission-wide Environmental Action Plan, supported by working group discussions and technical guidance notes. By the close of Phase 1, detailed Waste Management Plans were in place for each mission providing the critical steps and actions toward the achievement of sound management solutions aligned with the waste management hierarchy and the 4R principles (reduce, reuse, recycle, recover) and supported through long term system wide improvements. Moreover, the REACT/ETSU waste team provided direct inputs to the Category Management for Solid and Hazardous wastes for which the overall approach for improved waste management across peacekeeping operations as well as other UN entities is based upon.

Waste Management Plans

A key step during Phase 1 was the launch of the SOP and template for development of Mission Waste Management Plans (WMP) for UN field Missions (2018.30) whereby missions were required to develop a detailed WMP. The WMP is an overarching mission document that outlines the mission strategy, objectives and targets for the achievement of improved solid and hazardous waste management as well as a comprehensive description of the mission waste management system and procedures.

To date, 14 out of 17 missions have established their own WMPs (11 are signed off) and the process of self-evaluation and analysis enabled missions to better understand the strengths and weaknesses of their existing waste management systems. This resulted in Missions developing clear improvement strategies and actions, often supported by performance targets, as well as more focused waste management documentation and reporting, budget development and defined internal feedback cycles.

While WMPs are tailored to the mission context, common approaches to be adopted include:

- The development of appropriately sized centralized waste management yards (WMYs) fitted with a suite of waste management equipment including incinerators of various sizes, shredders, balers and compactors, bulb crushers and woodchippers to improve recycling and disposal options and composting of organic wastes.
- Development of improved supply monitoring and stock inventory (for the management of hazardous materials related to rates of usage and expiration) and implementation of processes for the ongoing standardised treatments of hazardous wastes (to address accumulating stockpiles in order to ease waste operations on mission drawdown).

- Waste minimisation initiatives such as the use of water fountains and reusable water bottles with the cessation of using single-use plastic bottles and plastic bags across mission canteens and PX outlets.
- Engagement of higher quality local, regional and global service contractors through using improved Scopes of Requirements/Works for solid, biomedical and hazardous waste services.

Consistent with the approaches outlined in the WMP Templates annexed to the SOP and a specific technical guidance note, the development of WMYs at missions will, over the longer term, enable the majority of solid wastes to be diverted from current disposal in un-engineered landfills and dumpsites. Moreover, implementation of increased solid waste incineration, composting of organics and waste volume minimisation will reduce transportation costs as well as GHG emissions (even when taking into account incinerator emissions), due to reduction in methane emissions. The construction and operation of WMYs across missions will require consideration of Environmental Impact Assessment to ensure all environmental aspects are reviewed and appropriate mitigation measures put in place to minimize environmental and human health impacts.

Waste Management Equipment

Key to the success of WMYs is the supply of high-quality waste management equipment. Significant efforts have gone into developing technical specifications for a range of key waste management equipment, including waste incinerators, woodchippers, shredders, compactors, and balers. To ensure consistent approaches in commissioning, training, operations and maintenance, a systems contract was determined as the sourcing solution for these products. To ensure fit for purpose equipment and solicit likely demand, a survey was conducted with missions to gauge the approximate quantities and sizing for the suite of waste equipment suited for placement in new WMYs. As of early 2021, the systems contract is in the final stages of evaluation before contract award recommendation and review of the headquarter committee on contracts (HCC).

Guidance Materials

Extensive guidance materials have been developed, or are in preparation, to further support missions to improve their solid and hazardous waste management.

A key challenge identified at UN missions is the accumulation of hazardous material and waste stockpiles, especially during mission liquidation, as emphasised by the extensive clean-up operations required at UNOCI, UNMIL, MINUSTAH and currently conducted at UNIOGBIS and UNAMID. Hazardous wastes primarily result from end-of-life equipment, or from expired or unneeded/despoiled products/chemicals/ reagents/pharmaceuticals. These are derived from both the civilian component, and the police and military contingents, particularly from hospitals and clinics.

To ensure that accumulated hazardous wastes are safely and correctly treated to avoid environmental and human health impacts, technical advice notes were developed that detail the treatment method to be used (e.g. neutralization, alkaline hydrolysis, encapsulation), the potential risks of the procedure and any mitigation measures required, as well as the personnel and equipment resources needed.

Banned refrigerants used in older heating, ventilation and air conditioning (HVAC) and refrigeration equipment have also caused some issues due to their high Ozone depletion (ODP) and Global warming Potential (GWP) and the difficulty in dealing with remaining gases after the equipment's end of life.

During Phase 1, a total of 16 hazardous waste advice notes were prepared to deal with a wide range of hazardous materials, including:

- solid and liquid chemicals (e.g. acids, alkalines & pesticides);

- lead based and toxic paints;
- fluorescent lamps;
- expired pharmaceuticals;
- unused bitumen; and
- toxic waste x-ray solutions.

A series of general waste technical guidance notes were also developed to further promote and support actions and preventative measures for improved waste management. These include specific guidance on:

- excavation and bioremediation of diesel and oil contaminated soils (emphasising the need for proactive efforts to prevent this type of pollution);
- aerobic and anaerobic composting techniques;
- development of centralized waste management yards;
- criteria analysis for improved waste management solutions;
- plastics recycling options;
- paper and cardboard briquetting; and
- anaerobic bio digestion for biogas energy recovery.

In some instances, these notes have been referenced by the Board of Auditors when assessing environmental performance and compliance.

Several inputs were also provided for COE manual revisions 2017 and 2020 on the upgrade to digital X-ray machines and biomedical waste management and incineration.

Soil remediation activities occurred in several missions (ONUCI, UNMIL, MINUJUSTH and UNAMID), which involved clean-up and bioremediation operations followed by continued phytoremediation and monitoring of sites using the Normalized Differentiation Vegetation Index (NDVI) by UNGSC. NDVI enables ongoing attenuation of the remediated areas to be identified beyond the lifecycle of the mission through analysis of satellite imagery.

Guidance was also provided to missions on the destruction of ballistics protective equipment such as blue helmets, ballistic plates and Kevlar protective jackets and equipment, including the need for proper verification and provision of 'end of life' certification for these materials.

COVID-19 Response

The COVID-19 pandemic in 2020 has resulted in increased generation of infectious wastes from the increased use of personal protective equipment (PPE), especially for masks across mission sites. At the early stages of the pandemic, missions were contacted on a biweekly basis to gain updates on the impacts of COVID-19 on waste management operations and this information was fed directly into the C19 Pandemic Field Response (key risk factors) dashboard managed by UN HQ. In order to adequately prepare missions for COVID-related wastes a guideline was developed and distributed that included best practice handling, segregation, collection, storage and safe disposal protocols of infectious wastes, including the use of sodium hypochlorite (i.e. bleach) disinfecting solutions. To deal with COVID-related wastes, an emergency contract for the supply of barrel incinerators with air incineration was implemented, with missions procuring approximately 150 units to date. These incinerators are also an ideal option for use at forward operating bases (FOB's) or remote sites for solid waste management and will benefit MONUSCO, UNMISS, UNSOS and MINURSO over the longer term. Technical assistance was provided

to missions in developing standard operating procedures (SOPs) and contingency plans to aid them in better coping with the environmental impacts arising from the response to the pandemic.

Waste Working Group

All the above guidance materials as well as specific mission achievements and initiatives have been actively shared through presentations and roundtable discussions during monthly Waste Working Group meetings. These have been invaluable for bringing together relevant personnel from the missions, UN HQ and waste experts and have provided a key platform for refining existing approaches or developing new ideas and initiatives.

Waste Management Officers

Multiple missions either engaged or reassigned personnel as waste management officers during Phase 1. To support missions, a roster of waste management officers (WMO) at the P3 level was completed. To date, WMOs are in place in MINUSCA, MINUSMA, and UNISFA. Additional WMO positions are expected to be needed as more missions build out their WMYs and increase the need for focused management oversight.

Operational Procedures

Revised standard operating procedures and upgraded service contract templates for solid and hazardous waste operations have been developed centrally for use by missions. These include SOP templates for solid and biomedical waste handling, collection and disposal, including WMY development specifications, incinerator operations and maintenance, and correct storage and segregation of hazardous wastes according to hazard and compatibility. SOR/ Statement of Works (SOW) service contract templates have also been developed to assist missions with local and regional procurement activities. These include minimum standards of best practice and improved requirements for technical evaluation and verification inspection of contractor facilities and capabilities.

Training

Comprehensive training programmes for incinerator operations, soil remediation and hazardous waste management (e.g. appropriate storage) were provided to ensure better technical knowledge and expertise for such activities and to further increase training capacity within missions. Hands-on training was provided at the 2019 Brindisi workshop for environmental and waste colleagues on hazardous waste management and treatment methods and contaminated soil remediation, using real world examples. In the absence of a suitably qualified service contractor, these treatments can now be conducted by UN personnel, ideally trained by, or under the supervision of, subject matter experts.

Reduction of Waste in the Supply Chain

A series of metric analyses were conducted to identify areas where supply of goods can be improved to minimize both environmental impacts and waste generation. Such an exercise was used to assess the packaging of Contingent Ration Packs (CRPs), and while some interventions were recommended, these were somewhat limited due to food hygiene requirements.

Take back schemes whereby the contractor is responsible for the removal of specific goods at end of life are a pragmatic but under-utilised option to reduce waste burdens in missions. A limited number of waste streams currently make use of takeback approaches (i.e., petroleum, oils and lubricants (POL), and printer cartridges) but good rates of take up indicate that expansion to other problematic hazardous goods and products could be expected to be equally successful. During Phase 1, a request for information (RFI) was conducted for take back of HVAC units, which indicated existing market capacity and willingness to provide services. Although limited to

HVAC, the situation is likely to be similar for other specialised products of interest to the strategy. Such requirements should be included, and if necessary, RFIs completed if there is a concern that such clauses limit market participation.

Electronic (e)-waste is considered by missions as one of the most difficult waste types to deal with, resulting in large stockpiles being accumulated across missions. E-wastes include a wide variety of electronic products that contain recyclable materials and precious metals that are considered valuable and are an attractive option for recyclers. During Phase 1, in collaboration with OICT and supported by Procurement Division, an RFI for an electronic waste recovery contract was issued that attracted a positive response from 16 global companies, leading to a draft RFP that is currently being reviewed. A recent EOI also elicited responses from more than 20 companies indicating a positive market reaction for such a contract. In the meantime, assistance was provided to several missions in their tendering for local e-waste contractors (MINUSMA, MONUSCO and UNAMID).

Gaps Remaining after Phase One

While there has been notable progress and waste management improvements during Phase 1 there remain many areas to be addressed and further consolidated during Phase 2. For example, both new efforts and strengthening of planned improvement initiatives and projects is required to ensure that targeted efficiencies and performance, improved standards, and overall operational compliance can be met within the expected three-year timeframe.

System Contracts

The Waste systems contract has taken longer than expected to be finalised, resulting in some missions commencing local procurement using the same specifications (with varying degrees of success); others are awaiting the global solution. Some emerging needs amongst the missions are not currently included in the scope and such ancillary items (e.g. automated incinerator feeders) could be a useful addition. Other sourcing needs have also been identified, such as automated composting machines, which could be procured locally or by establishing a systems contract to achieve competitive prices through economies of scale and ensuring common equipment across missions.

Waste Management Yard Operations and Maintenance (O&M)

Good equipment, operated well, is significantly environmentally superior to dumping waste and markedly cost effective in comparison to constructing and operating an engineered landfill. However, waste incineration is sometimes not well perceived due to the use of poor equipment or through improper use. Indeed, as shown in the figure below, even a poor-quality incinerator can give acceptable emissions results when operated correctly. Although best practice incinerators have engineering controls to ensure proper use (and thus it is highly recommended that automated incinerator feeders be specified, as noted above), it is expected that qualified service contractors will be engaged and trained to use either UNOE or contractor leased equipment. Missions intending to operate WMYs using in-house resources could be constrained by the 9-month cycle of locally employed IC's affecting operator continuity and requiring continual retraining to ensure effective operations.

Improved emissions through adjustment of the airflow fans

Overall recycling rates are low due to lack of local capacity. Recent investigations have identified some appropriate technological solutions that could be implemented by missions either on- or off-site. These include recycling of plastics using shredders, plastic moulders and reformulators to make plastic bricks, beams and tiles for construction use and pathways as well as other useful everyday objects, and conversion of PET bottles to PET floss that can be used as stuffing materials (e.g., pillows) or as insulation (with fire retardant). These approaches could be piloted and tested in Phase 2. There is a high potential to engage with local communities to identify collaborative and innovative projects for the utilisation of the above products for beneficial end point uses that do not have negative environmental impacts. Similarly, there is scope for community groups with the correct support and resources, especially in the initial stages, to conduct the above recycling themselves. However, it is important that a clear chain of custody is in place for any plastic materials passed onto downstream recyclers for audit records. At no stage should plastic wastes simply be passed on to become a waste problem elsewhere. The availability of new waste equipment in Phase 2, such as crushers, compactors and balers also make it more feasible to return recyclable products to the central WMYs to increase recycling rates, through reduction of volumes for transport.

Similarly, building on the guidance on composting in Phase 1, there has been further investigation into the production of biogas from organic material using a bio digestor. Once filtered, biogas can be used as a cooking gas or to produce electricity using specific biogas generators. If well managed, biogas recovery systems could help to make canteens and WMYs fuel independent at least for part of the day. A new guidance note is currently in preparation which outlines both small scale biodigester solutions and larger scale options that can be implemented by missions.

Supply Chain Management and Metric analysis

There is room for improvement in the supply of goods to missions to reduce waste impacts. More emphasis needs to be placed on improving supply contracts to minimize potential wastes and this can be achieved by specifying reduced or more readily re-used or recycled packaging. Prohibiting the use of certain hazardous and difficult to dispose materials can also reduce hazardous waste stockpiles. Improved supply chain analysis can be implemented using mass balance calculations of critical goods/consumables associated with significant waste generation. This would include metrics on general rates of usage, expiration and waste composition, in order to determine whether these goods should be better controlled through improved stock management, improved by design or packaging elimination, or substituted with alternative products and may even result in the banning of use of some supply materials. The Umoja Demand Planning and Supply Network Planning (DP/SNP) solution currently in development will be an important tool to source information and conduct analyses to improve the supply of mission goods and consumables. In addition, more emphasis needs to be placed on the application of life cycle assessments (e.g. input vs output ratio efficiencies) to more precisely calculate the Total Cost of

Ownership of a product. Such analysis should consider the quality standards/lifespan, ongoing maintenance and/or storage requirements, and the required mechanism and costs for its end-of-life destruction or disposal. Only when all these elements are known will a precise estimate be gained of the true costs and whether or not this actually represents best value to the UN for specific goods.

Furthermore, to better deal with accumulated end of life or expired hazardous wastes, improved inventory and monitoring is required, including waste retention triggers so that ongoing disposal is activated when a certain quantity of the waste product is reached. This ensures that disposal is conducted throughout the sustainment phase of the mission rather than being left to be dealt with during liquidation when downsizing can seriously hinder the capabilities of the mission to do so.

Takeback schemes can be further evaluated on a case-by-case basis for large supply and problematic goods to reduce accumulated stockpiles at missions. Key candidates include HVAC units and IT and communications equipment. Takeback would also be relevant for highly problematic wastes such as the toxic HACH Lange chemical oxygen demand reagents, for which this company can accept both unused and used reagents for recycling. Such schemes would likely be more cost effective over the longer term compared to acquiring specific service contracts (which are sometimes unavailable). Moreover, working with the vendor to set up and use effective reverse logistics (e.g. goods in, goods out) could result in other beneficial efficiencies (e.g. transportation costs). They may also lead to vendors themselves working with sub-contractors to set up local/regional recycling and disposal facilities to ensure lower costs, and as these would have to meet auditable best practice standards, could help to raise capabilities locally/regionally.

Inclusion of take back provisions for equipment under the new solicitations will not address existing stockpiles currently in the missions. A global hazardous waste disposal system contract could be considered as a potential solution. As noted above, such a solution should consider the use of local vendors, particularly if it raises local/regional capability.

Solid and Hazardous Waste Guidance Handbook

With many guidance documents already produced, and more required to be developed, there is a need to ensure the guidance is easily available. A comprehensive solid and hazardous waste guidance handbook with sections on systemic requirements for waste management, specific chapters on solid and hazardous wastes topics and a section on waste management training and awareness has been identified as a useful systemic output. This handbook would provide a valid reference document for missions on waste management and will represent a useful tool for waste management and environmental officers, environmental managers, engineers and leadership at the missions and across UN entities.

WIDER IMPACT

Progress in Phase One

Phase 1 of the strategy chiefly focused on “inside the fence” issues associated with the water, waste and energy aspects of field missions. In most cases, UN sites and camps are either brownfield sites (i.e. set up in existing facilities provided by the host country) or are very temporary (expeditionary or forward operating bases), without significant impacts on environmental aspects not addressed in the strategy (such as biodiversity). Nevertheless, an SOP on Environmental Impact Assessments and Guidelines on Environmental Clearance and Handover have been developed and issued to strengthen environmental considerations in the planning and drawdown processes. Wider impact issues are also addressed in Environmental Policy and Guidance, Directives and Instructions, such as in the use of charcoal, keeping of wild animals and pets, and the desecration of sites of cultural heritage.

To date, the majority of initiatives in this pillar are led by individual missions (summarised elsewhere) and pertain to topics such as:

- Tree planting (e.g. indigenous species, including fruit trees).
- Environmental clean-ups (off site).
- Creating environmental awareness among host communities (e.g. in collaboration with schools, local partners, CBOs and NGOs).
- Conservation of biodiversity / ecosystems in demilitarized "blue" zones, and flora and flora surveys.
- Capturing and neutering of stray animals.
- Helping to establish small businesses and community groups that gain income from environmental initiatives (e.g. composting and recycling).
- Resource monitoring and analysis such as groundwater levels and aquifer characterization.

Major projects with elements of positive legacy as a key aspect of their design are listed below and are summarised in more detail in the *Mission level status and gaps* section.

- Energy: The Baidoa Power Purchase Agreement in South-West State, Somalia
- Water and Wastewater: The ANGESEM wastewater project in Bamako, Mali
- Solid Waste: The Kolongo landfill project in Bangui, Central African Republic

All these projects involved technical assistance and support from either REACT, ESTU, or HQ. The implementation of more such projects will be a key objective of each technical pillar in Phase 2.

Environmental Impact Assessments

Environmental impact assessment is a requirement in the Environment Policy, however at the operational level, the requirement to conduct environmental baseline studies, regular impact assessments and risk analyses had generally not been met prior to the strategy; due in part to the need to deploy quickly, in part to a lack of capacity and in part to a lack of clear methodology and procedures. Early in Phase I, the need to define and institutionalise an appropriate model for environmental assessment, which balances the need for better environmental performance and environmental damage control with the imperatives for rapid deployment, light mission support footprint, and cost-efficiency, was identified as a strategic priority. The Government of Italy provided extra-budgetary support towards meeting this priority and a standard operating procedure on Environmental Impact Assessments for Field Missions was promulgated in early 2019. This SOP is a standalone document that includes guidelines, checklists and procedures that ensure an appropriate and achievable level of environmental assessment by peace operations.

The second phase of this project is kicking off with extended funding from Italy; it consists of the roll-out of the methodology across peace operations and includes integration into the technical assistance function in the Environmental Technical Support Unit in UNGSC. The immediate objective is to build capacity through technical advice and training to all personnel in charge of implementing new projects and activities in the field.

Gaps Remaining after Phase One

What we have learned in Phase 1 on wider impact is that where positive legacy considerations are effectively integrated into the early planning and problem-solving process of project development, there is huge potential for peace operations to reduce their environmental footprint while leaving a positive legacy at nominal additional investment, if any. There may be particularly strong potential for this in the growing area of renewable energy, as discussed elsewhere in this document. A mission like UNIFIL had already achieved positive legacy impact through built-in-place wastewater treatment systems in the Naqoura HQ in 2012. The local community, estimated at a population of 2000, benefits from tertiary treatment of their wastewater. Independent monitoring of the effluent quality allows the mission to recycle most of the water for landscaping and the local ecosystem, which includes turtle and fish species, to thrive in an unpolluted environment.

We have also seen that it has taken a considerable amount of time and internal resources to bring these projects to fruition, both in terms of engagement with the host nation and local representatives of the government and to navigate how to deliver on new ideas, especially when it arises from (or includes) partnerships, leasing, vendor prequalification and similar arrangements. It goes without saying that positive legacy also requires engagement and collaboration with a range of other partners/stakeholders and development actors. Given this, elevating the scope of management engagement to the resident coordinator/deputy SRSG level, will be explored.

Phase 2 of the strategy will also aim to address several other gaps under the Wider Impact category, including:

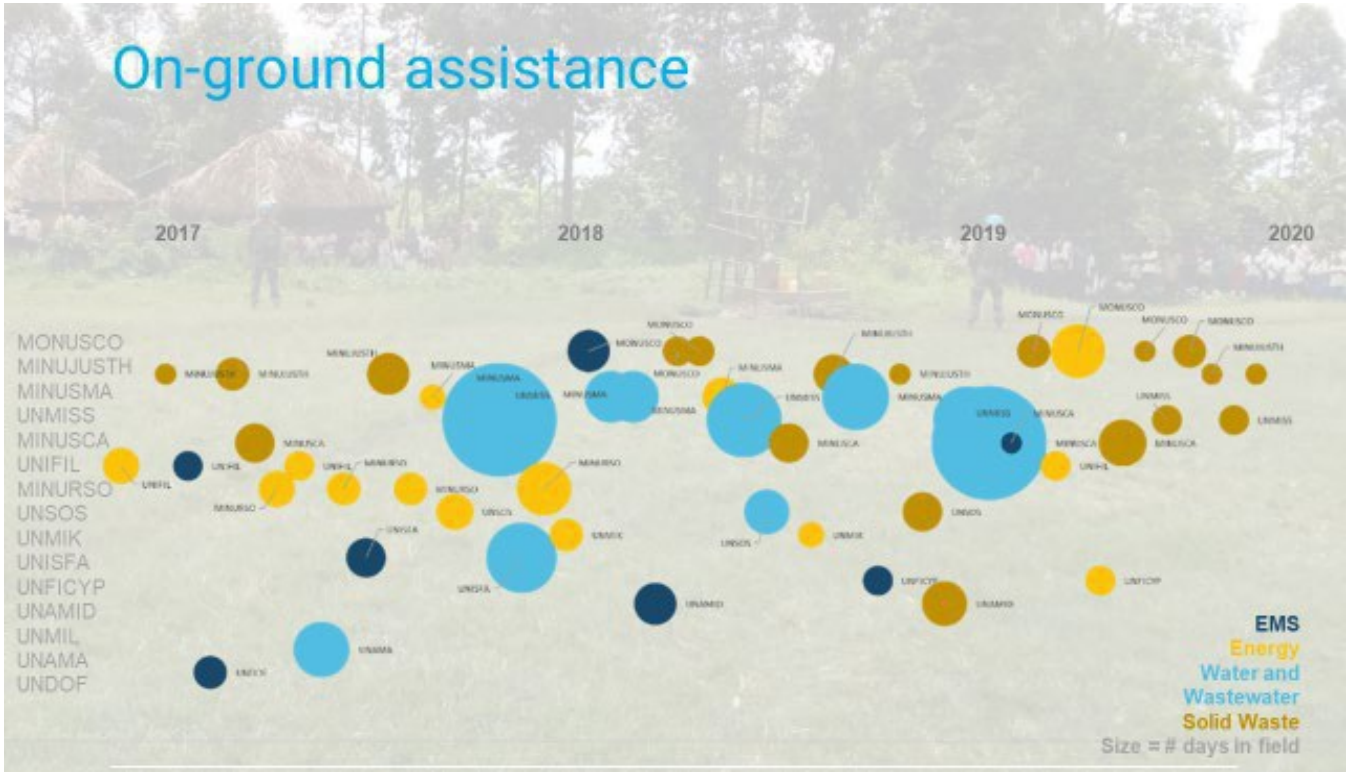
- Stewardship of environmental information (baseline studies, flora and fauna survey information, water quality monitoring, groundwater analysis).
- Support DPO and DPPA in the understanding of linkages between environmental drivers of conflict, mandate delivery and mission footprint.
- Supporting local vendors to strengthen capacity on good environmental management.
- Explore ways, given the high rotation of troops, that environmental awareness / good environmental culture can have broader and long-lasting impact outside of the field missions (e.g., national staff within the host country and international staff returning to their home countries and organizations).

2.2. TECHNICAL ASSISTANCE

Providing direct support to missions to improve their footprint on the ground has been one of the primary areas of focus during Phase 1 of the Environment Strategy.

An SOP was promulgated in November 2017 to standardize the approach for requesting, prioritizing and deploying on-ground technical assistance to missions, led by ETSU. In each case, the objectives of the technical assistance were jointly agreed with the mission in a technical assistance request proforma (TARP), and the agreed actions resulting from the on-ground support documented in a technical assistance summary and action plan (TASAP). The infographic shows the range of missions that received on-ground technical assistance during Phase 1 – the missions that have closed since the start, MINUSTAH, ONUCI and UNMIL, also received support. The size of each bubble represents the time on ground per visit and the number of bubbles gives an indication of the demand.

During Phase 1, a more than 900 person days were delivered via on-ground technical assistance. Deployment periods ranged from a week to a couple of months to meet the specific mission requests. For example, the support to capacity building in the operation and maintenance of modular wastewater treatment plants lasted up to three months at a time, based on the need to effectively address risk and to train wastewater treatment plant operators across multiple regions and camps in the mission. However, most assessment visits were shorter and typically lasted ten days. Typical deployments targeted the identification of comprehensive technical solutions to common problems, often involving hands-on assistance with a capacity building element (e.g. treatment of hazardous waste stockpiles; meter installation). Missions responded positively to the opportunity to leverage the on-ground assistance facility, which came at no additional cost due to up-front contributions to the REACT facility, enabling faster deployment times.



Missions responded positively to the opportunity to leverage the on-ground assistance facility, which came at no additional cost due to up-front contributions to the REACT facility. The SOP ensured that the missions' needs were matched with the most appropriate expertise in an agile manner and the technical assistance facility enabled

missions to tap into diverse subject matter expertise on-demand. Specialists are available in energy modelling, design and planning; hazardous waste and landfill management; water and wastewater management and environmental management systems. In some instances, the ESTU and REACT teams deployed jointly, e.g., to UNISFA (supporting both waste management and environmental monitoring), MONUSCO (to initiate an energy audit), and MINUSCA (in response to a fire hazard at the local municipal landfill in Bangui). The range of remote and on-ground technical assistance support made available to missions has included desktop research, technical guidance/advice, peer review, risk assessments, training, environmental assessments, project implementation support, etc. all of which are flexible and customizable. The range of technical assistance outputs have included, reports, advice notes, scope of requirements for tender development, risk matrices, training materials, action plans, implementation review reports, management plans, standard operating procedures, feasibility assessments, cost estimates/business cases, design concepts, and technical specifications, among others.

Phase 1 on-ground technical assistance resulted in more than 340 actions. While the bulk of this support has been provided to the larger missions, there has also been more assistance provided to missions in transition (most notably in MINUSTAH/MINUJUSTH/BINUH). The assistance has been synergistic: actions resulting from mission visits are incorporated into the individual mission's waste management plans, energy infrastructure management plans, and (where relevant) water and wastewater risk mitigation plans; while the on-ground problem-solving and solutions find their way into strategic responses that benefit all missions.

When COVID-19 introduced travel restrictions, planned on-ground assistance was immediately impacted (67 days with MONUSCO and 7 days with UNISFA). Field assistance was replaced by remote assessments for various drawdown activities, including Environmental Close out Assessments, such as at BINUH, UNAMID, UNIOGBIS, and BNUB. Assistance, provided through video stream enabled by local operators, allowed remote technical staff to identify environmental issues (e.g., conduct incinerator inspection, infrastructure assessments, assess ground conditions, and observe discarded waste volumes).

COVID-19 also resulted in increased usage of technical assistance and the team rapidly pivoted to provide additional surge support. This included technical guidance on the handling of COVID-19 waste and wastewater and tracking of environmental risks in the list of high-level data points shared across Departments (DOS, DPO and DPPA) to monitor the overall situation with COVID-19. Some of the risk data covered includes:

- biomedical waste treatment methods,
- wastewater and waste management services and the extent to which they were being affected,
- if missions had procured emergency equipment, and
- if a contingency plan was in place and remained effective.

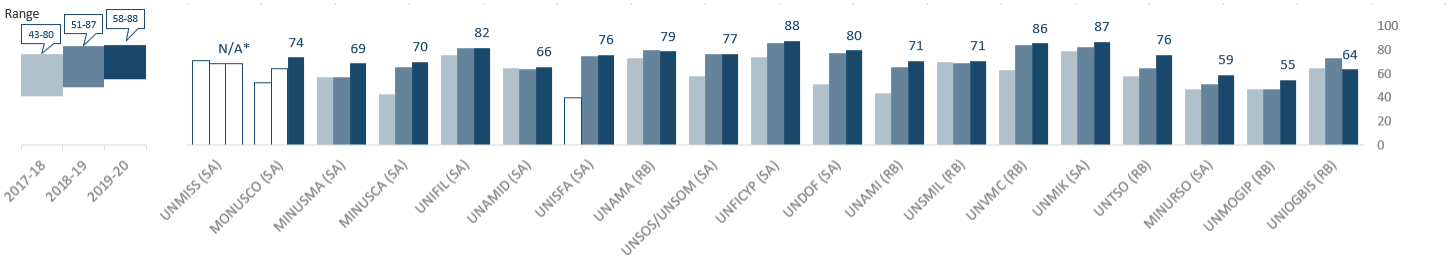
More than 150 requests for remote assistance, of varying complexity, have been logged in the last twelve months.

2.3. MISSION LEVEL STATUS AND GAPS

The following section provides an overview of the performance status in missions in relation to the objectives set out for each pillar in Phase 1 of the strategy.

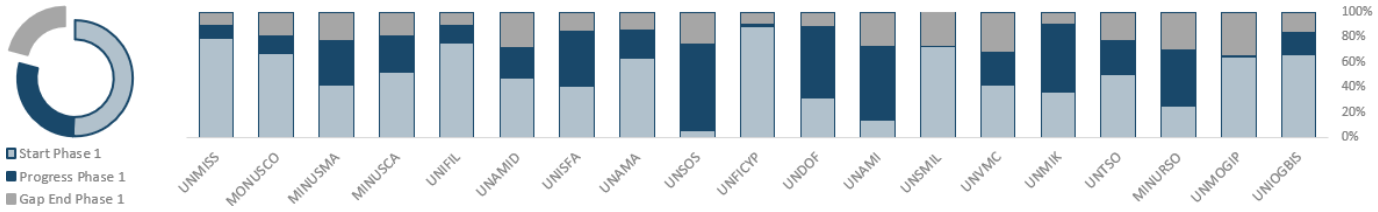
Overall environmental performance "scores" for the missions is presented below. Scores are derived from a range of indicators within each pillar, with equal weighting given to each of the strategy pillars. To give adequate priority when a significant risk is triggered, a "N/A" score is noted in such cases. The scores are annually prepared in line with the budget cycle (Jul-Jun for those on the Support Account; Jan-Dec for those on the Regular Budget) and are reported as part of the RBB framework and in Senior Management Compacts.

The trend is one of continual improvement, reflecting better reporting, the implementation of actions, and ultimately, performance improvement, across the range of indicators and pillars.



* no score due to signifcant risk (☐)
For missons on suport account (SA), score is for 2017/18, 2018/19, 2019/29; for regular budget (RB), score is for 2018, 2019, and 2020 (provisional)

ENVIRONMENTAL MANAGEMENT SYSTEM



Almost all missions demonstrate continual improvement in the implementation of EMS elements. Some started from a good base in 2017 and continued improvement (e.g. UNIFIL, UNMISS and UNFICYP); whereas others started from a low base, with marked improvement (e.g. most of the SPMs and the PKOs without an environmental officer at the start of the strategy: UNISFA, UNDOF and MINURSO). The most improved is UNSOS.

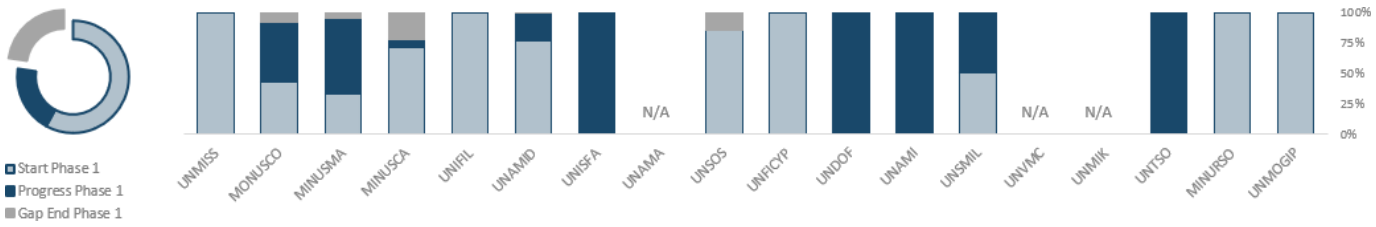
Environmental Actions

All missions completed annual environmental action plans that were endorsed by Senior Leadership. Approximately two thirds of planned environmental actions are completed on time.

Resources

Almost all missions have an Environmental Officer reporting directly to the DMS or CMS. Even in large missions with multiple environmental personnel, oversight of up to 100 remote sites is a challenge, and a system of military environmental focal points, supported by the Environmental Officer, has been established at 98% of sites across field missions.

Competency development



Since 2017, induction of uniformed components increased from 58% to 77%. Mission environmental officers also received “train the trainer” training in 2019 to improve the effectiveness of delivery of briefings and inductions.

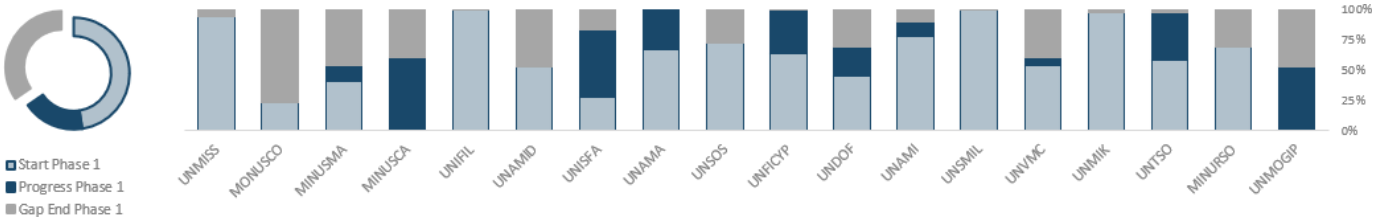
Awareness

Environmental awareness reported by missions increased from 75% to 99% (evidenced by multiple communication and/or outreach materials and events including physical evidence at each site: i.e. posters in communal areas, by rubbish bins etc.). An environmental campaign involving stickers and posters was distributed throughout missions in the key languages of the troop contributing countries (French, Arabic, Amharic, Hindi and Spanish). A “Duties of Peacekeepers” pocket card for uniformed components in various languages was issued in 2020. Although there is little room for further improvement, the awareness topic is one that can benefit from constant refreshment. The indicator also is not diagnostic as to whether awareness has translated into behaviour (walking the talk).

Emergency preparedness and response

Due to the introduction of this indicator, and examples of best practices shared amongst practitioners in the EMS WG, missions completing emergency drills increased from around a quarter in 2017/18, to more than half of missions in 2019/20.

Evaluation of performance

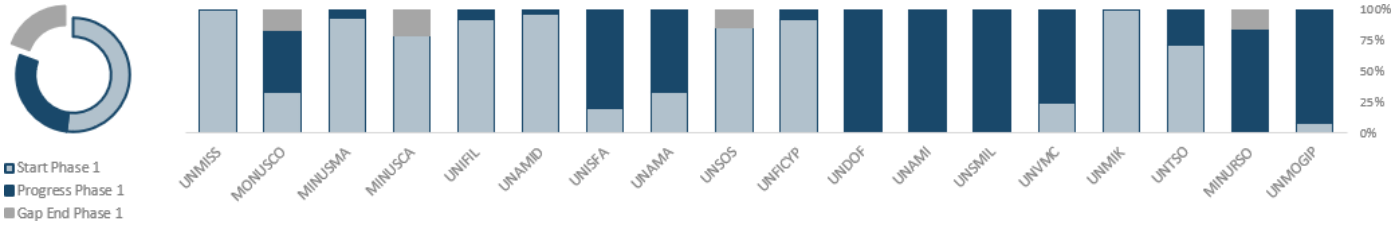


Measurement of electricity, water and waste, has increased from 48% measured (i.e. more than half estimated) in 2017/18, to 65% measured in 2019/20. Unsurprisingly, the missions with the most remote sites have the most room for improvement, with MONUSCO, MINUSMA and MINUSCA currently having the biggest scope for increasing the measurement of environmental performance data.

Review

95% (all bar one mission) completed reviews of environmental performance with senior leadership.

Assessment and improvement

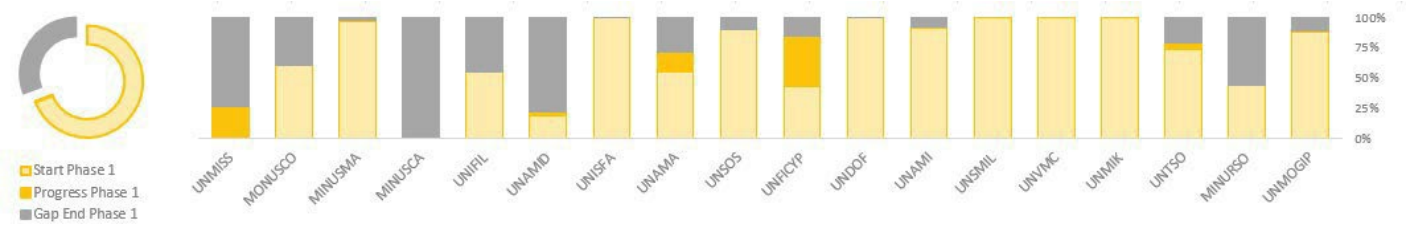


Site assessment completion rates per annum increased from 52% to 81%. However, up to one third of issues identified are not addressed on time by those responsible. As can be expected, MONUSCO and MINUSCA have the most difficulty in completing all site assessments given their size, and this could be improved by greater use of remote assessment techniques. Missions who could most improve on corrective action completion rates are MINUSMA, MONUSCO, UNMIK and UNSOS, with MINURSO the best placed to improve its implementation of the mission environmental action plans.

ENERGY

Mission energy performance during Phase 1 has been positive with notable results achieved in a few missions and solid foundations established across the board for improvement in Phase 2. The focus in Phase 1 was on finding the most cost-effective strategy to reduce the consumption of diesel fuel for electricity generation, accounting for 50% of the overall fuel consumption in 2018. Activities were categorised as either low complexity "low hanging fruit" activities with short payback times (between one and two years) and moderate budget requirements including turnover of air conditioning units, replacement of lighting with LED lights, installation of sensors, timers and solar powered equipment and larger activities including building retrofits, diesel generator optimisation and synchronisation and introduction of renewable energy with longer payback period in the range of 3-5 years.

Air Conditioning Units



Air Conditioning (AC) represents the largest energy demand in missions and significant opportunities exist to reduce energy consumption, especially for missions that still operate old "window type" AC units. In the past few years, missions have been turning over these old units with inverter split AC units. The inverter technology adjusts the speed of the compressor to control the refrigerant (gas) flow rate, thereby consuming less current and power. In 2019, UNMISS replaced 5,000 traditional window type units with inverter split AC units and in UN house this project contributed to an 11% and 17% reduction in energy and fuel consumption between FY 18/19 and 19/20. Also, in 2019, UNISFA piloted the use of hybrid solar air conditioners, installing 50 units in personnel accommodation units in Abyei. Results showed an average of 29% lower power consumption. Turnover of old AC units has resulted in 70% of the installed units being inverter type split ACs at the end of Phase 1. Further environmental improvements can be achieved in this area, gradually replacing existing units with those available through the current contract amendment and the new system contract under development, which have an even higher energy efficiency and use lower Global Warming Potential (GWP) refrigerants.

LED Lighting

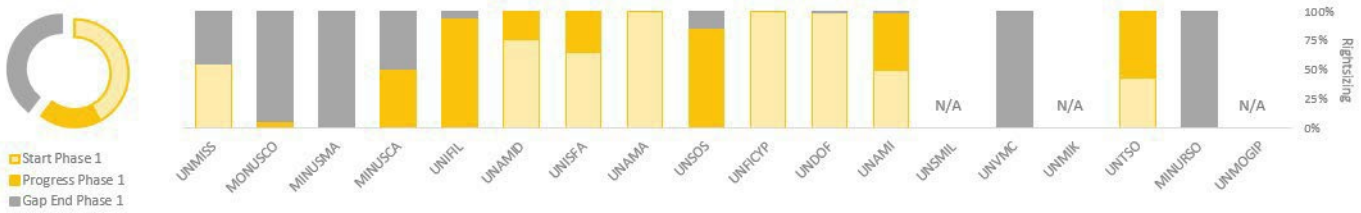
For missions that had a low penetration of LED lighting (i.e. using energy intensive fluorescent and incandescent bulbs), lighting was found to be one of the biggest electricity loads after cooling/heating, accounting for roughly 10-15% of the total. Given the considerable improvement in energy consumption of LED lights now available, this activity was found to result in short payback times of even less than a year. Therefore, substantial emphasis was given to this topic through the systemic work discussed in the *System level progress and gaps* section. Most missions made significant progress on this indicator throughout Phase 1 and cumulatively this indicator progressed from 37% to 62%. Unfortunately, the lack of a global system contract resulted in missions purchasing LEDs locally, which resulted at times in low quality products being purchased which affected the longevity of the LED lights and caused network stability issues. However, now that a global system contract is in place missions are able to more readily purchase high quality product to support full roll out across all missions.

Sensors and timers

Another short payback period activity is the installation of AC sensors and thermostats and lighting sensors. To monitor progress, data is gathered 6-monthly on AC and lighting sensors, with progress shown in the figure. While missions made considerable progress on this activity in Phase 1, it is expected that both activities will progress more rapidly in Phase 2 as AC sensors are integrated into the AC contracts. Lighting sensors are available in the new LED system contract (see above).

Buildings

The need for energy intensive active cooling can be significantly reduced through passive cooling techniques including shading and increased vegetation. For example, in 2019 UNAMI constructed a retractable shade of 900m² to protect the building from direct sunlight at its Forward Support Base in the Baghdad International Airport and planted indigenous bushes to improve resilience and energy performance. This resulted in a 35% cooling consumption reduction. Overall, information reported on improved efficiency of accommodation showed an improvement from 30% to 63%, owing to mission's efforts and investments in new prefabricated buildings and/or concrete structures with double roofing and double glazing in order to reduce heat transfer with the surroundings (though the 30% at the outset may be lower than actual due to absence of data). Most gaps remain on the T/PCC side, which are often accommodated in tentage well beyond the initial six months of deployment, for example in MONUSCO's Sake site. The insulation of reefer units, which draw a lot of power to keep the low temperatures, can also be improved across all missions to limit radiative heat from the sun.

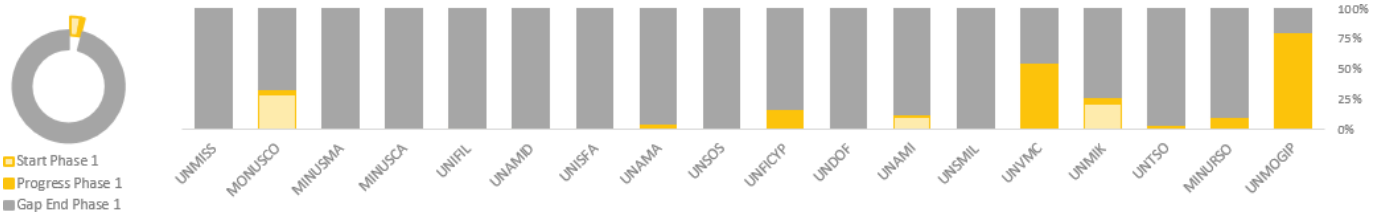


Results from case studies developed in MONUSCO and UNIFIL, where large non-synchronised generators or multiple small capacity grids were replaced with a centralised synchronised grid, showed a reduction in fuel consumption of more than 20%. Based on the theoretical and experimental evidence of the achievable fuel consumption reduction through generator re-sizing and synchronisation and relatively low-cost / 3-4-year payback, this activity was a key area of focus in Phase 1. Most missions made significant progress on generator synchronisation and cumulatively throughout all missions this indicator progressed from 15 to 55%. Gaps remain in large missions including MINUSMA, UNSOS, UNMISS on rationalising the fragmented existing diesel generator grids to central power houses with synchronised generators. For large sites (i.e. greater than 1 km radius), following good examples in UNIFIL (HQ Naqoura), and MINUSMA (Timbuktu), missions will be exploring options to switch the distribution to medium voltage using step-up and step-down transformers in order to limit the distribution losses.

Contingent Owned Equipment

Through collaboration between uniformed and civilian stakeholders at missions as well as with the Member States, some very positive examples were demonstrated in Phase 1 of T/PCC energy deployment. For example, UNIFIL amended the MOU with the Nepalese TCC, switching the existing fourteen low-capacity inefficient generator sets with a centralized powerhouse consisting of three synchronized generators, leading to a 22% reduction in fuel consumption. In other cases, various missions have started supplying power directly to the T/PCCs, keeping the COE generators as back up and reducing the fuel supplied. For example, UNMISS connected the Rwandan PCC and Nepalese TCC to the UNOE powerhouse in UN House. MONUSCO connected additional T/PCC sites (Munigi, Kivanja) to hydropower grids with plans to connect further sites in the coming years.

Renewable Energy



By the end of Phase 1, the renewable energy share of missions had increased slightly to around 4%, through the following project types:

- On-site low penetration solar photovoltaic (PV)
- Grid connections to national grids with a share of renewable energy
- Green Utility Contracts

The first model has progressed through solar PV systems purchased through the global system contract and installed either through mission personnel or locally sourced contractors. This has resulted in the installation and commissioning of roughly 5.6 MW of solar PV systems, including 2.25 MWp in UNMISS (which will provide roughly 5% renewable energy to the mission), 468 kWp in MINUSCA, 1 MWp in MONUSCO, 358 kWp in UNMIK, 373 kWp in UNIFIL, 250 kWp in UNDOF, 100 kWp in UNFICYP, 720 kWp in UNAMI, 592 kWp in UNAMA, 12 kWp in MINURSO[13]..

These initiatives lead to almost US$2.2 million savings in energy costs per year and 6,700 tons CO_2 eq. However, these installations still remain a small component of the overall energy needs, and combined they contribute to a share of renewable energy of just under 2%. Key constraints at the mission-level included:

- The upfront investment required to drive a larger scale transition to renewables via mission capital investment in renewable energy projects is prohibitively high, particularly as the longevity of the mission may be unknown.
- In-house technical capacity—particularly around the complex battery management systems required for high penetration of solar in on-site power generation.
- Challenges in terms of the space that would be required for large scale solar projects, especially for sites that are located in towns (e.g. UNOCA site of UNAMA, Bangui, MINUSCA).

The challenges faced in Phase 1 in the execution of on-site solar PV projects, highlight the limitations of self-managing energy production in missions, especially when trying to integrate large scale (i.e. >1 MWp) renewable energy in the power production mix.

Connections to grids with a renewable energy share (e.g. MONUSCO) provided between 1-2% in Phase 1. While outside the strategy scope, the green utility contract of UN GSC makes a further contribution to reduction in the UN footprint [14] . Activities in this area are constrained by the current availability of local renewable energy infrastructure in the majority of mission host countries.

Two missions, UNSOS and MINUSMA, have explored new ways to overcome some of the limitations described above through piloting outsourced renewable energy supply ("Energy-as-a-service").

a. Outside-the-fence: UNSOS recently signed a renewable energy Power Purchase Agreement (PPA) for its Baidoa site with an international service provider, who had previously established an MOU with the local government to increase local energy infrastructure. The UNSOS PPA is expected to increase the mission's renewable energy share by 4%, securing fuel savings of roughly 900,000 litres per year and contributing to local socio-economic growth as excess energy from the plant will be sold to local communities. The fuel savings will lead to significant cost savings and safety improvements, as the road to Baidoa is often prone to hijackings and floods forcing fuel to sometimes be flown by helicopters.
b. Within-the-fence: MINUSMA has received Headquarter Committee of Contracts (HCC) approval for an adapted PPA project solar PV with energy storage project (in Bamako) with an international power plant developer; the novel contractual arrangements are currently being worked through. The MINUSMA model has the potential to increase the mission's renewable energy share by 8% and lead to yearly fuel savings of roughly 2,500,000 L. Adopting such approaches provides the opportunity to significantly upscale the renewable component of missions.

The scale of the environmental benefits of these projects is substantial with expected greenhouse gas emission reductions of the UNSOS and MINUSMA projects greater than all of the on-site solar PV projects in missions outlined above. Such approaches are therefore expected to be rolled out in other missions. However, there are a number of key constraints, which are heavily context dependent, including:

- Remoteness of sites and security issues affecting the interest of private sector companies to operate there.
- Local energy regulatory framework or lack thereof.

[13] As some of these projects were connected at the End of Phase 1, their figures are yet to translate into the full financial year presented in the graph. Thus, the renewable capacity cannot yet be seen.

[14] Although not reported amongst field missions in the strategy, GSC's energy footprint is substantially comprised of hosting servers for missions. Thus,

sourcing Greenpower indirectly contributes to lower GHG footprints of Peace operations, and the UNs footprint overall.

- Maturity of renewable energy private sector market.
- Political risks affecting long term financial security of investors.
- Limited visibility on ongoing energy development work in the host countries preventing creation of synergies between operations and UN development actors.

Solar Powered Equipment

Besides central solar PV systems connected to the diesel generator grids, missions have introduced standalone solar powered equipment including solar streetlights, solar water heaters and solar-powered water treatment plants (WTPs). Storing solar energy directly where the energy is needed offers benefits especially when the equipment's location is remote from the central power production system (e.g. perimeter security lighting) as it reduces distribution losses. Moreover, for solar streetlights and WTPs, as the systems operate in DC current, it avoids DC/AC conversion which leads to additional losses. Solar water heaters are different in that they do not use the photovoltaic effect to produce electrical energy, but they directly collect the thermal energy from the sun to heat up the water, leading to high efficiencies.

Most missions have installed solar streetlights where beneficial, including: MINUSCA, UNMISS, UNFICYP, UNIFIL, UNISFA, UNAMI, UNAMA, UNAMID, UNMIK.

Solar water heaters are currently available to missions as an add-on item through the ablution system contract. This coupled with the lack of suitable spare parts for maintenance of the systems, led to either the purchase of ablution units without solar collectors or to their gradual rundown past the point of operability. Missions which have operational solar water heaters are: MINUSMA, UNIFIL, UNMISS, UNAMI, UNAMA, UNISFA, UNSOS, MONUSCO.

Overall effect on Fuel Consumption

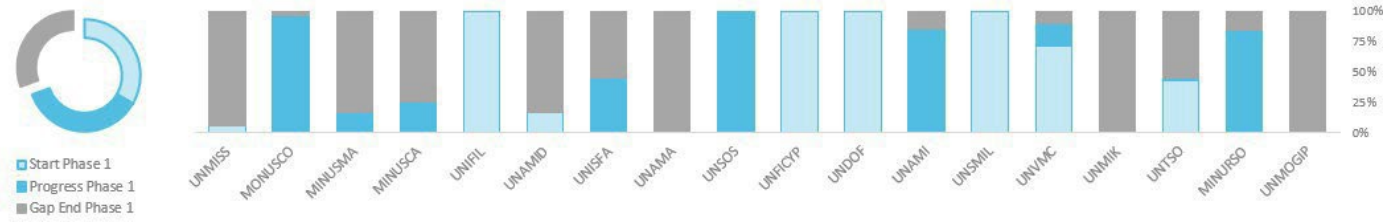
The total reported fuel consumption appears to reduce significantly from 342 (2017), to 300 (2018), to 280 (2019) million litres per annum during Phase 1. However, this is due to improved record keeping, primarily of the use of diesel vehicle fuel, particularly in UNSOS, MONUSCO and MINUSCA from 2018. Data for fuel use in generators is considered relatively reliable from the start of Phase 1 and generator fuel consumption per capita can be observed to decrease from 4.4 (17/18) to 4 (19/20) litres per person per day. This is mostly due to the drawdown of less efficient missions. As noted elsewhere, we are already seeing impacts on COVID-19 in the early stages of Phase 2, primarily in commercial air travel, though this is quite temporary, and by and large COVID-19 has not impacted fuel use due to continued operations despite the pandemic. Fortunately, the baselines established in 19/20, are not impacted by COVID-19, though tracking improvements in this area in the early stages in Phase 2 will be complicated by its effect.

WATER AND WASTEWATER

Progress

Significant risk was identified in six (6) missions early on in strategy implementation period (UNSOS, MINUSMA, UNISFA, ONUCI, UNMIL, and MONUSCO), which prompted the development of Risk Mitigation Plans (RMPs) to urgently mitigate all cases as a top priority. All six (6) risk mitigation plans were implemented. During strategy implementation, significant risk was subsequently identified in two (2) further missions (UNMISS and MINUSCA). At the end of the 2019-2020 cycle, all but one mission had reduced the risk levels from significant.

Sites at Minimum Risk



The aim of the strategy is to reduce risk to minimum levels, and a key performance indicator for water and wastewater is the proportion of sites reporting minimum risk. The conditions for minimum risk include, but are not limited to, meeting the requirements for infrastructure and treatment capacity, coupled with adequate management controls, e.g., effluent quality monitoring and contractor oversight. In the Phase 1 strategy period the proportion of sites reporting minimum risk doubled from a third to some 70% of the more than 400 sites across field missions. The level of minimum risk attained is a result of coherent and consistent efforts and best practice across these key indicators.

At least six (6) missions report operating at 100% minimum wastewater risk: UNSOS, UNIFIL, UNFICYP, UNDOF, UNGSC, and UNSMIL, with the bulk of effort, and focus, still needed in UNMISS, UNISFA, MINUSMA and MINUSCA to transition the high proportion of their sites operating at moderate risk in the same direction. For these missions, wastewater management planning will be essential to resourcing and implementing the requisite infrastructure upgrades.

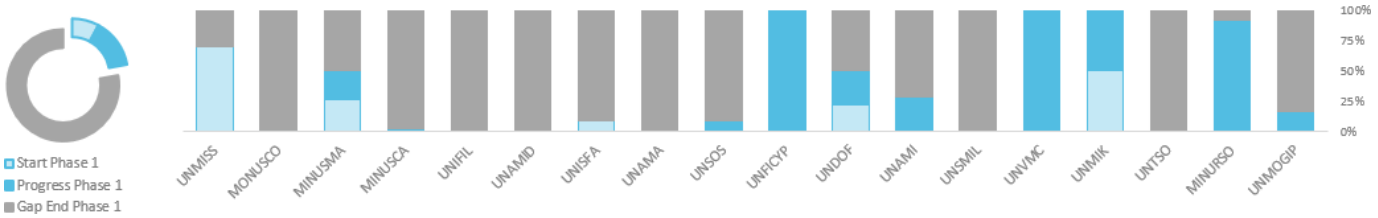
Each water and wastewater indicator have seen improvement during Phase 1.

- High coverage of site inspections (from 52 % to 81%), which form the basis of the risk assessment determination. Both UN and external sites are considered in the assessment, e.g., where a camp may be connected to a municipal facility there is a duty of care to ensure the mission is not inadvertently causing downstream negative impacts. Where staff face security and other restrictions in accessing municipal facilities and disposal sites used by contractors, the risk assessment allows for remote assessment using a combination of desktop research and geographic information system (GIS) techniques and methodologies. Remote sensing techniques have been successfully adopted in support of UNISFA, UNMISS and UNAMA.
- Water conservation plans and standard operating procedures for Water and Sanitation are in place in most missions (38% increase).
- The installation of grease traps at kitchen facilities has increased by 34%, and oil-water interceptors at workshops, fuel stations and power generation facilities by 20%. These units provide critical on-site pre-treatment of wastewater to increase the effectiveness of downstream processes and to prevent pollution.
- The launch of the strategy also led to a sharp increase in the annual procurement of modular wastewater treatment systems (an estimated increase of 126%, equivalent to more than US$8 million) during 2017/18. This cost is associated with both the turnover of previous wastewater treatment assets and new installations. Of the wastewater treatment plants procured, missions report 90% being in operation.
- A minimum of one awareness campaign per year focused on water and wastewater management in nearly every mission.

The performance portrays the on-ground wastewater management reality and challenges. For missions to achieve minimum wastewater risk across most of peace operation deployments, they need to establish, and rely on, onsite and inhouse solutions; ranging from simple passive solutions for small camps to a series of modular wastewater treatment plants in super camps. Host country wastewater treatment infrastructure faces significant challenges in many of the locations where peace operations are deployed, meaning that in order to manage risk missions like UNSOS, UNISFA, UNIFIL, UNDOF, MONUSCO, MINUSMA, MINUSCA and MINURSO currently report almost 100% reliance on mission/inhouse wastewater management solutions.

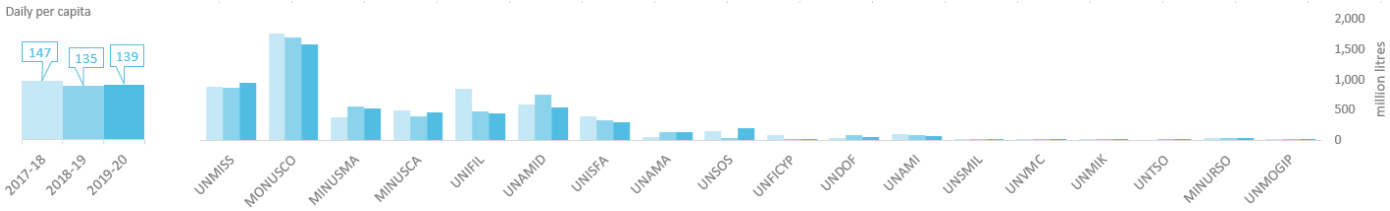
The best performing field missions in overall wastewater management are UNIFIL, UNFICYP and UNDOF. During the implementation of Phase 1, UNIFIL shared their best practice during a centralized training for all missions and a major outcome since this training is the recent shift to built-in-place conventional activated sludge systems using UNIFIL's experience. Another standout is UNAMA, which has installed decentralized wastewater treatment systems, also known as DEWATS. The systems adopt a passive design which makes it affordable, low maintenance and uses local materials, while meeting the requirements for effluent discharge standards. MINUSMA, MINUSCA, UNSOS, UNISFA, and to a lesser extent UNMISS, are the missions most in need of centralized wastewater treatment infrastructure. This stems from the fact that they are currently supporting super camp deployments ranging in size from 1000 to 4700 personnel and more than ten modules have been installed in many camps across these missions. MINUSMA, UNISFA and UNMISS are already moving in this direction.

Alternative Water Sources



The proportion of sites using alternative water sources to offset freshwater consumption has almost doubled. The range of alternative sources includes harvested rainwater and treated wastewater effluent. Treated wastewater reuse is implemented in 11 Missions, figure that doubled throughout the Phase 1 of the strategy. This water is used to flush toilets, wash cars, landscaping, and dust suppression. This positive trend contributes to the reduction in freshwater abstracted and treated.

Fresh Water Consumption



Despite the increased use of alternative resources, per capita freshwater use has remained relatively constant in Phase 1. Objectives around water use is highly dependent on the individual missions' context, most clearly in areas with low water resources, but less obviously, in some areas with high rainfall: saturated soils and standing water make wastewater treatment problematic—and reducing water use can reduce stress on treatment systems. Demand can be managed through equipment such as dual-flush, low flow and dry toilets, push taps and aerated showers and through cultural change.

Groundwater Monitoring

There has been progress on groundwater management, including exploration, rehabilitation and monitoring. This effort is led by the GSC, and their technical expertise supports missions to evaluate the wider local context of water sourcing. The impact of this work is most evident in missions in water scarce regions (MINURSO, MINUSMA, UNSOS, UNDOF and UNAMA) as well as where water quality is an issue (UNMISS and MINUSCA). UNAMID is the one mission that includes the skills of hydrogeologists and drillers in its ranks enabling it to monitor the effects of groundwater abstraction and to complete an injection well, allowing the mission to discharge treated effluent through a borehole designed to disperse that water through the process of percolation.

Real-time monitoring in Support of Risk Management

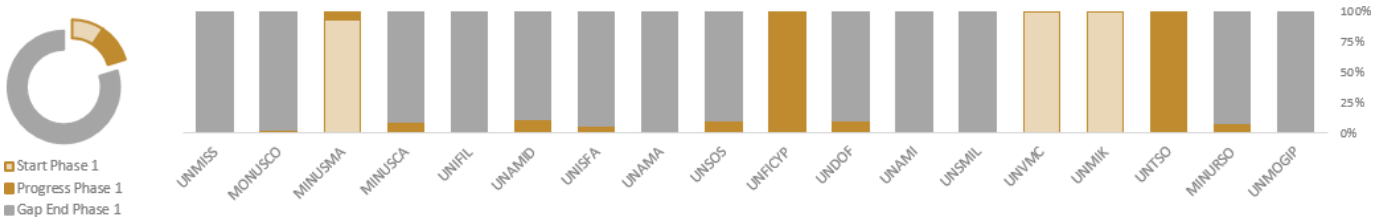
UNISFA and MINUSCA are leading the effort to use FRIM for real-time awareness of wastewater treatment plant performance with the support of the Technology Infrastructure Support Unit (TISU) in UNGSC. FRIM can now deliver:

- the real-time changes in the valves and pumps i.e., which valve is opened/closed or which pump is on/off; the working times for the suction pumps, blowers and the ultraviolet (UV) lamp;
- information about the water production (instantaneous/daily);
- alarms e.g., lift pump/blower/suction pump failures, high water levels in the various tanks,
- trigger maintenance/repair/replacement.

SOLID WASTE

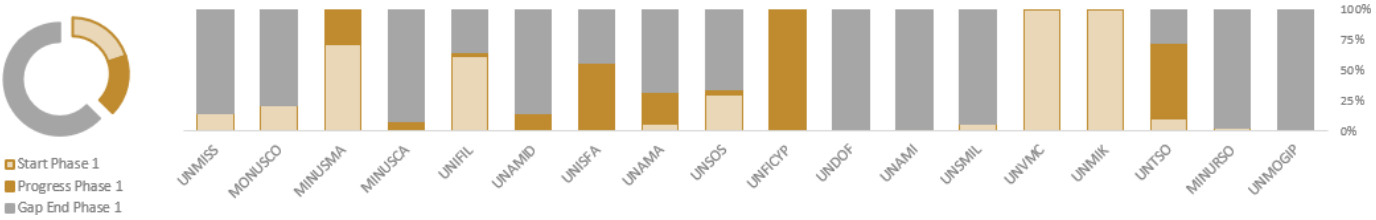
Overall, mission progress on waste management during Phase 1 can be considered positive while varying across missions.

Reducing waste risks



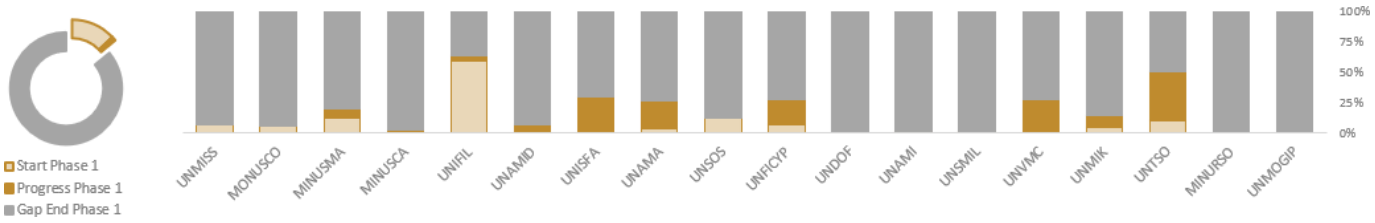
A key indicator of performance is whether the missions use engineered landfill or best practice incineration for solid waste disposal. The number of sites recorded as meeting these criteria increased from 9% in 2017/18 to 20% in 2019/20. Initial results were largely dependent on the availability of host country municipal infrastructure (e.g. UNFICYP, UNMIK and UNVMC all dispose of their solid wastes in European/EU or equivalent standard engineered landfills). However, the roll out of high-quality incinerators and the planned development of waste management yards (WMYs) across multiple missions during Phase 2 will enable the diversion of potentially all waste from dumping sites or being open burned. However, as these numbers indicate, the task is substantial: 80% of sites need improvement.

Improved disposal methods



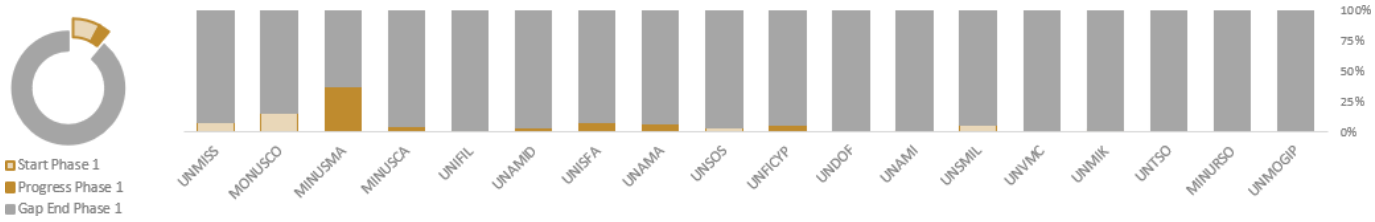
Improved disposal methods, as a result of increased recycling of plastics, metals and glass, composting of organics, use of best practice incineration and appropriate engineered landfills has a strong correlation with the above indicator but is expressed on a volumetric, rather than site by site basis. Across missions this indicator recorded an increase from 20% of total waste in 2017/18 to 37% in 2019/20. As above, substantial variation between missions reflects the host country context, but MINUSMA is illustrative of what is possible with 100% of waste disposal by improved methods. It is one of two missions operating WMYs since 2017 and sets a leading example of a well-organized system of effective organic composting and sustainable plastic recycling supplemented by incineration of remaining solid wastes that has resulted in the mission achieving complete solid waste diversion from municipal dumpsites.

Recycling



Even though overall results indicate a small increase of 1% in recycling from the beginning until the end of Phase 1, the share of sites performing this good practice activity has increased by 8%. Again, across missions, results vary widely with UNIFIL recording 63% for recycled wastes, UNISFA 30% due to a recent scrap metal contract reducing stockpiles of aluminium cans, UNFICYP at 27% and MINUSMA scoring 19%. Other missions all scored lower, indicating a clear need for efforts to be made to identify improved recycling opportunities. Plastic recycling is occurring at UNAMI, MINUSMA and MONUSCO to produce various items such as water pipes, conduits and for local crafts, while several missions (e.g. UNMISS, UNISFA) have expressed interest in conducting plastic recycling pilot projects.

Composting



Composting rates are relatively low considering that organics can represent approximately 40-50% of all solid wastes, though it increased from just 8% in 2017/18 to 11% in 2019/20. The leading mission implementing composting is MINUSMA at 37% which is generally three times more than remaining missions. There are clear opportunities for this to be increased during Phase 2.

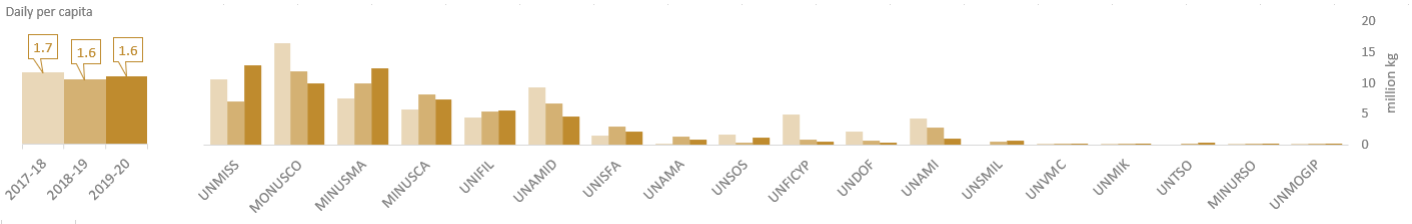
Improved waste segregation

A key requirement for improved solid waste management and recycling is an effective waste segregation programme. While virtually all missions have at one stage launched awareness campaigns to support this requirement, in nearly all visits to missions' waste segregation was observed to be poorly adhered to and managed. This is an area expected to improve through the assignment of waste management officers.

Takeback

Statistics on use of takeback were collected during Phase 1. While only a limited number of waste streams currently make use of takeback approaches (i.e. POL and printer cartridges) good rates of take up (88%) indicate that expansion to other problematic hazardous goods and products would be expected to be equally successful. On the other hand, survey results indicated that 10 out of 13 missions did not know about the availability of the disposal services in the system contracts for solar PV, though this is likely due to the longer lifecycle of these products (i.e. still in service). This highlights the need for good communication to missions on the availability of such contracts and consideration of the lifecycle of the products when establishing contractual arrangements.

Waste minimization



Waste minimization results indicate that waste generation across missions has remained constant amounting to on average around 1.6 kg/capita/day. While this figure has been static, multiple missions report they have actively initiated waste minimization initiatives, particularly for certain waste types. For example, UNMISS and UNSOS have banned the use of single use plastic bottles and Styrofoam food containers replacing them with reusable items and large capacity water fountains. MONUSCO has similarly implemented another positive initiative by switching to the use of 20L reusable containers rather than the 1.5L single use plastic bottles for the provision of reserve water supply to contingents. These initiatives could be expanded and consolidated further to continue along the path of overall reduction in plastics use across all missions (coupled with other efforts of the Water and Wastewater Pillar).

Waste management yards

A key factor to enable better solid waste management across missions will be the development of WMYs. Currently WMYs are being constructed in three Missions (MINUSCA, UNISFA, UNMISS) and are already operating in two (MINUSMA, UNSOS). Planning is underway for development and/or improvement of waste management yards in four further missions (MONUSCO, UNDOF, UNAMA, UNAMI). With multiple WMYs having to be constructed of various sizes and equipment to be commissioned it is expected that these operations will nonetheless take up to three years to complete and will be dependent on budget resources being provided to missions so that these projects can be realised.

Conversely, at UNIFIL incineration is not permitted for the disposal of solid wastes due to a combination of community resistance to this approach and recent national government decisions. Thus, these wastes continue to be sent to municipal landfills after sorting at the contractor facility. Recycling efficiency of plastics, metals and paper/cardboard is considered relatively high but nonetheless the mission should continue to focus on improving composting operations. At MINUSCA, the Kolongo landfill in Bangui is undergoing remediation to extend the lifespan of the site but unfortunately this has been seriously delayed due to COVID-19 restrictions. At other sites within the mission, WMYs are being constructed with specifically designed incinerators due for delivery by end of March 2021.

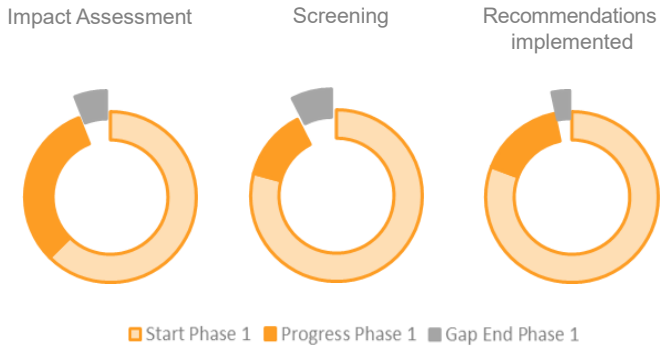
Hazardous waste stockpiles

Major treatment operations for accumulated hazardous wastes were conducted during liquidation of MINUJUSTH and UNMIL. To support the drawdown at UNAMID, advice notes are being developed to treat and dispose of approximately 60 tonnes of solid hazardous chemicals, 10,000 litres of liquid hazardous chemicals as well as R22 refrigerants.

Soil remediation was conducted at ONUCI, UNMIL, MINUSTAH and UNAMID and ongoing monitoring at remediated sites is conducted using remote means by UNGSC. Destruction of ballistic protective equipment was also carried out at MINUSTAH and UNAMID with innovative methods used to cut, separate and where necessary incinerate these materials.

WIDER IMPACT

Impact Assessment



Environmental Impact Assessment (EIA) rates climbed from two thirds of projects in 17/18 to 94% in 19/20. Environmental screening (i.e. of projects not defined as "major" in the EIA SOP), also increased. No doubt the promulgation and associated communications around the EIA SOP contributed to this increase. Implementation of recommendations improved from 88% to 97%. Further work is required in Phase 2 to ensure that there is a clear audit trail of EIAs on (particularly) major projects, and to ensure they are conducted on relevant programmatic (DPO/DPPA) activities.

Initiatives designed with secondary benefit to host country capacity

At the start of the strategy only 6 missions had a process in place to identify assets/infrastructure with environmental benefits for gifting at demobilisation, By June 2020, this rose to 13. Major initiatives in Phase 1 included:

- **Energy: The Baidoa Power Purchase Agreement in South-West State, Somalia**

  The South-West State in Somalia established a power purchase agreement with a company in 2020 to introduce 20MW of renewable energy in Baidoa, its largest city in the region. This scale is possible due to the proximity and footprint of the AU-UN camp managed by UNSOS, which will tap into 4MW. This project will enable UNSOS to transition from diesel power generators to renewables without having to invest in any of the infrastructure upfront and it presents compelling cost benefits; the agreement will charge USD 0.48 per kWh in the first five years of operation, and USD 0.30 per kWh thereafter (lower than the current estimated price of generation at USD 1.0 per kWh). At the same time, the project increases community access to affordable and clean energy – SDG 7. The long-term benefits of this project to the mission include almost 100% transition to renewable energy for Baidoa camp, saving around 900,000 litres of fuel per year; and resource savings from lower generator operation and maintenance. Looking beyond our peacekeeping presence, the key wider impact element is that the contracted company will transfer ownership of the plant to the South-West State after 15 years of operation.

- **Water and Wastewater: The ANGESEM wastewater project in Bamako, Mali**

  ANGESEM, the Malian government agency in charge of wastewater management, has infrastructure in Bamako, Timbuktu and Mopti. A visit to the ANGESEM facilities in Bamako and Timbuktu during a technical assistance visit to MINUSMA in 2016 established the availability of sewers and waste stabilization ponds. For different reasons the plants were not working at their design capacity, however with appropriate technical support and intervention (including process evaluation) the mission would be able to support sustainable wastewater management in the long-term in partnership with the Malian Government. A comprehensive technical assessment of the ANGESEM facilities in Bamako to define strengths, weaknesses, opportunities and threats associated with the possibility to support improvements and enable long-term sustainable, centralized wastewater management for MINUSMA was undertaken. Upgrade works were subsequently

designed and costed for tender. This work is currently under implementation and will allow the mission to meet operational needs, while contributing to the host nation's strategy for wastewater management.

- **Solid Waste: The Kolongo landfill project in Bangui, Central African Republic**

  MINUSCA designed a project to extend the useful life of the municipal landfill, which the mission has continued to use until their own waste management yards are constructed and commissioned. The project focuses on critical remedial actions at the site including, the installation of a leachate management system to protect against pollution and to provide an acceptable level of treatment; engineered waste covering; and suitable storm water and methane gas management. Apart from this project work, which was outsourced, MINUSCA and DOS also provided support in the form of heavy engineering works for waste compacting, local capacity development, and technical assistance to respond to a subsurface fire in 2019. The technical training was well received by the local landfill personnel and some of the material covered included operational safety, site grading, compaction, waste covering and soil characteristics. The project will ensure that the local community will benefit from additional safeguards that will remain in place for the life of the facility.

2.4. CHALLENGES AND DEPENDENCIES

The key challenges and dependencies for delivering on the environmental vision for field missions are summarized as follows. While these challenges are to be managed, some are invariably outside of the Organization's ability to control. Many of the issues described here were raised by missions through a client needs survey issued to twenty peacekeeping and special political missions[15] from 13 July to 19 August 2020. The survey collectively engaged the cross-cutting sourcing, acquisition, end-user, contract management and compliance roles within missions. The response rate was 100%.

Operating context and priorities

- Missions operate in highly challenging environments with competing priorities, many of which carry high elements of operational risk. Environmental challenges are one category among many and in some instances these risks need to be adequately prioritized. In the case of energy, as the major risk is associated with longer term effects of greenhouse gases and the reputational risk to the UN of inaction on climate change, rather than immediate or short-term risk, the risk may not prove an effective driver for action at the working level.
- Missions can feel the need to aim for reliability over efficiency. Changes to existing systems introduce potential operational risks, so projects may be avoided.
- Lockdowns of sites can occur (and have occurred) at any time due to a variety of reasons, such as deteriorating security conditions. Although the COVID-19 pandemic in 2020/21 was of an unusual nature, it is illustrative of the impact of restrictions on movement, particularly in terms of access by contractors involved in operating and maintaining infrastructure. Therefore, although nominally self-sufficient, missions may still need to rely on contractors and suppliers outside the direct control of the UN for a range of critical environmental services.
- The location and size of mission sites is often controlled by a variety of operational factors. Issues can range from the use of thermally inefficient existing buildings, lack of space for renewables and wastewater treatment systems, to non-ideal internal placement of facilities (warehouses, accommodation blocks offices etc. which can result in large internal distances within big camps).
- Achievement of optimal operational efficiencies are subject to changes in deployment capacity (such as troop relocation, down/up-sizing, and site changes). This often results in a default responsive stance, at the expense of planning and forecasting.
- Responsibility for environmental performance and risk is delegated to Heads of Mission by the UN Secretary-General, and there are a wide range of actors at the mission level that each play a crucial role in implementing the strategy. While DOS can set the ambition, implement mechanisms for performance evaluation to track progress, provide technical support on solutions, and assist with budget preparation (including supporting the missions in budget committees), ultimately it is mission leadership that delivers the actions committed to in the various action plans endorsed by the mission.

Budgets and resources

- While most upgrade projects have the additional benefit of leading to economic savings (some energy projects even ensuring payback times of less than a year), most projects do not have payback periods within the one-year financial cycle. Thus, missions tend to spread incremental project execution over several financial years, which limits the speed of the strategy's implementation. Budgets are also compartmentalised. For example, investments in renewables under the engineering budget are not recuperated there but accrue savings in the fuel budget.

[15] MINUSCA, UNSOS, MONUSCO, UNIFIL, UNMISS, MINURSO, MINUSMA, UNAMID, UNDOF, UNFICYP, UNISFA, UNMIK, UNAMA, UNAMI, UNMOGIP, UNRCCA, UNSCOL, UNSMIL, UNVMC, OSESG-B

- The uncertain lifetime of mission sites deters investment in high capital-intensive projects. This constraint can be mitigated through redeployment of equipment to other sites or other missions, but this is not always easy.
- Infrastructure that impacts on the environmental footprint can have a long operational lifetime. For example, properly maintained twinned diesel generators have a lifetime between 7 to 10 years, and containerised/modularised Wastewater Treatment Plants have a similar design life. Equipment commissioned prior to the environment strategy may still have many years of expected service and even where there is a clear cost benefit to replacement, there may be an environmental cost of turnover (e.g. increased waste). Likewise, once contingent equipment is established in mission, it is rarely swapped out.
- Operation and maintenance of key equipment and infrastructure is often achieved via locally employed independent contractors or TCC/PCCs rather than through UN staff posts. The contracting arrangements are constrained by a 9-month employment cycle that affects operator continuity. Both approaches result in continual retraining to ensure effective operations. While this can be overcome by "outsourcing" to a servicing contractor (i.e. a firm), this has its own challenges including perceived higher costs, the need for procurement/tender, and effective oversight/contract management. Outsourcing can also be problematic as in many cases capacity does not exist in the local market for firms with the experience to manage the competency requirements of the personnel.
- Ultimately, the key constraint is that investments of the scale of hundreds of millions would be required to fully transition peace operations to be more environmentally sustainable. Even though this can be demonstrated as economically beneficial over the longer term, the scale needed is unlikely to be secured through mission's present budgets, at least within the strategy period. The Strategy outlines how the above can be partially overcome by outsourcing, primarily through the replacement of purchase of fuel with purchase of electricity, though the approach also applies to other environmental services noting that the opportunities are severely constrained by the local context. While the capital investment needs are of the same order, they can be derived from other sources, such as private and development financing. However, such investment is not expected to emerge without pro-active engagement from the UN. Peace operations can facilitate this investment by establishing the enabling conditions (as keystone client and project initiator), but other actors are also required to achieve the scale. Peace operations have already shown what is possible in MINUSMA and UNSOS.

Sourcing and Supply

- The key challenges relate to the limited availability of quality goods and services and limited coverage and capacity of utilities and regulatory frameworks. It follows that where new sourcing/supply opportunities are being explored and/or introduced, every effort is needed to fast-track viable alternative approaches e.g., vendor pre-qualification to avail missions of a broader range of services.
- There is a need to continually focus on quality and value to the UN, rather than low cost, throughout the various stages of the procurement process, including review and approval, and to reduce instances of inadequate quality of goods and services leading to wastage, in order to respect the principles of UN procurement adopted by the General Assembly.
- Adequately address environmental risks in missions by exploring ways to recognise the urgency of certain contracts and prioritise resources across DOS accordingly to expedite procurement contracts under existing arrangements that allow for urgent procurement action.

Technological constraints

While significant improvements can be made using readily available technologies, there are still some areas that have technological constraints. These include:

- Use of plastic packaging is essential for certain products, namely food, due to food safety and hygiene requirements. The UN will need to require food manufacturers and their packaging suppliers to advance in the use of suitable alternatives before complete elimination of plastics is considered feasible.
- Fossil fuels in transport: while some modest improvements in the UN fleet is possible (in missions with access to renewable energy), the bulk of transport fuel use is in military vehicles and in aviation. In these areas, electric/renewable power has significant technological constraints that will not be resolved within the timeframe of the strategy.
- For stationary power generation, technology development for advanced energy technologies such as waste-to-power or hydrogen fuel will not reach sufficient maturity for deployment in a field mission environment (beyond potential pilot projects) in the time frame of this strategy.
- As noted above, even if technically and economically feasible, an entire replacement of infrastructure with more efficient equipment will have environmental consequences that could outweigh the environmental benefits: from the embodied energy of equipment manufacture to, most significantly, the disposal of old equipment. Even in the unlikely event that the constraints above are able to be overcome, wholesale replacement would need consideration of the environmental consequences.

3. PHASE TWO STRATEGY

3.1. STRATEGIC APPROACHES PER PILLAR

ENVIRONMENTAL MANAGEMENT SYSTEM

- Objective: *To introduce and maintain a system to mitigate adverse environmental impacts and enhance environmental performance in line with the UN's objectives.*

Strategic Approach: Phase 2 will focus on mainstreaming, such that appropriate long-term governance and organizational structures are in place, environmental considerations are incorporated into all relevant processes and functions, and a culture of high environmental awareness and accountability is present throughout the Peace operations and supporting organizations of the Secretariat, so that environmental best practice is "business as usual" by June 2023.

ENERGY

- Objective*: To reduce overall demand for energy through efficiencies, increase the proportion of energy sourced from renewables and reduce GHG emissions.*

Strategic Approach: With 14 Energy Infrastructure Management Plans developed by missions in Phase 1 for roughly US$50 million capital spend and supplemented by catalysing an additional US$40 million investment by the private sector through energy outsourcing projects, the focus in Phase 2 will be on supporting missions with timely and effective implementation of the plans, over 3-4 financial years. Common approaches across missions include:

- acceleration of deployment of energy efficient equipment and sensors with the availability of new global system contracts;
- centralisation of power generation and distribution (serving both UNOE and COE users) where feasible, while maintaining operational flexibility for T/PCC units; and
- implementation of renewable energy projects both inside and outside the fence, especially in the missions where renewable energy prices can be less than diesel generation (i.e. where current diesel generation costs are in the US$0.25-1.5/kWh range).

DOS will complement mission activities by undertaking systemic support work to:

- assist missions on engineering design of inside the fence projects and to assess the feasibility of outside the fence projects in their local context, facilitating partnerships where needed;
- develop turn-key contracts and/or leasing solutions for renewable energy (or leverage other UN agency contracts);
- develop standard contractual templates for energy outsourcing projects and a standard application form to accelerate internal project vetting;
- promote deployment of renewables by T/PCCs through the COE Working Group in 2023 and exploring Letters of Assist (LOAs) as a contractual alternative to MOUs, and
- continue the development of FRIM to enable missions to manage the operational efficiency of the power production fleet.

WATER AND WASTEWATER

- Objective: *To optimize the use of resources for water and wastewater operations while managing risk to personnel, local communities and ecosystems.*

Strategic Approach: Effective wastewater risk management requires rapid response and deployment when critical issues arise backed-up by medium to long-term solutions to offset the high capital and operation and maintenance costs of package wastewater treatment plants and their limited design-life. The Phase 2 approach will continue to be grounded in managing wastewater risk to protect local ecosystems while also advancing the following dimensions: reduction[16], removal[17], reuse[18], recycling[19], recovery[20] and re-thinking[21] (a 6R approach):

- Reduction will be achieved through sustainable abstraction, increased measurement, sensitization of personnel, water-use efficiencies, and greater attention to achieve fit-for-purpose treatment levels; all of which will also reduce downstream pollution risk and waste. The reduction of single-use plastics in the provision of potable water through greater quality assurance and safely managed drinking water services—available when needed and free from contamination—will also be a priority, working closely with the waste pillar (water-waste nexus).
- Removal of pollutants from wastewater prior to discharge will be in accordance with prescribed treatment levels.
- Wherever possible, every effort will be made to treat wastewater to substantially increase recycling and safe reuse. Water and Wastewater multi-year infrastructure upgrades will be driven through the development and implementation of mission-specific management plans. This work will design with the end in mind, ensuring technology is appropriate to meet both medium- and longer-term needs, so as to pave the way for infrastructure handover. Where external disposal sites are inappropriate, a cost benefit analysis will be integrated into the mission's management plan to support in-house/on-site treatment and tighter controls to fully address risk.
- Recovery will ensure water is re-used where possible and to provide a level of ambition for the post strategy implementation period, innovative solutions (for instance with the potential to recover energy/nutrients from wastewater) and thinking how water and wastewater initiatives support the peacebuilding effort, in partnership with local actors, will be explored.
- Re-thinking will address a shift to built-in place ablution facilities (to replace prefabricated ones) and overhead tanks (to reduce energy requirements). This work will also address reduction by enhancing specifications for goods that match trends in the supply market, for instance energy conservation and recovery using variable speed drives and IE5 motors (the water-energy nexus); a shift to easy-to-dispose lab reagents (Chemkeys); and water conservation, reuse and recycling by introducing technologies that support localized reuse of treated water.

Phase 2 will see the continuing roll out Internet of Things (IoT) technologies and solutions to bridge human resource gaps, increase efficiencies and reduce waste (this is also linked to the evolution of a Smart UN Camp).

Technical assistance in this Pillar will centre on enabling UNMISS, MINUSMA, MINUSCA, UNSOS and UNISFA to develop and implement robust water and wastewater management plans (WWMPs) so that sustainable and

[16] Reduce: prevent wastewater generation by the reduction of water usage and pollution reduction at source
[17] Removal/reclamation: application of effective technologies for the removal of pollutants from water and wastewater.
[18] Reuse: of wastewater as an alternative source of water supply (non-potable usage)
[19] Recycling: recovery of water from wastewater for alternative uses
[20] Recovery: of resources such as nutrients and energy from water-based waste
[21] Rethinking how to use resources to create a sustainable economy, which is `free` of waste and emissions

effective wastewater management is achieved, and risk adequately mitigated by the end of the strategy implementation period.

SOLID WASTE

- Objective: *To minimize solid and hazardous waste generation and improve waste management, reducing the level of risk to UN personnel, local communities and ecosystems.*

Strategic Approach: Missions through their waste management plans have committed to a range of strategic projects and initiatives to improve their waste management, the most significant being the development of centralised waste management yards (WMYs). With a total estimated spend during Phase 2 of US$67 million, these waste projects, aligned with the waste management hierarchy and 4R principles, will be supported by the provision of direct technical assistance, budgetary resources and strengthened project implementation mechanisms involving review, documentation and reporting. Comprehensive guidance and technical tools have and are being prepared to assist with the operationalization of WMYs and for piloting of composting, recycling and energy recovery initiatives. Where necessary, these will be piloted, to verify viability prior to up-scaling operations at missions. Supply chain management and monitoring will be improved to facilitate overall waste minimization and better hazardous waste management using a combination of supply chain metric analyses, life cycle assessments (e.g. cradle to grave), stock management, revised inventory and upgraded contract mechanisms for goods supply (e.g., takeback, improved material use) and contractual templates for waste disposal services (e.g. e-waste). Improved capacity will be achieved through the provision of technical guidance materials, practical training and information sharing through the Waste Working Group meetings and during Mission technical assistance visits. Assigned waste management officers will bring about improved monitoring and reporting of waste management activities. Innovative disposal and reuse solutions will be sought for problematic wastes such as ballistic protective equipment (e.g. Kevlar recycled for brake pads) and other hazardous wastes. Greater emphasis will be placed on preventative measures to avoid issues such as soil contamination and accumulated waste stockpiles and their associated high treatment and disposal costs.

WIDER IMPACT

- Objective: *To ensure that operational requirements are met in a way that takes account of environmental impact and to increase the extent to which the footprint leaves a positive legacy.*

Strategic Approach: Embed wider impact considerations in the work of each pillar in order to promote local sustainable development through mission's environmental projects. Support the establishment of stronger linkages between environmental drivers of conflict and mandate delivery.

3.2. ENVIRONMENTAL REPORTING AND STRATEGY LEVEL KPIS

A significant amount of work by HQ and missions has gone into establishing the accurate reporting of key environmental performance indicators. At the end of Phase 1 (i.e., data from the 2019/20 period) the data collection is considered robust enough for this period to be considered a reliable baseline for gauging progress of the strategy. However, as explained below, the baseline will likely need to be regularly recalculated.

Strategy KPI	2017/18	2018/19	2019/20	2020/21
Range of mission environmental management scores	N/A-80	N/A-87	N/A-88	N/A-89
Proportion of data measured (not estimated) (percentage)	46%	30%	65%	75%
Proportion of sites where environmental assessments were conducted	50%	67%	91%	88%
Generators fuel consumption (UNOE and COE) (L/cap/day)	4.51	4.88	4.46	3.95
Proportion of renewable energy	3%	3%	3%	5%
GHG emissions (TCO2eq/cap/year)	7.8	8.3	7.8	7.4
Freshwater use (L/cap/day)	121	127	146	124
Sites where wastewater assessed to pose a minimum risk (%)	33%	47%	64%	70%
Sites that use some alternative water sources (e.g., treated wastewater, collected rainwater) (%)	8%	18%	27%	25%
Generation of solid waste (kg/cap/day)	1.70	1.60	1.64	1.70
Sites where waste assessed to pose a minimum risk (%)	9%	20%	23%	16%
Share of waste with preferred disposal methods	20%	32%	40%	43%

Clearly, significant changes in operations, for example the opening or closing of a peacekeeping operation, will affect the reported figures. On the one hand, these changes are a true reflection of the operating footprint at a given time. On the other, significant changes make it impossible to determine whether the strategy is successfully reducing impacts and improving performance. For example, if a large mission were to close, reductions in fuel use are more likely to be due to this closure, than to increased efficiencies in the remaining missions.

It is usually the case that expressing such data on an intensity basis (e.g., per capita, per dollar) caters for changes in operational size. However, intensity based KPIs are not entirely immune from these issues because of the different operating contexts of the missions. In UN field missions, personnel numbers are considered the most appropriate intensity unit[22]. But a unit of "per capita per day" does not account for different usage patterns— missions with a high proportion of personnel accommodated on a 24/7 basis will have higher usage figure than those on an 8-hour (office use) basis. This means that if a large mission hosting personnel on a 24/7 basis closes, then, all things being equal, this can create an improvement in the overall KPIs simply due to the change in the mixof usage patterns in the remaining group (i.e. a higher proportion of staff on an 8-hour office basis). The same logic can apply across all metrics—if the "worst" performing site or mission closes, then clearly the KPIs will improve even if they are not a result of the strategy or of individual missions' direct actions.

[22] Note contractors performing roles relating to the mission mandate are included as the mission generally may be considered to have "operational control". Likewise, the common practice of provision of accommodation to other hosted entities (e.g. UNICEF, WFP) means that these entities are included in the calculation of KPIs. However, these are separated from the mission totals when reporting as part of the UN system (and allocated to those entities). It should be recognised that the personnel figures may not in fact be entirely representative of the number of people on the ground (e.g. does not account for those on rest and recuperation, training, visitors, etc.), and as COVID-19 has illustrated, personnel tables may not represent the actual occupancy at a given time. Surprisingly, it has been the determination of accurate personnel data which has proved a significant challenge in determining KPIs and baselines.

This also clearly highlights the difficulty in comparing KPIs between sites and missions or to other UN entities and organizations. These comparisons should be avoided, with the focus on improvement at individual sites and in aggregate.

To account for changes in organizational and operational setup, KPIs need to be recalculated whenever a material change occurs [23]. In practice this means the following:

- Where a site or mission is closed, this is removed from the baseline.
- Where a site or mission is opened, this is added to the baseline using a "baseline scenario" method.

As sites and missions are dynamic entities, this means that it is highly likely that the baseline will need to be recalculated. Certainly, it will need to be recalculated upon the closure of UNAMID in 20/21.

[23] For the purposes of the strategy a material change is any structural change which has an impact greater than that expected from the strategy outcomes. E.g. if structural change is 1% of the GHG footprint, but the strategy action changes are expected to result in 5% reductions, then it is immaterial. Conversely, if the structural change is 10%, but strategy actions are expected to result in 5% reductions, then it is material.

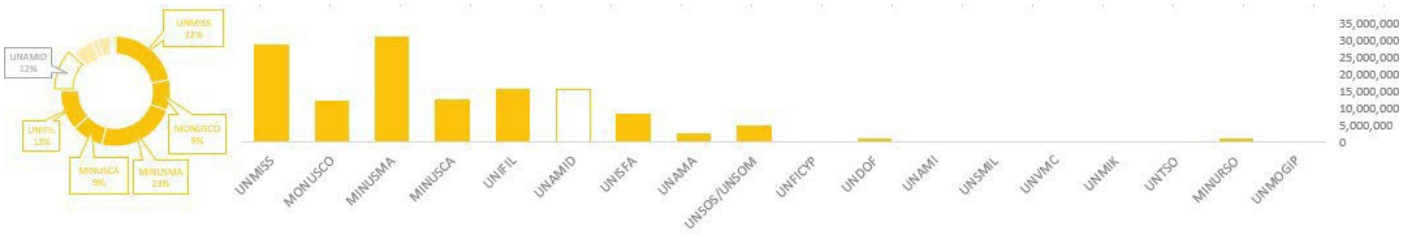
3.3. PRIORITIES AND KEY DELIVERABLES

3.3.1. MISSION OPPORTUNITIES

This section analyses the interventions and—where relevant—locations that would be likely to have the highest impact on improving key performance indicators in absolute terms across peace operations. This analysis is based on progress and achievements in Phase 1, in order to support missions with their ongoing planning in these areas. These opportunities consider both technical feasibility and the respective mission operating context but are subject to the constraints outlined in the *Challenges and Dependencies* section. More details on current mission commitments in relation to these areas during Phase 2 are provided in the *Mission plans and commitments* section.

ENERGY

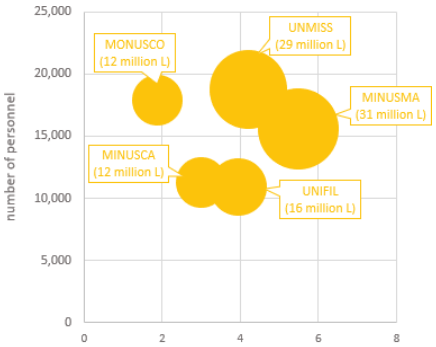
Electricity production in peace operations is the largest GHG emission source, accounting for almost half of emissions due to the widespread reliance on diesel for electricity generation. This is the key opportunity for improvement, as transport emissions are much harder to reduce due to mandated operational constraints and technological barriers, as described in more detail below.

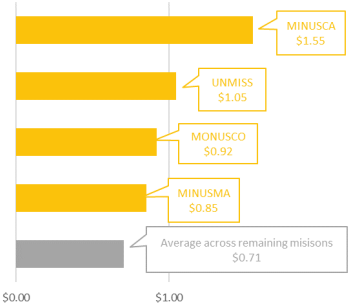


The highest fuel consumption for electricity generation is in MINUSMA and UNMISS. This is followed by UNIFIL, MINUSCA, MONUSCO and UNAMID[24]. Fuel use is generally correlated with the number of personnel, but as can be seen in the above figure, and in more detail to the right, there other factors: in the case of MONUSCO, fuel use is substantially lower due to the partial availability of renewable grids in parts of the country.

The missions with the highest diesel fuel costs, and therefore with higher economic returns from investment, are, in order: MINUSCA, UNMISS, MONUSCO, and MINUSMA (see figure to the bottom right).

While all missions have significant opportunities for improvement, it is the largest missions that present the biggest and most cost-effective opportunity to reduce the Secretariat's greenhouse gas footprint.





[24] Note fuel use by AMISOM is large, but is not shown in these figures. Fuel use on behalf of other UN entities (i.e. provided to hosted personnel) has also been excluded.

Demand-side Technology Improvement

Switchover of LEDs is well underway, and with a short ROI and a new systems contract anticipated in Q1 2021, close to 100% rollout is feasible by mid-2023. This contract also contains another suite of short payback period equipment: lighting sensors and AC thermostats and sensors and full deployment is also considered feasible within this timeframe. While it is expected that conversion to more efficient split AC units can be largely completed, only around 15% of the stock could be expected to be of the newest efficiency standard, given the lifecycle of the units and longer ROI. Likewise, though the new, more efficient, prefabricated buildings will be progressively rolled out, full replacement is not expected due to both the costs and associated lifecycle impacts (i.e. resource wastage of serviceable units), though low-cost interventions are possible for existing units, such as by increasing shading. As noted above, progress in the largest missions will represent the biggest opportunity, particularly in those with high electricity demand per capita.

Supply-side Technology Improvement

Enhancements to generators through rightsizing and synchronization (primarily in UNOE) progressed from 10% to around 50% in Phase 1, and this activity would be expected to be largely completed for all UNOE generator sets (with a suitable cost/benefit case) by 2023.

Deployment of Renewable energy

Phase 1 results and analysis indicates that it is technically feasible to roll out sufficient levels of renewable power to deliver the targets established in the UNSCAP (i.e. in line with IPCC recommendations and global ambitions). As discussed in more detail in the mission commitments section, Peace operations are currently expected to increase the renewable energy share to just under 15 % by 2023 (7.2% onsite solar, 6.5% grid connection, 1.2% offsite/energy-as-a-service), which is an 11% improvement from the end of Phase 1 baseline. With substantial commitments in train in MINUSMA (on site solar) and MONUSCO (grid connection), the additional upside opportunities are in MINUSCA and UNMISS, though further analysis will be required to assess the optimal way forward. UNMISS is commencing assessment on options to outsource energy supply where economically and environmentally favourable. In MINUSCA, the mission's energy consumption amounts to 20% of the host country, with most key sites located in towns or in proximity to local communities. Its sites do not have large land areas available for on-site renewable energy projects, which, together with favourable market conditions in the Central African Republic, suggests an outside the fence model which could stimulate investments in local renewable energy infrastructure in a country with one of the lowest rates of energy access in the world (estimated at less than a third of the country and mostly concentrated in the capital Bangui).

Transport

In some missions connected to a grid, UNOE vehicles can make up the bulk of diesel fuel use and up to half of greenhouse gas emissions (e.g. UNMIK and UNFICYP), and thus opportunities for electric vehicles (EVs) may be usefully pursued. However, these examples represent only 2% of total greenhouse gas emissions across peace operations and EVs cannot be more widely adopted while electricity is sourced from diesel generators. Even with increased share of renewables, the bulk of transport emissions come from aviation and COE military vehicles whose movements cannot be reduced for mandate and operational reasons. These vehicles will not have renewable options by the end of the strategy, and a 2050 timeframe is probably more realistic for significant reductions in this area. Thus the 2% figure is effectively the limit of reductions in this area by 2023, though implementation in selected missions.

WATER AND WASTEWATER

Phase 1 saw substantial reductions in wastewater risks across all missions and this is expected to continue in Phase 2. Based on the results achieved it is considered feasible to eliminate all significant wastewater risks (and maintain this), and to achieve best practice treatment at the vast majority of sites. The strategy to phase out packaged wastewater treatment plants reaching end of design-life and phase in either built-in place, low tech, or locally partnered solutions will also deliver significant risk reduction benefits. Phase 2 will also see the installation of smart water and wastewater quality sensors. With water quality sensors in place missions can provide safe drinking water to all personnel and provide up to the minute, automatic quality information that can be shared with users to build confidence (to reduce use of purchased bottled water) and wastewater quality sensors will enhance the mission's capacity to mitigate pollution risk in especially sensitive environments, as well as increasing the potential for safe reuse and recycling.

Wastewater risks

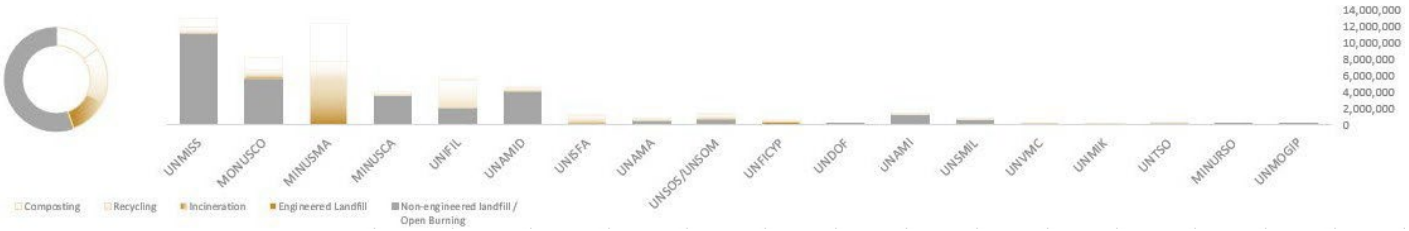
The remaining five locations of significant risk (UN House, Tomping, Malakal, Bentiu and Renk in UNMISS), are expected to be remedied in 2021. Many missions are exploring built-in place solutions, and these are particularly relevant in missions with higher pollution risk due to the heavy precipitation (increases the likelihood of overflows and easy pathways for pollutants to local water bodies) and where shallow groundwater levels limit attenuation through filtration through the soil (such that soak pits are less effective). Even in missions with climactic advantages, the sheer scale of the super camps lends themselves to these solutions, over maintaining large banks of energy intensive and technologically complex equipment. Highest priorities are the large super camps of UNMISS, MINUSCA, MINUSMA, UNSOS and UNISFA. By the end of Phase 2, super camps supporting over 1000 personnel will be in a good position to phase out modular systems, where feasible. it is estimated that half of the current fleet would fall into this bracket. Adequately sized and maintained septic systems, grease traps and oil-water separators, which play an essential pre-treatment role and increase efficacy, are of relatively minor expense, and their wholesale adoption is considered feasible by June 2023. The biggest opportunities for improvement are in MINUSCA, MINUSMA and UNMISS. At least eight (8) missions already report operating at 100% minimum wastewater risk and concerted efforts in the above could yield minimum risk levels across all Peace operations by the end of Phase 2.

Water use

It would be expected that investment in water use efficiency is correlated with water scarcity. However, as reductions in water consumption reduces wastewater flows, and thus treatment requirements (a key risk mitigation measure), investments may also be prioritised at sites located in wet areas prone to wastewater treatment risks, as discussed above. The installation of water efficient fixtures (available in the current ablution block systems contract) can yield reductions from one fifth (e.g., dual flush) to two thirds (e.g., low flow facets) in water use for these fixtures and these should be prioritised in areas with low water resources and wastewater treatment issues. Supplementary sources (e.g., rainwater) are limited by climactic conditions, though supplementing water use by treated wastewater is an option in locations with severely limiting water resources. In some locations, air-to-water generation is a rapidly deployable solution that allows for the diversification of water supply and increased water supply independence. Such technologies can be a more economical solution than supplying bottled water and also significantly reduces wastage. These reduction measures can also be complemented by smart meters to monitor water consumption and throughput. In summary, missions can be expected to continue to incrementally improve water consumption rates, with an emphasis on achieving the engineering design assumption of under 110 L per capita per day at sites with wastewater treatment issues and using appropriate supplementary or recycling technologies in areas of limited water resources. The missions on the higher end of the per capita water consumption spectrum are UNAMI, MINURSO and MONUSCO.

SOLID WASTE

Based on existing examples within missions and the strategic approach adopted, it is considered feasible to eliminate the dumping and open burning of wastes by mid-2023. In other words, it is anticipated that at the end of Phase 2, all waste disposal could be controlled though either best practice incineration or engineered landfill. The roll-out of equipment will significantly reduce volumes of disposal, such that only minimal levels end up in the ground. The key opportunities can be seen in the graph below.



Incineration and engineered landfills

While some missions have access to good municipal landfill facilities the majority do not and rely on less than ideal off-site (or in some cases, on-site) facilities. However, with the waste management systems contract award anticipated in Q2 2021 (and some local procurement to these specifications already underway), roll-out of best practice equipment is considered likely in the majority of missions in Phase 2. This could reduce volumes to landfill to less than 15% of existing levels and can make it more feasible to encapsulate / line landfill sites for ash disposal without the need for complicated leachate and methane treatment. Successful implementation of the strategy in UNMISS, MONUSCO and MINUSCA alone, could see volume reductions of waste to poorly engineered landfills by more than 100,000 cubic meters (20 million kilograms) per annum when compared to baseline levels.

Composting of organic wastes

Considering that organics can represent 40% of total solid wastes, only MINUSMA (38%) is close to this target with other missions ranging between 0-16%. There are no technological impediments, nor significant cost constraints, to achieving high rates of composting across all missions in Phase 2, thereby reducing disposal to landfill and resultant greenhouse gas emissions and leachate issues.

Recycling

Overall recycling rates are low and are only patchily implemented due to lack of local capacity. Recent investigations have identified some appropriate technological solutions that could be implemented by missions either on- or off-site, such as recycling of plastics using shredders, plastic moulders and reformulators to make other useful objects. In the meantime, plastic waste disposal to landfill will be significantly reduced (if not entirely eliminated) through incineration with appropriate emission scrubbers. Glass and metals are more likely to be able to be recycled locally, and the waste management systems contract will make available equipment (compactors and balers) to reduce volumes for more efficient reverse logistics to recycling facilities. These approaches can be most usefully deployed in missions with large camps (e.g. super camps) and those where the reverse logistics are favourable (such as MINUSMA and UNMISS).

Waste Minimisation

While some progress has been made on this topic, further analyses are required to identify the scale of the results of actions and interventions. Due to the logistics involved, material supply to missions is relatively tightly

controlled as packaging of goods for freight. There is room for improvement, particularly on stocking rates and packaging (materials), to reduce disposal. However, the potential results yet quantified.

3.3.2. MISSION PLANS AND COMMITMENTS

Energy

The commitments in Phase 2 are set out in the mission Energy Infrastructure Management Plans (EIMPs). These plans reflect a cumulative projected spend of roughly US$50 million, spread over 3-4 financial years plus an additional US$40 million investment by the private sector, stimulated by the outsourcing of energy supply under the "Energy-as-a-service" contract model.

Mission priorities reflect their intention to progress on intensifying and saturating mainstream energy efficiency activities, including replacement of existing lighting with LED lighting, turnover of HVAC units with more efficient units, installation of solar water heaters, sensors and solar streetlighting. To improve penetration of renewable energy, mission priorities reflect a shift towards energy outsourcing options (national grid connection, decentralised Power Purchase agreements (PPAs), leasing agreements), leveraging local and international momentum towards the growth of renewable energy infrastructure. A further shift on energy production is on the TCC side, with missions exploring where it is more economical to provide electricity to T/PCCs while retaining back up capacity from COE. Plans are also in place to improve the availability of energy data both in both UN- and Contingent-owned equipment. The following sections provide an overview of mission plans across the key activities.

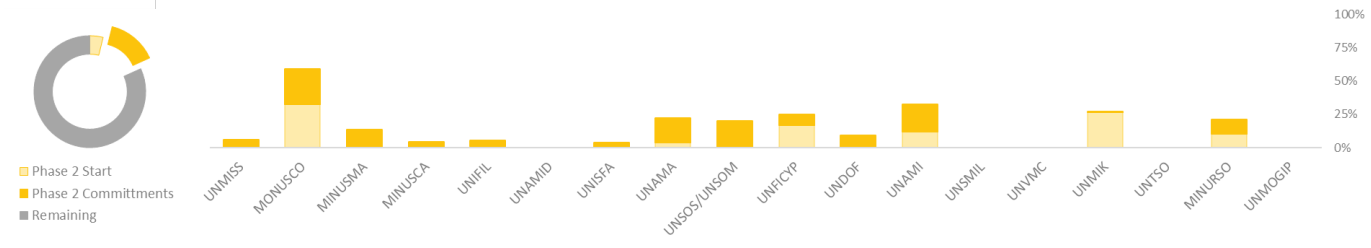
LED lighting

Missions are highly ambitious on the replacement of existing lighting with LED lights, with seven missions (MINUSMA, UNDOF, MONUSCO, MINURSO, MINUSCA, UNFICYP, UNSOS) planning to reach 100% LED penetration by 2023 and other missions planning to make significant progress. The total expected investment in this activity in the next three years is US$1.5 million.

HVAC Units

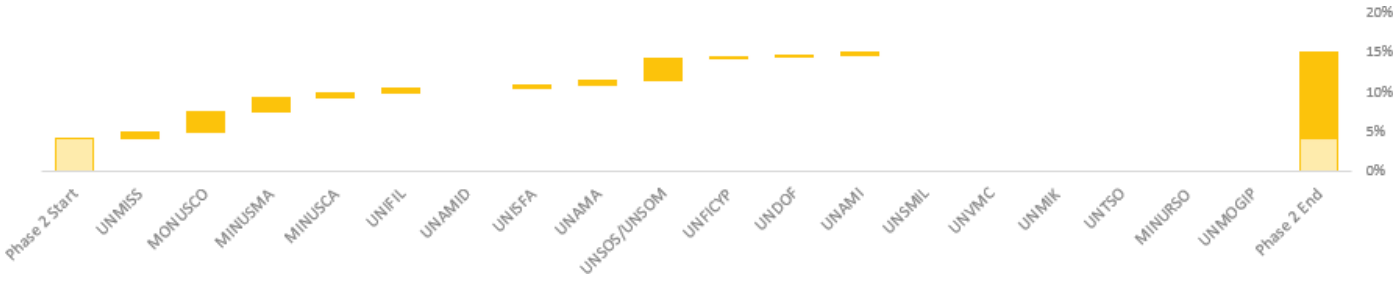
Replacement of old window type AC units and gradual turnover of existing inverter type units with split AC units which have a higher energy efficiency class and operate with R32 refrigerant are planned in the following missions: UNIFIL, UNMISS, MINUSMA, UNSOS, MONUSCO, UNISFA, UNAMA. Total expected investment in this activity in the next three years is of US$14.5 million, which will lead to a close to complete turnover of existing AC units to inverter type compressor units. Of these, roughly 15% will be of even higher energy efficiency and use low GWP refrigerants, and contain integrated motion sensors, through new systems contracts.

Renewable Energy



Overall, the projects currently outlined in the EIMPs are expected to lead to a cumulative renewable energy share of just under 15 % by 2023, which is an 11% improvement from the end of Phase 1 baseline. Increases to the

proportion of renewable energy in each mission is provided in the figure above. The overall contribution (and overall GHG reductions) is dependent on the respective energy share (size) of a given mission. This is shown in the graph below, which highlights that three missions (MINUSMA, MONUSCO, UNSOS) on their own can increase the renewable energy share by 7% through implementation of their EIMP approved projects. Nevertheless, the graph also shows that a significant contribution can still also come from smaller missions (e.g., UNAMA, UNAMI). In the case of UNAMA, the contribution comes mostly from the execution of one single project: connecting the HQ site to the local grid with a share of renewable energy of approximately 40%.



MONUSCO plans to connect five further sites to the local hydropower grid including sites in Goma, Bukavu, Uvira and Bunia reaching a renewable energy share close to 60% by 2023 with solicitations having already been launched for sites in Goma and Bukavu. These projects include the connection of Sake, which is a T/PCC site, further extending the benefits of having access to a sustainable local grid to the T/PCC.

Building on the Baidoa PPA project, which is planned for finalization in Q3 2021, UNSOS plans to explore further renewable energy projects. These include the connection of AAIA and Kismayo sites to local commercial energy providers in order to reduce energy costs and at the same time promote growth of local sustainable energy production infrastructure. These projects represent a significant step towards the UN fulfilling its security council mandate, stated by Security Council resolution S/2020/854, on supporting Somalia's efforts to advance the 2030 Agenda for Sustainable Development. Moreover, the mission plans to execute on-site renewable energy projects in AAIA, Dhobley and Beletweyne, exploring leasing solutions to circumvent the upfront investment barrier. These projects are expected to increase the renewable energy share to 20%. In order to promote synergies between the mission's EIMP and the development work of other UN agencies, the SRSG has established an environmental executive committee, with thematic working groups.

MINUSMA plans to increase its renewable energy share mostly through energy outsourcing projects, similar to the Bamako PPA which is planned to be executed in 2021. In order to achieve "economies of scale" and expand the benefits of the renewable energy projects to the T/PCCs, the mission will also explore the opportunity to connect the co-located T/PCCs in its super camps in Bamako, Gao, Mopti, and Timbuktu to a central UNOE powerhouse. Given the significant ongoing development work in Mali to restructure the local energy sector and increase energy access, there is an opportunity for the mission to act as an enabler for local energy development projects (e.g. in Gao), becoming a key project client and at the same time secure cost and environmental benefits.

UNIFIL plans to increase the on-site renewable energy power production, making use of its extensive land area especially in HQ Naqoura and Sector East, exploring both solar PV and small-scale wind energy. In the next three years the mission plans to install a further 1.1 MWp of solar PV systems and to pilot a wind turbine in one of its operating positions. The national grid in Lebanon is mostly powered by fossil fuels. The restructuring of the Lebanese energy sector, with planned regulations allowing independent power producers to increase local energy production capacity, provides the opportunity for UNIFIL to be able to enter into commercial agreements with private service providers, however this is not likely within the environment strategy period. However, in the interim, given the mature local private sector market, there are opportunities to explore renewable energy leasing

agreements and “energy efficiency as a service” models for the direct supply of renewable power to the mission (i.e., off-grid).

MINUSCA is currently completing the installation and commissioning of a 310 kWp solar PV system in Bangui and plans to install a further 290 kWp by 2022. The capital Bangui is powered by the Boali Hydroelectric power station and presently both the dam and the transmission line to Bangui are being rehabilitated to increase capacity and reliability of service. There is an opportunity under investigation for the mission to connect to the local government-owned grid in Bangui and attract investments in other renewable energy solutions in other mission sites, such as Bria and Bouar.

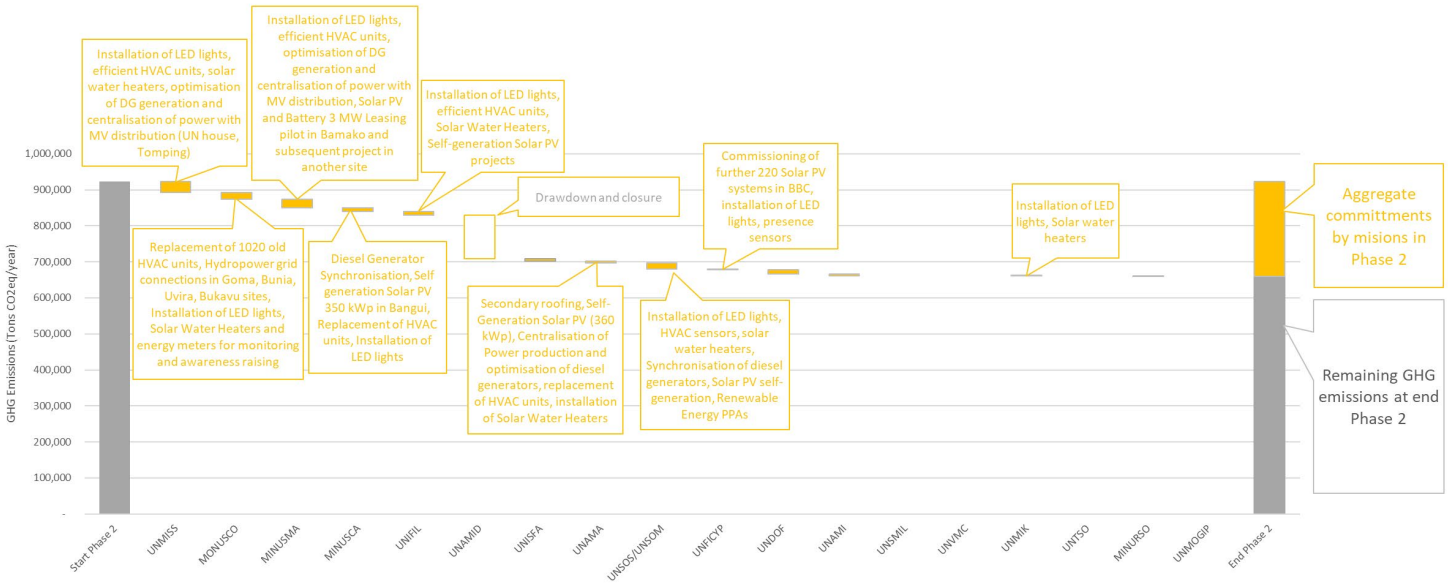
UNMISS has successfully commissioned a diesel generator grid-tied 1 MWp Solar PV system in Juba UN House site in Q4 2020 with the commissioning of a further 1.25 MWp Solar PV system in Wau expected to be accomplished by Q1 2021. Both systems are expected to lead to a share of renewable energy of almost 5%. The mission plans to explore further opportunities within Phase 2, with USD 1 M budgeted for FY 21/22 for renewable energy projects to be executed in various sites connecting co-located T/PCCs where feasible.

Energy Data

Missions plan to gradually install energy meters and roll out the FRIM system across all UNOE power houses and sequentially move to consumption side and COE energy production metering. FRIM deployment is scheduled to occur first in UNISFA and UNMIK, UNIFIL (already well underway), continuing on to UNAMA, UNFICYP, UNSOS and MINUSMA, and then to UNTSO, MINUSCA, MINURSO, MONUSCO, UNMISS with expected deployment by FY 2022/2023.

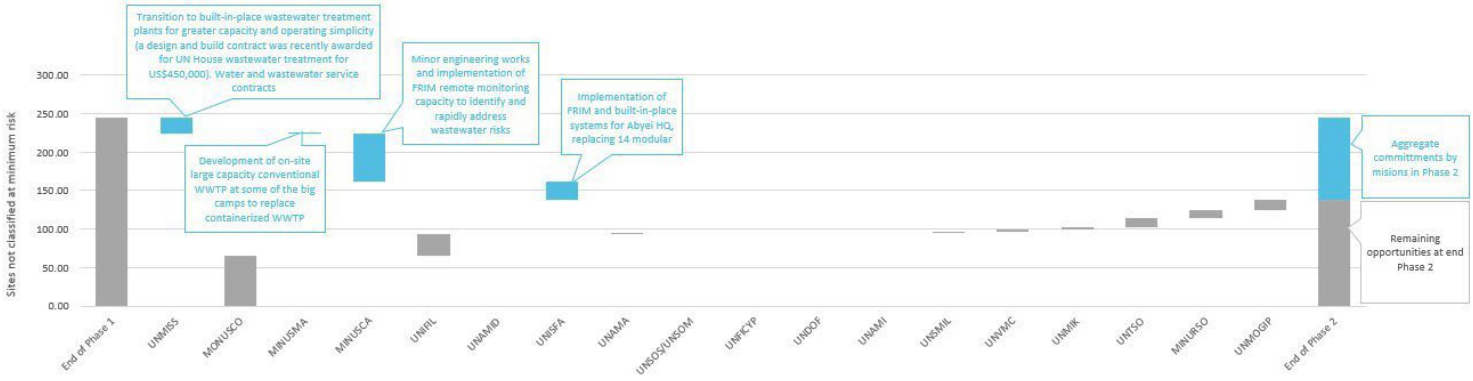
Net Result on GHG Emissions

The overall contribution to GHG emissions by the mission activities outlined in this section varies, based on the relative share of overall carbon emissions and the GHG intensity of their current footprints. Estimated projected GHG emissions reductions resulting from complete implementation of missions EIMPs is shown below. Successful implementation of their current EIMP projects would lead to GHG emissions reductions of approximately 15% of 2018 levels by end 2023. In addition, an equivalent reduction is brought about through the closure of UNAMID.



WATER AND WASTEWATER

Wastewater risks



The remaining five locations of significant risk (UN House, Tomping, Malakal, Bentiu and Renk in UNMISS), are expected to be remedied in 2021. UNMISS has also investigated built-in place systems, awarding a contract for the design and build of a 600m^3/day conventional activated sludge system to serve 3000 persons at a contract value of US$450,000 over 8 months at UN House. More plants and designs for other camps will be based on the success of this first one to reduce dependency on their large fleet of package wastewater treatment systems, of which 68 out of 91 are in operation.

MINUSMA has initiated a phased approach to shift to built-in place wastewater treatment systems, starting with Timbuktu and Gao, followed by Kidal and Mopti. The total estimate in MINUSMA's tender is under US$800,000, to meet the needs of 7500 persons in Gao and Timbuktu super camps. MINUSMA has been pressed for human resources to support the mission's efforts, and an end-to-end contract to outsource water and sanitation services will be out to market soon.

In MINUSCA, the large fleet of package wastewater treatment plants (49 out of 56 in operation, spread across the four main sectors), are being connected to FRIM to monitor operational parameters. The mission will continue to roll-out the various minor engineering works (grease traps and oil-water separation) to reduce risk levels.

UNISFA has also initiated its shift to built-in-place wastewater treatment systems and is currently out to tender for Abyei HQ.

Water use

UNMISS has initiated a project to pipe water from the River Nile, in partnership with UNICEF, to reduce heavy reliance on trucking—this project is at 90% completion and expected to be commissioned in early 2021. It is expected that all missions will progress the installation of water efficient fittings, though exact figures on this are not yet available until missions complete water and wastewater management plans. Approximately one quarter of demand planning (by spend) is for water supply equipment.

SOLID WASTE

Progress during Phase 2 will be primarily directed by mission strategies, projects and commitments under their waste management plans (WMPs). Currently a total of 12 out of 17 missions envisage investments ranging from US$0.06 – 23.5 million, for a total value exceeding US$67 million, over a three-year period (2020-23), to better meet acceptable standards of waste disposal and minimize risk.

The following graph provides details of mission commitments under the Waste Management Plans for Phase 2. In summary, of the almost 60 million kilograms of waste generated by missions, approximately one third was through improved treatment and disposal options in 19/20. The mission activities outlined below, can increase this to above 85% by the end of Phase 2.

By far the largest commitment during Phase 2 is towards the planned development of 69 waste management yards (WMYs) and the procurement of waste management equipment including incinerators (solid and biomedical), shredders, woodchippers, bulb crushers and automated composters.

MINUSCA is developing 13 WMYs and has recently procured 8 medical incinerators with 21 solid waste incinerators to arrive by end of March 2021. Procurement of 10 medium sized shredders is in the pipeline.

UNISFA have procured a total of 24 incinerators for 24 waste management yards, with the first and largest WMY in Abyei completed and under operation. This yard includes a glass crusher and an automated composter. The remaining WMYs are planned for construction over the next two years, as this is limited by the availability of aggregate materials. The mission is also procuring SMART weigh scales and intends to accurately calculate the precise quantities of generated wastes by type to get a better handle of waste management requirements and provide more robust reporting.

MONUSCO plans to develop 12 WMYs and has 4 existing incinerators and a large industrial shredder that will be reassigned for this purpose. Otherwise, the mission is awaiting the completion of the global systems contract for the procurement of the required additional waste management equipment.

UNMISS is to develop 10 WMYs, and has procured 6 medical incinerators, 8 medium sized solid waste incinerators, and is finalizing local procurement for 5 large incinerators with automated feeders and enhanced pollution controls. This mission also intends to procure other waste equipment such as shredders, bulb crushers and woodchippers via the Global Systems Contract. The mission is also committed to repairing the access roads to municipal dumpsites used by local communities as a legacy benefit.

MINUSCA and UNISFA intend to operate their WMYs using in-house resources. MINUSMA and UNSOS have been operating WMYs using service contractors for several years and continue to invest to improve these services, upgrade incineration equipment, and to expand and consolidate composting and recycling operations. UNSOS is currently commissioning large-scale incinerators with sophisticated pollution controls and automated feeders that will result in minimal emissions, which is critical since the main base is stationed alongside an airport.

A total of 6 missions recently procured a total of 158 air induced barrel incinerators for a total cost of US$327,000 to manage COVID-19 wastes and longer-term solid waste disposal, especially for remote sites and FOBs (UNDOF [3], MINURSO [17], MONUSCO [50], UNMISS [36], UNSOS [50] and UNGSC [2]). Operational SOP and SOR service contract templates have been developed to support these projects.

UNISFA and UNMISS have expressed interest in piloting plastics recycling while UNAMI plan to pilot bio-digestion for energy recovery. UNMISS also intends to investigate ways to reduces wastes associated with ration packs.

Several missions are currently tendering for e-waste contractors (MINUSMA, MONUSCO and UNAMID). All missions have committed to improving their overall hazardous waste management including undertaking soil remediation and disposal of problematic wastes (e.g. ballistics protective equipment) which will be a major focus of Phase 2 activities following the lessons learned from missions undergoing liquidation.

3.3.3. DIRECT SUPPORT FROM DOS TO MISSIONS

This section describes "direct", i.e. one-on-one support to missions, as opposed to the systemic assistance provided through multi-mission frameworks and approaches. It includes both on-ground and remote assistance. Support is to be provided upon mission request through the SOP established in 2017 which standardizes the approach for requesting, prioritizing and deploying on-ground technical assistance to missions, as well as processes for follow up actions.

ENVIRONMENTAL MANAGEMENT SYSTEMS

EMS support is primarily at the "system" level. However, there are several mission-specific support activities that can be expected to occur in Phase 2, including but by no means limited to, the following:

- Support to missions on site and risk assessment, either in-field or remotely (i.e. assistance with mission's own remote assessment of sites/focal points).
- EMS conformity assessment.
- Support to missions on data collection processes and systems.
- Verification and assurance of environmental reporting and environmental compliance.
- Ad-hoc support on a wide range of environmental issues, such as peer review of SOPs and processes, budgets and plans, environmental initiatives and awareness, EIAs and ECOAs, and assistance with OIOS and BOA findings and corrective actions.
- Co-ordination of the EMS assessment program across field missions, including the use of inter-mission assessment teams for competency development of environmental personnel.

ENERGY

Phase 2 will focus on supporting missions on the implementation of the EIMPs. Support available includes:

- Engineering design support for energy efficiency projects (e.g., LED lighting, HVAC units, Sensors) through development of energy project plans (EPPs).
- Development of demand plans and budget requests and justifications clearly showing economic and environmental benefits of upgrade projects.
- Assistance to missions in their strategic planning / and or trouble shooting of the roll-out.

Support will also be provided on implementation of renewable energy projects to facilitate:

- National grid connections (e.g. MONUSCO) and with green utility contracts where possible (candidate missions being MONUSCO, UNAMA, MINUSCA),
- New decentralised Power Purchase Agreements (PPA) (based on the UNSOS example) with candidate missions for this approach being UNMISS, MINUSMA, UNSOS, MINUSCA, and
- Entry into renewable energy leasing agreements (to be explored in MINUSMA, UNIFIL and UNSOS).

DOS is ready to support missions to assess feasibility of a range of out-sourced approaches requiring groundwork now, for likely implementation beyond the strategy period. Activities may include:

- Facilitate, with missions, the analysis of host country regulatory arrangements and opportunities, in partnership with lead agencies such as International Renewable Energy Agency (IRENA), World Bank and UNDP.
- Guide the missions on the possible delivery models and identify possible partnerships and assist with outreach activities.
- Support engagement with local energy sector regulatory authorities to scope project opportunities and to determine and assist in the obtaining of required licences and permits.
- Develop procurement documents (RFI, SOR etc.) for local procurement activities.
- Guide and participate in mission efforts to strengthen the integration of the mission's activities with the development work of other international organizations in country.

WATER & WASTEWATER

DOS will develop and promulgate an SOP on Water and Wastewater Management Planning, leveraging the work accomplished so far on EIMPs and WMPs, and assist missions to complete and implement them. DOS support available to missions on these plans includes:

- Design and development of SORs and support for effective tendering for built-in place wastewater treatment systems. This will leverage the processes already underway in UNMISS, UNISFA and MINUSMA.
- Assistance with the development of mission demand plans utilising practical templates—to standardise the approach and save engineers time—to ensure key spares and consumables while countering overstocking.
- Provision of enhanced end-user support under existing contracts focused on reducing waste and improving benefits on-ground.
- Development and provision of a tool for water and wastewater quality monitoring, as part of the implementation of the water and wastewater guidelines, and support in its application in missions to manage risk.
- Advocacy with mission management especially in the scoping, development and implementation of the water and wastewater management plan.
- Identification of possible partnerships, working closely with the mission e.g., with the UNCT to identify opportunities to extend in-house solutions to provide support to local community initiatives, such as irrigation with FAO.
- Provision of on-ground technical assistance to missions, including support towards the implementation of corrective actions identified through the on-going wastewater risk assessment process, as well as instituting a remote wastewater risk monitoring solution that relies on remote sensing.

SOLID WASTE

The following support is available to missions on solid and hazardous waste management:

- Revise WMP's in line with Phase 2 of the strategy.
- Development of business case justifications for waste management projects and initiatives for demand planning and budgeting cycle review.

- Design, commissioning and maintenance of enhanced waste management infrastructure / waste management yards.
- Provision of technical specifications and technical evaluation to facilitate local procurement of waste management equipment not covered by global contracts.
- Review of Mission SOWs for waste management service contracts to ensure alignment with goals of the environmental strategy and best practice criteria and provide an SOP and SOW templates for waste management operations and service contracts.
- Conduct supply metric analyses collaboratively with missions to identify areas of concern and solutions for product supply improvements (e.g. rations), especially for hazardous waste materials.
- Conduct training for waste equipment operations and hazardous waste management, treatment and disposal.

WIDER IMPACT

Direct support to missions on Wider Impact will focus on improving assessment/design and maximising the positive legacy benefits of mission infrastructure projects and their management and operation across all DOS Environment Strategy pillars (EMS, Energy, Water and Wastewater and Waste Management). DOS support available to missions includes:

- Partner with missions on the development of robust Environmental Impact Assessments of major projects.
- Provision of assistance to mission in identifying opportunities to incorporate positive legacy considerations into infrastructure projects that support mandate implementation and could lead to secondary and sustainable benefits for host communities, including, for example, achievement of the SDGs:
  - SDG 13 “Climate Action”
  - SDG 7 “Affordable and clean energy for all”
  - SDG 6 “Ensure access to water and sanitation for all”
  - SDG 12 “Responsible Consumption and Production”
  - SDG 15 “Life on Land”
  - SDG 9 “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”
- Expand engagement with host countries and development partners at both field, regional and global level to create opportunities for Wider Impact/Positive Legacy.
- Support cross-mission exchanges on Positive Legacy best practices and lessons-learned through Pillar Working Groups and a dedicated Positive Legacy Community of Practice, making use of documented good Wider Impact/Positive Legacy practices and concrete examples that can be replicated.
- Provision of guidance, and support training and awareness raising on Wider Impact/Positive Legacy to create additional support for Wider Impact/Positive Legacy interventions.

3.3.4. SYSTEM LEVEL IMPROVEMENTS

This section outlines key strategic deliverables at system level. It is not a comprehensive list of deliverables in that there are many other routine activities to be undertaken during Phase 2, as outlined throughout this document. However, the below identifies new areas of focus. This table will be developed into a cross-Departmental action plan, progress against which will be regularly considered by the DOS Senior Leadership Team.

Objective	Key Deliverables
Crosscutting / Environmental Management Systems (EMS)	
Ensure that Environmental Policy provides effective governance in line with the UNs expectations	• Revised and promulgated policy that incorporates current UN environmental doctrine and objectives
Support effective action planning and prioritization	• Scope and deliver a simple but effective system to ensure that environmental actions feed into mission demand planning
Ensure coherent and consistent approach in environmental management and mainstreaming in operations across all components and support functions	• Review category management and supply chain strategies, and solicitation schedules, to ensure the implementation of environmental mandates. • Create and maintain a register of priority goods and services to ensure integration of appropriate and relevant environmental considerations in their sourcing (such as total cost of ownership and life-cycle considerations, especially disposal) • Establish a project to initiate a range of nexus/crosscutting working groups to stimulate mainstreaming across multiple functions e.g., single-use plastic reductions (water and waste), biogas (waste and energy), etc.
Build and maintain partnerships that support and contribute to the realisation of the Strategy	• Establish formal and informal partnerships with private sector, bilateral governments, development agencies/funds, EU, IRENA, IFC and other actors as relevant
Build and maintain a clear knowledge management platform for environmental doctrine	• Consolidate all available documented environmental information in the knowledge management portal • Provide a schedule of documents under preparation
Ensure all relevant personnel have the expertise and skills to incorporate environmental considerations and deliver objectives in their roles	• Complete environmental auditing training programs for environmental officers and their teams • Scope mechanism by which key environmental information and documents can be communicated in an engaging way to increase awareness of requirements and objectives • Complete scoping of needs for the technical pillars and

	deliver a plan for the roll-out of training to missions in a defined and structured program
Enhance environmental performance evaluation and accountability	• Deliver eAPP version 2.0, complete with enhancements to facilitate reporting on compliance with UN environmental policies and other mandates
Establish a structured system assessment and improvement process in line with accepted organisation and industry standards	• EMS internal assessment and conformity assessment schedule comprising intra-mission peer review of environmental management processes using trained and competent environmental officers
Map post-strategy implementation approach and aspirations	• Deliver proposal for post-strategy approach and resourcing
ENERGY PILLAR	
Strategic overview and support on implementation of energy infrastructure management plans (EIMPs)	• Delivery of comprehensive and ambitious EIMPs in partnership with missions • Complete annual review and analysis of EIMPs and status of implementation • Deliver an Energy category management strategy to support missions in the implementation of their EIMPs. • Deliver sourcing solutions for relevant goods and services, including inter alia: – Solar solutions, including PV equipment, and hybrid solution – Engineering, procuring and contracting (EPC) solutions for turnkey energy projects – Air conditioning solutions Category 1 – Air conditioning solutions Category 2 and 3 – Solar Streetlights – Solar Water heaters – Diesel generators – Medium voltage equipment and transformers for grid connection template scope of requirements – Template scope of requirements/methodology for energy Power Purchase/Leasing Agreements vetted by OLA – Template scope of requirements for installation/commissioning/maintenance services
Increase COE power generation efficiency and proportion of renewables	• Identify data entry opportunities (e.g. KVA, kWh) in UCM for COE management system (retrieved through COE inspections) • Develop a COE generator dashboard to identify priority sites for increased efficiency and develop site energy plans in partnership with missions (use UCM data) • Develop enhanced checklists for engineering counterparts for ORI (COE inspections) to enable better analysis of energy information, and communicate output

	• Find opportunities for MOU amendments across all missions, including identification of amendment opportunities by Core Team Energy Pillar through EIMP work and Support form UCSD for the MOU amendments • If required, train COE inspectors on retrieval of required energy data • Amend the standard diesel generator KVA capacity per person specified in the DFS 2016 Standard Costs and Ratios Manual and include limitations in the Env Policy • Develop a paper on renewable energy incentives for T/PCCs for consideration by the COE 2023 working group, in partnership with member states • Identify a Pilot on Letters of Assist for the deployment of renewable power – (e.g. Bangladesh/Italy/USA) • Develop mission specific SURs to establish a minimum performance criteria for equipment deployed by T/PCC and amend standard SUR template • Establish a working group on renewables with Member States (share lessons learned, explore bilateral partnerships)
Enable availability of site energy data for analysis and reporting purposes	• Roll out of FRIM sensors and integration of eFMS and FRIM platforms to provide consistent fuel and electricity usage data in missions • Collect key parameters from power generation and consumption equipment and develop dashboards to achieve operating efficiencies and support O&M services
WATER & WASTEWATER	
Promulgate operational guidance	• Water and Wastewater Manual • SOP on Significant Wastewater Risk Determination and Reporting • SOP on the Development of Wastewater Management Plans • Guidance on environmental management during temporary deployments (Consolidation of pre-existing guidance + development of additional guidance): - Guidelines on temporary deployments (UNMISS) - Practical guidance developed on risk assessment in TOBs (MINUSCA) - COE issue paper on wastewater management - Development of standardized equipment kits for mobile deployments (e.g., MONUSCO) - Explore the possibility to add guidance as an Appendix in the OMA Military Commander Manual • COE issue paper on wastewater management
Strategic overview and support on implementation of water and wastewater management plans (WWwMPs)	• Delivery of comprehensive and pragmatic WwMPs in partnership with missions: - UNMISS (support on-going) MONUSCO and MINUSCA: on-

	ground deployments scheduled Q1&Q2 - Missions will be prioritized for support according to the size, context and potential risk profile in establishing WwMP • Complete annual review and analysis of WwMPs and status of implementation • Deliver sourcing solutions for the goods and services required by missions to implement their WWwMPs, through the delivery of the water and wastewater category management strategy, including *inter alia*: – A range of wastewater treatment systems that meet the business needs – Water efficient fittings and a catalogue of other materials – Water/wastewater quality sensors – Water/Wastewater analytical equipment catalogue contract – Regional/local systems contracts and options to piggyback where viable – Template scope of requirements for end-to-end water and wastewater services, e.g., operation and maintenance checklists – Engineering, procuring and contracting solutions for built-in place wastewater treatment systems – Develop a scope of requirement / scope of works for built in place water treatment systems
Enhance water/wastewater and risk data	• Roll out the FRIM platform to deliver the data required to support effective analysis of water and wastewater usage and the operation and maintenance of wastewater treatment plants.
Promulgate operational guidance	• Waste Management Handbook
Strategic overview and support on implementation of solid waste management plans (WMPs)	• Delivery of comprehensive and ambitious WMPs in partnership with missions. • Complete annual review and analysis of WMPs and status of implementation • Deliver sourcing solutions for the goods and services required by missions to implement their WMPs, through the delivery of the waste category management strategy, including *inter alia*: – Systems contract for waste management equipment (incinerators, balers, shredders) – SOR Biodigesters/Local procurement – SOR Composters/Local procurement – SOR Cardboard briquette presses/Local Procurement – Plastic extruders, injection moulding and plastic floss equipment, etc.

	– Template Scope of Requirements (SORs) for waste disposal services, including hazardous waste, – Template Standard Operating Procedures (SOPs) for WMYs and waste equipment installation/commissioning/maintenance services – Takeback solutions for applicable materials e.g. large supply products (e.g., HVAC, PV, electronics) and hazardous goods (e.g., water laboratory reagents)
Ensure best practices during liquidation	• Environmental clean-up and Waste Management paper capturing lessons learnt from liquidation • Ongoing updates of the environmental closeout assessment and site closure addendum checklists/processes
Enhance waste data and improve hazardous material controls	• Undertake a supply chain analysis to identify waste impacts in order to determine upstream improvements to material specifications in order to reduce amounts of waste disposal • Complete analysis using Umoja to determine hazardous material inventories, rates of usage vs. expiration, and determine an appropriate inventory management solution for hazardous materials (e.g. guidance note)
WIDER IMPACT	
Strategic overview and support on implementation of environmental impact assessment plans	• Delivery of robust and pragmatic EIAs in partnership with missions • Complete annual review and analysis of EIAs and status of implementation of environmental recommendations, and provide recommendations on potential revisions to EIA SOP
Routine consideration of the potential for positive legacy in environmental infrastructure projects	• Identify project types that have positive legacy benefits and support missions in the design and implementation of such projects to amplify secondary and sustainable benefits for host communities and governments. • Convene a Community of Practice to identify and analyse examples, solutions and lessons learnt and provide guidance and training on how to effectively mainstream positive legacy into infrastructure projects. • Expand engagement with host countries and development partners (including through the DSRSG/HC/RC) at both field, regional and global level.