TERMINAL EVALUATION OF THE GEF/UNDP PROJECT IN SUDAN ENTITLED "LEAPFROGGING SUDAN'S MARKETS TO MORE EFFICIENT LIGHTING AND AIR CONDITIONERS."

Terminal Evaluation REPORT

June 26, 2024

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ACKNOWLEDGEMENTS

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LIST OF ACRONYMS AND ABBREVIATIONS

A/C	Air Conditioning
APR	Annual Progress Report
AWP	Annual Work Plan
CEO	Chief Executive Officer
COVID-19	Coronavirus pandemic
DIM	Direct Implementation Modality
EE	Energy Efficient
ET	Evaluation Team
ERA	Electricity Regulatory Authority
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Gigahertz
HEAT GmbH	Consulting Company
HQ	Headquarters
IT	Information Technology
Log-Frame	Logical Framework
MEPS	Minimum Energy Performance Standards
M&E	Monitoring and Evaluation
MSPs	Medium-sized Projects
MTR	Mid-term Review
MWRIE	Ministry of Water Resources, Irrigation and Electricity
MVE	Monitoring, Verification and Enforcement
NDC	Nationally Determined Contributions
NEEAP	National Energy Efficiency Action Plan
NERC	National Energy Research Centre
NIC	Sudan National Information Centre NIC
NIM	National Implementation Modality
NLTC	National Lighting Test Centre (China)
OTB	OUT the Box Consultancy
SSMO	Sudan Standards and Metrology Organization

SSTrC	South-South and Triangular Cooperation
PIF	Project Implementation Framework
PIR(s)	Project Implementation Report(s)
PM	Project Manager
PMU	Project Management Unit
PPG	Project Preparation Grant (GEF)
PRODOC	Project Document
RF	Results Framework
RFP	Request for Proposal
SDG/SDGs	Sustainable Development Goal(s)
SEDCO	Sudanese Electricity Distribution Company
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
U4E	United for Efficiency (Private-Public partnership linked to UNEP)
UNDP	United Nations Development Programme
UNEG	United Nations Evaluation Group
UNEP	United Nations Environment Programme
W	Watt(s)

EXECUTIVE SUMMARY

TABLE 1- PROJECT DETAILS

Project Details		Project Milestones	
Project Title	Leapfrogging Sudan's markets to more efficient lighting and air conditioners	PIF Approval Date:	21 October 2015
UNDP Project ID (PIMS #):	5674	CEO Endorsement Date (FSP)	16 October 2018
GEF Project ID:	9328	ProDoc Signature Date:	11 February 2019
UNDP Atlas Business Unit, Award ID, Project ID:	SDN10	Date Project Manager hired:	April 2019
Country/Countries:	Sudan	Inception Workshop Date:	Not held
Region:	Arab States	Mid-Term Review Completion	*NA*
Focal Area:	Climate Change – Mitigation	Terminal Evaluation Completion date:	
GEF Operational Programme or	Climate Change –CCM 1	Planned Operational Closure	August 14, 2024
Trust Fund:	GEF Trust Fund		
Implementing Partner (GEF Executing Entity):	Electricity Regulatory Authority (ERA)		
NGOs/CBOs involvement:			
Private sector involvement:			
Geospatial coordinates of	*NA [Coordinates are available in the annual PIRs]*		

Financial Information:		
PDF/PPG	at approval (US$M)	at PDF/PPG completion (US$M)
GEF PDF/PPG grants for project preparation	80,000	80,000
Co-financing for project preparation	0	0
Project	At CEO Endorsement (US$M)	At TE (US$M)
[1] UNDP contribution:	0	0
[2] Government		
[3] Other multi-/bilateral:	250,000	0
[4] Private Sector:	0	0
[5] NGOs	0	0
[6] Total co-financing [1 + 2 + 3 + 4 + 5]:	**5,606,000**	
[7] Total GEF funding:	**1,770,000**	866,514.93
[8] Total Project Funding [6 + 7]	**7,376,000**	866,514.93

BRIEF DESCRIPTION OF THE PROJECT

Preparatory work on the project began with the Project Implementation Framework (PIF) Approval on October 21, 2015, and the CEO Endorsement Date on October 16, 2018. The full project was originally scheduled to be implemented over 48 months, between January 2019 to January 2023. However, it was officially signed in February 2019, a month later than initially planned and the recruitment of the Project Management Unit was not completed until the end of April 2019. In April of the same year, the country experienced political upheaval with the overthrow of the President and subsequent government restructuring, impacting key ministries and institutions crucial to the project, including the implementing partner which led to delays in project starting the project activities. Further delays were attributed to the transfer of funds to the implementing agent and then the COVID 19 pandemic came into play and de-facto work on project implementation did not start in full until late 2020. Therefore, in practice, the project was truly operational between October 2020 and April 2023.

The logic of the project´s implementation can be found in the project strategy and the Results Framework both prominent in the Project Document. The Evaluation Team analysed this logic and found that the project design was indeed logical, as the causal links between activities, outputs, outcomes, and the objectives were well established.

The Objective of the project is "To transform Sudan's market for energy efficient (EE) lighting and air conditioners, and thereby providing climate change mitigations benefits and decreased energy poverty." The project was designed with five components. The first was to develop a national strategy to advance energy efficiency in lighting and air conditioners as part of the National Energy Efficiency Action plan (NEEAP). The second was geared toward the adoption of regulatory mechanisms directing the market towards energy efficient lighting products and air conditioners, including Minimum Energy Performance Standards (MEPS), labelling scheme, testing, and importing procedures. The third was the adoption of a Monitoring, Verification, and Enforcement (MVE) system, to ensure that products in the market comply with the established MEPS. The fourth was to create awareness of the new MEPS and regulatory mechanism amongst government decision makers, manufacturers, importers and the public at large and the fifth was to enhance environmentally sound management of lighting products and air conditioners.

The project is part of the UNDP portfolio under Outcome 2: Enhancing the resilience of populations vulnerable to environmental risks and climate change and improving the effectiveness of relevant institutions in the sustainable management of natural resources.

SUMMARY OF FINDINGS, LESSONS LEARNED AND RECOMMENDATIONS

Based on the review of the documentation, the interviews carried out and their analysis, the Evaluation Team (ET) rates the project as per the table below.

Table 2 – Evaluation Rating Table for Leapfrogging Sudan's markets to more efficient lighting and air conditioners

MONITORING AND EVALUATION (M&E)	**RATING**
M & E Design at entry	Satisfactory
M&E Plan Implementation	Moderately Satisfactory
Overall Quality of M&E	Moderately Satisfactory
IMPLEMENTATION AND EXECUTION	**RATING**
Quality of UNDP Implementation and Oversight	Moderately Satisfactory
Quality of Implementing Partner Execution	Satisfactory
Overall Quality of Implementation/Execution	Satisfactory
ASSESMENT OF OUTCOMES	**RATING**
Relevance	Of High Relevance
Effectiveness	Moderately Unsatisfactory
Efficiency	Moderately Satisfactory
Overall Project Outcome Rating	Moderately Satisfactory
SUSTAINABILITY	**RATING**
Financial Resources	Unlikely
Socio-political	Moderately Unlikely
Institutional Framework and Governance	Moderately likely
Environmental	Moderately Unlikely
Overall likelihood of Sustainability	Moderately Unlikely

The explanations for these ratings can be found in the scale below:

Table 3 TE Rating Scales

Ratings for Outcomes, Effectiveness, Efficiency, M&E, Implementation/Oversight, Execution, Relevance	**Sustainability ratings:**
• 6= Highly Satisfactory (HS): exceeds expectations and/or no shortcomings • 5 = Satisfactory (S): meets expectations and/or no or minor shortcomings • 4 = Moderately Satisfactory (MS): meets expectations and/or some shortcomings • 3 = Moderately Unsatisfactory (MU): below expectations and/or significant shortcomings • 2 = Unsatisfactory (U): substantially below expectations and/or major shortcomings • 1 = Highly Unsatisfactory (HU): severe shortcomings • Unable to Assess (U/A): available information does not allow	• 4 = Likely (L): negligible risks to sustainability • 3 = Moderately Likely (ML): moderate risks to sustainability • 2 = Moderately Unlikely (MU): significant risks to sustainability • 1 = Unlikely (U): severe risks to sustainability • Unable to Assess (U/A): Unable to assess the expected incidence and magnitude of risks to sustainability

Relevance: The project's objectives are fully aligned with the Government of Sudan's national priorities and the strategic priorities of Global Environment Facility (GEF) and the United Nations Development Programme (UNDP). Creating a conducive environment for the adoption of more efficient lighting and appliances is essential for achieving energy savings and improving electricity accessibility. This is particularly vital for the country, especially in light of the electricity shortages it faces.

Effectiveness: The project completed numerous activities and achieved notable advancements in three components while showing moderate progress in one and limited progress in another. **Component 1, Development of a national strategy to advance energy efficiency in lighting and air conditioners, as part of the National Energy Efficiency Action plan (NEEAP)** achieved its primary goal by developing a national strategy to enhance energy efficiency in lighting and air conditioning within the NEEAP framework. Under **component 2 Adoption of regulatory mechanisms directing the market towards energy efficient lighting products and air conditioners, including minimum energy performance standards (MEPS), labelling scheme, testing and importing procedure,** Sudan's Minimum Energy Performance Standards and Labelling for five appliances (Lighting, Air Conditioners, Refrigerators, Evaporative Coolers, and Fans) were developed. Testing standards for the same five appliances were identified and incorporated into the MEPS. However, the implementation of a financing mechanism for the purchase of energy-efficient appliances was not accomplished. Progress under **component 3, Adoption of monitoring, verification, and enforcement (MVE) system, to ensure that products in the market comply with the established MEPS** is moderate: A study covering the MVE within the Sudan Energy Efficiency Strategy was completed. Key national stakeholders were trained on the safe handling of natural refrigerants, MEPS, MVE, metrics, and energy testing standards. The project also conducted a baseline assessment for in-country capacity to undertake the required testing procedure, including the cost efficiency of establishing a testing facility. Progress under **component 4, Awareness-building of the new MEPS and regulatory mechanism** was limited; an awareness campaign targeting school children was conducted in four states, reaching 4177 pupils in six schools. The campaign distributed 5000 copies of an educational comic book designed to teach school children. However, the primary public awareness campaigns were not implemented (scheduled to be implemented as of June 2023). Under **component 5: Enhancing environmentally sound management of lighting products and air conditioners,** the end-of-life management plan was developed and integrated into the national MEPs.

Efficiency: The project demonstrated efficient use of resources; the project managed to complete 68% of the planned activities using only 46% of the project budget. Moreover, while the project, as designed, sought to improve energy efficiency through improved lighting and air-conditioning, without requiring additional resources, it also covered refrigeration, air-coolers and fans. The savings were made possible by the efficient way in which the project negotiated with the various subcontractors as well as with the coordination and task assignments implemented through various working committees. In terms of compliance with adequate accounting standards and UNDP financial rules and regulations, a project audit carried out by certified external auditors found that the funds were being used in full compliance with those standards.

Sustainability: The project has progressed well in developing institutional frameworks and systems and increased awareness about the role of Energy Efficiency (EE) and the importance of EE appliances among

the key national actors. The risk of brain drains and the erosion of institutional memory[1] due to 2023 civil unrest pose threats to Socio-political and Institutional Framework sustainability.

Where the Evaluation Team has serious concerns is in respect of the sustainability over time of the results achieved and what if any impact it might have on the consumption per-capita of electricity in Sudan, as well as its possible negligeable impact on CO_2 emissions. As per the project´s design, the project was to be complemented by a series of contributions from various government agencies in the form of "parallel financing". Amongst these, the Sudan Standards and Metrology Organisation (SSMO) as to contribute the equivalent of US$ 2,756,000 in cash which was to serve two major purposes, to purchase the lab equipment necessary to measure compliance with the Minimum Energy Performance Standards (MEPS) and to adapt the necessary premises to house that equipment. Unfortunately, this financing has not materialized, and the Evaluation Team fears that given the enormity of the resources that will be required for reconstruction of basic infrastructure, the SSMO may not be given the resources to meet that commitment. All that has been accomplished to date under the project is of little use if the monitoring and verification equipment is not there. Under annex IV at the end of the report you will find tables with the estimated costing for this, and the Evaluation Team will make a recommendation toward overcoming this major shortcoming.

Gender: The project's gender results[2] focus on process indicators. The project reported gender results, including representation of females in project management structures, participation of women in capacity-building training and workshops and study visits, and inclusion in the Awareness Campaign targeting male and female pupils. Although there are no gender outcome indicators within the results framework, the project is anticipated to positively contribute to gender outcomes.

LESSONS LEARNED

- All funding offered by the government or third parties that is required to complete vital project components should be an integral part of the project budget and therefore should be received as a Cost Sharing contribution (not as Parallel Financing). This will guarantee that the funding for all vital project components is indeed available, are reflected in the project budget and that the corresponding OUTPUT and ACTIVITIES are included in the project´s Results Framework.
- Conflict and post-conflict environments present unique challenges to project implementation due to the rapidly changing environment and the socio-political complexities involved. As such, frequent engagement with project stakeholders is required to enable them to stay abreast of changes, assess their impact on project activities, and adapt plans accordingly. Moreover, more frequent meetings improve following up on meeting outcomes and improve partnerships. UNDP should consider increasing the frequency of project board meetings to more than once per year and establish a mechanism to follow-up the outcomes of these meetings as well as other meeting.
- Considering the extended GEF's programming duration, with a significant time between PIF, project document development, and project start, Monitoring and Evaluation (M&E) tools like inception workshops and Mid-Term Reviews (MTR) hold heightened importance, particularly in complex situations. These tools are pivotal in enhancing the project's adaptive management and should be seen as more than a compliance requirement.

[1] Most stakeholders which were based in Khartoum have had to disperse throughout the country and in many cases left Sudan.

[2] Defined as project results that have been found to be contributing to gender equality and women's empowerment

- Country ownership is essential for project results' success and sustainability. Fostering strong technical ownership, achieved through meaningful engagement and capacity development of national actors, enhances efficiency and enables country ownership, especially when financial ownership is weak due to limited national financial resources.

TABLE 4- RECOMMENDATIONS

TE Recommendation	Entity Responsible	Indicative Timeframe
RECOMMENDATION No. 1 Realizing that the investment to date (over US$800,000) as well as the achievements of the project (Energy Efficiency Strategy, Minimum Energy Performance Standards for 5 categories, labelling reflecting the MEPS, trained staff and created and conducted some awareness activities) will only be of value if two vital sets of key complementary activities are completed (basic metrological equipment is bought and installed and a market incentives mechanism is in place). the Evaluation Team strongly recommends that either the project be extended for a period of one year to achieve this, or include the remaining work within the framework of a new GEF-funded project	**GEF and UNDP**	**September 2024**
RECOMMENDATION No. 2 The capacity of the UNDP Office should be reviewed and strengthened as required, to be able to assist the Government in implementing either the extension or the new project (as recommended in the previous point). The Evaluation Team is convinced that this recommendation should be seen in the current context, when the reconstruction effort of Sudan will in all probability require substantial UNDP involvement at a time when the Government is weakest and will require greater support from UNDP office in disbursing funds correctly and in a timely manner, as well as accounting for them appropriately	**UNDP Office management**	**June 2025**
RECOMMENDATION No. 3 The project has produced a substantial volume of information, analysis, knowledge products, standards, and regulations. All project materials, such as policy documents, analyses, best practices, and standards, must be documented, categorized, and transferred to pertinent partners and government bodies. It's imperative that the resources be made available and accessible to the EE stakeholders to motivate their utilization. **This could involve**: I. Gather, categorize, and arrange all project materials, encompassing documents, studies, best practices, and standards. II. Review and update the EE appliances stakeholder mapping to identify any changes that have occurred in the last months. III. Deliver the pertinent product/documents to the appropriate organization and guarantee that ERA possesses a backup copy. IV. Ensure that the website is operational.	**ERA and the Programme Unit (UNDP Office in Sudan)**	**October 2024**
RECOMMENDATION No. 4 Follow-up to ensure the full adoption of Sudan Minimum Energy Performance Standards through a phased approach. Phase 1 would focus on imported appliances, followed by phase 2, which would target domestically manufactured ones.	**SSMO**	**March 2025**

I. INTRODUCTION

PURPOSE OF THE EVALUATION

The GEF Evaluation Policy (2019) specifies that all medium-sized projects (MSPs), projects with a GEF grant value of over US$500,000 up to US$2 million, must complete a Terminal Evaluation (TE). the UNDP Office in Sudan has contracted a team of consultants to undertake this task. The purpose of the evaluation is to provide the project stakeholders, GEF, UNDP, and the national partners with an independent assessment of project results and performance to improve the sustainability of the project's benefits and contribute to improving the overall UNDP programme. The TE is also meant to promote accountability and transparency.

OBJECTIVES OF THE EVALUATION

- Based on the project´s Theory of Change and the Results Framework (Log-Frame), generate evidence on the advances achieved so far, including documenting any lessons learned, as well as any effective strategies or best practices identified.

- Assess the project's relevance, coherence, effectiveness, efficiency and sustainability.

- Integrate targeted recommendations including aspects such as lessons learned, good practices gender impact and identify follow-up actions.

CAVEAT

This remote Evaluation is happening under extraordinary circumstances. Most stakeholders which were based in Khartoum have had to disperse throughout the country and in many cases even leave Sudan. The UNDP office has had to move to Port Sudan. Communications via internet with all the potential interviewees are difficult at best and sometimes non-existent. Many persons outside Sudan do not necessarily have access to all their records and documents. Interviewees numbered ___ distributed in 7 countries in the Middle East two in Europe and two in North America.

In spite of these very limiting circumstances, the evaluators (while applying classic evaluation methodologies) will attempt to ascertain progress based on the project´s Theory of Change and Results Framework and as importantly understand and document the risk factors and decisions taken in order to make appropriate recommendations for future actions. For this the Evaluation Team depended on interviews where possible and the receipt of questionnaires as well as the project documentation made available to them.

EVALUATION SCOPE

To determine the extent, the project achieved its intended short and medium-term outcomes, the final evaluation covered:

- The full project period from February 2019 to March 2024.

- Cross-cutting themes that were assessed include gender, South-South cooperation, knowledge management, among others.

- All groups of participants, including members of the project team, government counterparts, and local stakeholders, to the extent feasible in the context of the current political upheaval and logistical considerations for programme participants, such as the displacement of potential interviewees.

METHODOLOGY

The project's Results Framework, which delineates the objectives, outcomes, and outputs the project was designed to achieve, along with the corresponding activities required to generate these results, sets the framework for the evaluation. Two complementary evaluation approaches were used: log-frame analysis which is used to determine if the Theory of Change was logical and if the anticipated results were achieved. To capture un-anticipated results and events and to address the limitations of some of the indicators in the Projects Results Framework (RF), the evaluation also employed a light adaptation of the Most Significant Change approach.

Data Collection and Analysis

Data collection involved of document review and primary data collection via interviewing the project's stakeholders. The data collection was meant to gather evidence to support answering the evaluation questions outlined in the Evaluation Matrix (Annex III. The evaluation employed triangulation, aligning primary data from interviews with findings from the document review and cross-referencing information obtained from various interviews. Tools for data collection (Annex IV) were designed to facilitate gathering evidence from stakeholders, supporting the two evaluation approaches employed.

The TE team conducted 28 interviews. These comprised 19 interviews featuring representatives from national partners, including 16 government officials, three from the private sector, and one from the Consumer Protection Association (a Civil Society organization). Additionally, the TE team interviewed six UNDP staff members, comprising two from the UNDP Country Office, three representing the Regional Office in Amman, and one from the UNDP Headquarters. Furthermore, an interview was conducted with UNEP/ United for Efficiency (U4E) staff. The list of the interviewed stakeholders and partners is presented in Annex II.

The collected data was analysed and structured according to the evaluation matrix. The progress on activities implementation and the reported results progress project have been compared to the plans

reflected in the results framework. As part of the interviews, the evaluation attempted to solicit qualitative data on the partners' views on the project's most significant change to address the lack of status data for objective-level indicators.

The evaluation generated a rating for all the criteria in line with the UNDP/GEF Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed project. The rating scale is summarised in table 3 above, under the Executive Summary.

ETHICS, NORMS AND STANDARDS FOR EVALUATION

The TE was conducted in accordance with the principles outlined in the United Nations Evaluation Group (UNEG) 'Ethical Guidelines for Evaluations". The evaluation team is fully familiar with the UNEG Codes of Conduct for Evaluation in the UN System. The evaluation team confirms the independence and impartiality of the evaluation.

LIMITATIONS

- Field visits and in-person missions were unfeasible due to the conflict, necessitating all interviews, including those with UNDP, the project team, and key stakeholders, to be conducted online. Many participants faced challenges accessing work-related documents and encountered restricted internet connectivity; thus, the TE team was not able to interview some partners[3] or had to reschedule many interviews. The situation hindered the evaluators from pursuing further clarification from respondents or getting some documents. This is a limitation that the ET had to accept as part of the challenge of this assignment, and to the extent possible the ET sought information from various sources.

- The Project Manager had no active contract with the project/UNDP during the evaluation and had left the country due to the ongoing conflict. During this period, he was looking for work elsewhere in the middle east. However, despite these circumstances, the Project Manager graciously supported the evaluation by participating in several meetings, responding to the evaluation team's inquiries, and providing, whenever available to him, necessary documents and clarifications. The Team was limited in the time it could expect from him and had to use his time sparingly.

- The evaluation began a few days before the holy month of Ramadan, and some UNDP staff and other partners took leave during the month. This resulted in delays in obtaining certain data and addressing requests from the evaluation team promptly.

- The prolonged timeline of the project, commencing with the signing of the Initiation Plan for Project Preparation Grant (PPG) in November 2015, compounded by the political transitions in the country, led to the unavailability of some individuals within relevant organisations for interviews. The government underwent extensive restructuring, marked by frequent turnover of senior officials. Some of the interviewed stakeholders were not able to comprehensively explain the viewpoints and commitments of certain organisations that had been made at the early stage of the project.

[3] The TE team was not able to interview representatives of key partners such as the Sudanese Electricity Distribution Company (SEDCO), Sudan Customs Authority, and the National Energy Research Centre.

II. PROJECT DESCRIPTION

This section provides a comprehensive overview of the project's background, objectives, and the country context to provide a contextual understanding for the subsequent evaluation analysis.

PROJECT DESCRIPTION

Project Start and Duration

The project was originally scheduled to be implemented over 48 months, from January 2019 to January 2023. However, it was officially signed in February 2019, a month later than initially planned. Delays in implementation, attributed to the impact of COVID-19 and political transitions in Sudan, led to an extension until August of 2023. After the war erupted in the country, an additional extension was approved, prolonging the project duration until August 2024, primarily to facilitate the completion of the Terminal Evaluation.

Other important dates pertinent to the project include the PIF Approval Date on October 21, 2015, and the CEO Endorsement Date on October 16, 2018.

DEVELOPMENT CONTEXT

Policy Environment

Key strategic initiatives that are linked to Sudan's energy policy landscape include the country's 25-year National Development Strategy (2007–2031), which offers a long-term development plan for the

Country, Sudan's Interim Poverty Reduction Strategy Paper, and the Economic Reform Programme 2015-2019.

Sudan is also a party to several international environmental agreements that directly inform the project's formulation, including the United Nations Framework Convention on Climate Change. Sudan's commitments to the Sustainable Development Goals (SDGs) reflected in the National Sustainable Development Programme (2016-2020), developed by the Higher Committee for Sustainable Development. The programme outlines key Sustainable Development Goals for the country, focusing on a) Prosperity and economic development, b) Social development, c) Peace and security and d) Conservation of the environment[4].

Renewable energy plays a pivotal mitigation role in Sudan's National Determined Contribution (NDC) under the Paris Agreement. The country first NDC committed to environmental preservation by transitioning the electricity sector towards low-emission power generation and includes measures on reducing electric transmission and distribution losses and energy-efficient appliances in the residential sector.

Sudan's strategic roadmap for renewable energy policies and poverty reduction emphasizes the pivotal role of energy in alleviating poverty and empowering women. It outlines measures, such as improving

[4] Sudan VNRs for High Level Political Forum (2018)

energy efficiency in urban areas, enhancing the capacity for efficient energy use in the economy, and ensuring universal access to modern energy services as key strategic objectives in the fight against poverty. The National Energy Efficiency Action Plan (NEEAP) was developed with the overall objective of achieving annual energy savings by improving energy efficiency in the electricity sector and reducing electricity consumption.

Sudan's Political Transition and Economy

The project was developed and implemented within a context characterized by significant political and economic upheavals in the country. The project's start date coincided with a pivotal political transition, marked by the removal of longtime ruler Omar Al-Bashir in 2019, who had governed for three decades. In April 2019, a power-sharing agreement was reached between the military council and civilian opposition, heralding a transitional civilian-military government that had relatively good relations with international donors and a development-oriented vision. However, in October 2021, Sudan embarked on another phase of transition as the military dissolved the political cabinet, leading to the Prime Minister's resignation and posing challenges and obstacles to the international donors' commitments towards longer-term development programmes. At the time of the evaluation, the country has marked one year since the war broke out, causing a devastating humanitarian catastrophe, destroying the country's infrastructure, and restraining almost all productive activities.

Sudan's economic challenges have been further worsened by its recent political transitions. The loss of oil revenue after South Sudan's secession in 2011, coupled with a substantial debt burden and economic sanctions, had already placed significant strain on the country prior to the exacerbation caused by political instability. Gross Domestic Product (GDP) contracted by 1.3 percent in 2019 and 1.6 percent in 2020 (amid the COVID-19 pandemic). GDP per capita declined from USD 1,103 in 2017, to USD 595 in 2020, and inflation reached an average of 150 percent in 2020. The Sudanese Pound devalued sharply against the US dollar in the parallel market.

Problems that the project sought to address:

Sudan faces significant energy challenges due to its limited oil and natural gas reserves, relying heavily on imported fossil fuels for a substantial portion of its electricity production. At the time of the project's formulation, it was estimated that 60% of the Sudanese population (about 24 million people) lacked access to electricity. The government aims to reduce energy poverty and achieve an electrification rate of over 80% by 2030, with a shift towards energy efficiency being crucial for reaching this goal. The NEEAP aims to achieve annual savings in total energy demand primarily through measures to improve energy efficiency in the electricity sector, such as using energy-efficient appliances. These energy savings will also lead to significant emissions reductions. The project aligns with the National Development Strategy (2007–2031) and Sudan's NDC, as discussed in the Policy Environment section. The project is part of the UNDP portfolio under Outcome 2: Populations vulnerable to environmental risks and climate change become more resilient, and relevant institutions are more effective in the sustainable management of natural resources.

Immediate and development objectives of the project.

The project's overall objective (as spelled out in the project document) is to provide climate change mitigation benefits and decrease energy poverty by transforming Sudan's market for energy-efficient (EE) lighting and air conditioners. The Second National Communication to the UNFCCC identified mitigation

measures to achieve long-term GHG emission reductions in Sudan associated with energy use; energy-efficient lighting and air conditioners are estimated to yield a reduction of 16.24 million tonnes of CO2 emissions by 2030, which equates to a 9.5% reduction in GHG emissions compared to the baseline.

Description of the project's Theory of Change:

The project theory of change is based on the assumption if efficient lighting and air-conditioning are used, the ability to distribute electricity to populations who do not have public electricity would increase and will also contribute to reducing GHG emissions through efficient use of electricity.

Based on the country assessment and baseline data, the transformation of Sudan's appliance market to energy-efficient appliances was anticipated to yield substantial reductions in electricity consumption, generate monetary savings, and mitigate greenhouse gas (GHG) emissions. Additionally, although power generation has increased in the country, Sudan still faces many challenges with over 50% of its population lacking access to electricity. The National Energy Administration estimated that lighting and air conditioning, which are the two appliances initially targeted by the project, account for 50% of the electricity consumption in the residential sector (which itself constitutes 51% of the total electricity consumption). Lighting and air conditioning consumption is estimated at 80% in the commercial sector, and over 90% in the governmental sector.

At the time of the project formulation Sudan had a National Energy Efficiency Action Plan (NEEAP), but its implementation was challenged. The project identified the following barriers to the implementation of the NEEAP measures concerned with reducing electricity consumption in the residential and government sectors:

- None of the stakeholders acted as a national coordinating agency on EE initiatives; and there was no specific strategy/workplan developed for the lighting and air conditioning sub-sectors.
- There was a critical need for the introduction of appropriate regulatory mechanisms – including Minimum Energy Performance Standards (MEPS), as well as an accompanying Monitoring, Verification, and Enforcement (MVE) system. The market is currently promoting inefficient window-mounted air conditioning (A/C) and inexpensive, but also inefficient, incandescent light bulbs (60-100W).
- There is a general lack of public awareness by end-users and energy stakeholders of the benefits of energy efficient lighting products and air conditioners.
- The transition to a market for EE lighting and air-conditioning products must be done in the context of enhanced environmentally sound management, particularly as regards 1) a reduction in the use of hazardous materials in lighting and air conditioners; and 2) a national system in place to collect, recycle and/or responsibly dispose of lighting products and air conditioners that contain hazardous materials.

The project also addressed assumption on why EE air-conditioning and lighting have not been widely adopted by consumers/ electricity users in Sudan.

The project sought to address these barriers through combining top-down policy components and several bottom-up activities. The top-down component comprised developing standards, enforcing regulations supporting energy-efficient products and building the institutional framework in order to maintain steady

market development. The bottom-up activities targeted creating a positive ambience for implementing the new regulations at the levels of distributors and end users. The project design also included a component on Enhancing environmentally sound management of lighting products and air conditioners as electronic waste is among the fastest growing waste streams in the world and the electronic waste Sudan estimated at 3–6 kg per person per year.

Expected results:

The project document includes a comprehensive result framework with clear objectives, outcomes, outputs, and activities and provides the basis for the evaluation. There were no significant changes since the project design; inception workshop was not held, and Mid-term Review (MTR) review was not required being a medium-sized projects and was not conducted. The project design aimed to overcome the barriers to reducing electricity consumption in the residential and government sectors. Through producing eight outcome-level results across five components, outlined in Table 5.

Table 5- Project Results

Component 1: Development of a national strategy to advance energy efficiency in lighting and air conditioners as part of the National Energy Efficiency Action plan (NEEAP)	
Outcomes	Outputs
OUTCOME 1.1. National strategy for energy efficiency in the lighting and air conditioning sub-sectors is developed and adopted following a consultative process.	**Output 1.1.1**. Strategic goals of relevance to lighting products and air conditioners under the NEEAP are defined, and a work plan to achieve them is developed in accordance with the integrated policy approach recommended by the United for Efficiency (U4E) initiative. **Output 1.1.2**. All actors working on project EE sector are identified, with description of their roles, mandates, and responsibilities in implementing the key tasks of the work plan **Output 1.1.3.** Consensus is achieved by all energy stakeholders and policymakers on the goals, workplan, timeline, and the responsibility of each party in transforming the markets for EE lighting and air conditioners
OUTCOME 1.2. Electricity Regulatory Authority (ERA) is capacitated as a focal point responsible for promoting and overseeing all activities related to energy efficiency in Sudan	***Output 1.2.1.*** A focal point is operating, with official representations in the different ministries involved in the implementation of the NEEAP, collection and analysis of supplier-end data, sales data, and electricity consumption data, etc.
COMPONENT 2. Adoption of regulatory mechanisms directing the market towards energy efficient lighting products and air conditioners, including minimum energy performance standards (MEPS), labelling scheme, testing and importing procedure	
OUTCOME 2.1. Internationally recognized regulatory mechanism is adopted, and the corresponding MEPS, label classification, energy performance test protocol, and	**Output 2.1.1**. Economic and financial cost/benefit analysis is performed, to determine the appropriate level of regulatory measures for the residential, governmental and commercial sectors, including assessment of benchmark ***Output 2.1.2.*** MEPS legal framework has been selected, localized, and adopted, including the accompanying labelling scheme and test procedure/certification

Table 5- Project Results

import-related procedure are localized to be suitable for Sudan.	***Output 2.1.3.*** Compliance checking on imports and pre-export inspections are integrated in import regulations.
OUTCOME 2.2. Provide technical support for the identification and development of an appropriate financial mechanism to promote energy efficiency in lighting and air conditioning.	***Output 2.2.1.*** Financing mechanism is developed and implemented
COMPONENT 3. Adoption of monitoring, verification, and enforcement (MVE) system, to ensure that products in the market comply with the established MEPS	
OUTCOME 3.1. Internationally recognized MVE programme is established and adopted by trained personnel.	**Output 3.1.1.** Establish and implement an effective MVE programme using the six guidance notes developed under the U4E initiative. **Output 3.1.2.** In collaboration with technical experts from the U4E initiative, the personnel to be involved in the implementation of the MVE system across all relevant public stakeholders are trained and equipped with the tools necessary to ensure enforcement of the MEPS and associated regulations. **Output 3.1.3.** In collaboration with technical experts from the U4E initiative, the developed testing protocol, including identification of appropriate in-country and out of country testing and certification, is implemented
OUTCOME 3.2. Mechanisms for collection of market data are in place	**Output 3.2.1.** Supplier, distributor and retailer surveys undertaken at the end of project, to assess how much purchasers overcome the higher initial purchase price of energy efficient products **Output 3.2.2.** Household and business surveys undertaken at end of project to verify cost savings from adoption of new technologies
COMPONENT 4. Awareness-building of the new MEPS and regulatory mechanism	
OUTCOME 4.1. Increased capacities of local supply chain stakeholders and end users to comply with new MEPS and to bring	**Output 4.1.1** End users are aware of the benefits of energy efficient lighting products and air conditioners, understand the benefits of appliance efficiency, and recognize the labels when they see it ***Output 4.1.2.*** Governmental agencies, local distributors, and retailers integrate the labels and product-certification in advertisement campaigns and marketing material for lighting products and air conditioners
COMPONENT 5. Enhancing environmentally sound management of lighting products and air conditioners	
OUTCOME 5.1. Reduction/minimization of leakage of hazardous materials to the environment by reducing the input	***Output 5.1.1.*** Life-cycle assessments for lighting products and air conditioners are carried out to identify products containing hazardous material, and develop a national end-of-life appliance management plan, in line with global best practices and the recommendations of the U4E initiative ***Output 5.1.2.*** In collaboration with technical experts from the U4E initiative, the end-of-life management plan is integrated in the national strategy for EE, the regulatory mechanism, the MVE programme, and the awareness campaigns undertaken as part of this project, where the key tasks of relevance to end-of-life management are assigned to the relevant authorities ***Output 5.1.3.*** Communication campaigns are delivered to stakeholders to raise awareness on proper disposal of used products and the incentives/penalties developed in the new regulations

Total Resources

The project document outlined a total estimated cost of US$ 7.37 million, with the GEF Trust Fund contributing US$ 1.77 million, constituting 24% of the total cost. The Government of Sudan planned to contribute US$ 5.35 million in cash, comprising 72% of the initial budget. The remaining 4% was expected to be provided by UNEP, offering support with US$ 50,000, and an in-kind contribution from the National Lighting Test Centre (NLTC) of China, valued at the equivalent of US$ 200,000.

Key Stakeholders

The project is derived from the global programme titled "Leapfrogging markets to high-efficiency products (appliances, including lighting and electrical equipment)". The parent programme includes eight national derived projects and a global derived project that focuses on the capacity of 15 countries to develop and implement projects and policies to advance the energy efficiency of lighting, appliances, and equipment.

The project was designed in line with the UNDP National Implementation Modality (NIM). The Electricity Regulatory Authority (ERA), which was at the project formulation time under the Ministry of Water Resources, Irrigation and Electricity (MWRIE), is the National Implementing partner. UNDP is accountable for the disbursement of GEF funds, quality assurance and ensuring achieving the project goals. Additionally, the Project Document (PRODOC) included the following institutions as the main stakeholders:

- Sudanese Standards and Metrology Organization (SSMO);
- Sudanese Electricity Distribution Company (SEDC);
- Ministry of Foreign Trade;
- Sudan Customs Authority, under the Ministry of Interior;
- National Energy Administration, under the Ministry of Petroleum.
- Sudan National Information Centre (NIC).

The PRODOC also listed manufacturers and distributors of lighting products and air conditioners; end-users of lighting products and air conditioners; and Institutions in charge of gender issues, as other groups that will benefit from the project.

III. EVALUATION FINDINGS

PROJECT DESIGN /FORMULATION

Project Strategy

The strategy outlined in the RESULTS & PARTNERSHIPS section of the PRODOC encompasses five components, eight outcomes, 17 outputs, and associated activities aimed at revolutionizing Sudan's market for energy-efficient (EE) lighting and air conditioners. The outcomes and outputs are comprehensive aligned with the identified barriers to transitioning Sudan's appliance market to energy-efficient and the activities will lead to the desired results.

The PRODOC also features a schematic representation (in p. 15 titled the "Theory of Change") that connects project outcomes to the project components and the overarching objective. It also outlines, the challenge, causses, and underpinning assumptions. The Terminal Evaluation team believe that the scheme does not perfectly represent the project strategy, yet this is not a major issue, as the Results Framework is aligned to the described project strategy and was used as the basis for Monitoring and Evaluation.

A weak area in the project design is the responsibility for establishing accredited laboratories to support the implementation of MEPs, which is central to achieving the project objective. The PRODOC under the heading Parallel Co-financing stated[5] that SSMO would proceed to obtain testing laboratories for all appliances both at its HQ and branches, as well as the ports of Sudan. This commitment is aligned with the SSMO signed co-financing letter devised as part of the project initiation phase. Yet, the establishment of the laboratories were to be financed in the form of parallel financing and executed by the SSMO and as a consequence was not included in the project results framework. The Evaluation Team sees this as the major flaw in the project´s design and believes this component should have been foreseen as a Cost-Sharing contribution and therefore the corresponding funds transferred to UNDP and included in the results framework.

A co-financing letter is insufficient for activities or deliverables central to achieving project objectives. It is feared that because of the financial constraints facing Sudan today and as the political transition triggered changes to senior officials, SSMO may no longer be in a position to honour its commitment to establishing testing laboratories.

Results Framework:

The Results Framework (RF) in the Project Document features objectives, clearly defined associated outcomes/outputs, and indicators with baselines and targets to facilitate monitoring progress toward achieving the specified results. TE team would like to note the following about the RF and some of the indicators:

-The objective statement comprises more than one result level, such as a) "transform Sudan's markets for energy efficient (EE) lighting and air-conditioners," and b) "providing climate change mitigation and decreased energy poverty." Although there is an indicator aligned with each level (Total amount of electricity saved as a measure of Sudan's markets for energy efficient (EE) lighting and air-conditioners, and Reduction in GHG emissions as a measure of providing climate change mitigation), by the end of the project, it was impossible to get the status for either indicator because both require a longer time span to

[5] Refer to p. 46 in the PRODOC

be realized. The project could have benefited from a better articulation of its objectives (short-term vs long-term/impact), which would have made it possible to include a mix of indicators to be monitored within the project duration and others to be realized after the project.

- The definition of indicators does not align with the level of results achieved. For instance, the number of direct project beneficiaries, which counts the individuals attending the awareness campaign, was employed as an indicator at the objective level. Furthermore, certain outcomes also utilize similar indicators.

- The results framework relies solely on metrics such as "# of trained staff/individuals" to measure the capacity of institutions encompassing both components 1 and 2. However, this singular measure falls short. It's imperative to supplement it with additional indicators, such as indicators to measure change in staff capacity, institutional performance, or the presence of effective operational mechanisms/ systems, to provide a more comprehensive assessment of capacity.

Gender:
A gender mainstreaming study was undertaken in 2016 to explore the access and use of energy resources and to recommend suitable measures to be undertaken during project implementation to ensure the inclusion and engagement of women in the different phases. Informed by the gender mainstreaming study, the PRODOC includes commitments to have acceptable gender representation in project management structures (committees, institutional frameworks) and capacity-building actions such as training and workshops. The project approach assumes that having women in managerial and technical positions, as well as ensuring their representation in committees, will lead to the achievement of gender-related outcomes.

Monitoring and Evaluation:
The PRODOC is committed to ensure project's compliance with the mandatory GEF M&E Requirements; it includes a comprehensive list of all the required M&E activities required by GEF/ UNDP regulations.
The assessment of indicators was provided under the Results Framework section above.

Assumptions and Risks: The Project Document identified several risks that could impede project implementation and performance. Among these, regulatory risks related to delays or sub-optimal design of MEPS under Component #2, and the lack of monitoring, verification, and enforcement under Component #3, were highlighted as the most critical risks that could undermine the project's success. Appropriate mitigation measures were identified for each of these risks.

A Social and Environmental Screening was conducted at the formulation, and based on the screening, the project was classified as a low-risk project. Additionally, the project strategy included a component on enhancing environmentally sound management of lighting products and air conditioners, aimed at mitigating risks related to the disposal of old appliances which meant as measure to mitigate risks related to disposal of old appliances.

Lessons from other relevant projects and linkages with other projects: The project was designed as a child project under the parent U4E programme "Leapfrogging markets to high efficiency products", which includes eight national child projects in Chile, Costa Rica, Indonesia, Kazakhstan, Myanmar, South Africa, Sudan, and Tunisia. This framework fostered collaboration and learning from U4E and among the participating countries. The ProDoc also envisioned partnerships with other GEF/UNDP CCM projects in

Sudan, such as those focused on wind energy, promoting solar energy in the Darfur Region, and solar PV pumping for irrigation.

Planned stakeholder participation:
The project design proposed the involvement of the government institutions, including standards and test agencies, customs, certification and accreditation bodies, test laboratories. Project planned stakeholders included also the private sector (primarily manufacturers, suppliers and distributors of appliances), consumer organizations representing civil society and End-users of lighting products and air conditioners as well.
ERA as the National Implementing partner, was tasked with managing the project and maintaining continuous engagement of stakeholders. Their role also included ensuring that the target groups and potentially affected communities are fully aware of the project. The Project Board/Project Steering Committee, with representatives from key stakeholders, bears the responsibility of monitoring project progress, guiding project in achieving its objectives. For institutions names refer to the stakeholder heading in Section 2 "Project Description.

PROJECT IMPLEMENTATION

The project implementation was significantly influenced by two major external factors: the political transition triggered by the fall of ruler Omar Al-Bashir in 2019 and the unprecedented challenges posed by the global COVID-19 pandemic in 2020. The political transition, marked by government restructuring, affected vital ministries and institutions relevant to the project. The project implementing partner itself had been affected. Furthermore, the turnover of senior officials and, in some cases, the nonexistence of management in some institutions had far-reaching implications for the project's operational environment, leading to delays in establishing the Project Management Unit (PMU). The project Manager and the Project Engineer were contracted at the end of April 2019, and the financial and administrative associate was hired in July 2019.

Moreover, the transition delayed signing the first-year Annual Work Plan (AWP) until the end of the year; consequently, the project did not implement any activities in its first year of implementation.
In its second year, the project encountered additional challenges imposed by lockdown due to COVID-19, causing the project to lose almost another year of its duration.

The project also encountered administrative and logistical challenges that further impacted the actual implementation period and contributed to the resign of some PMU staff. The project budget did not allocate enough funding for the staff salaries and the IT equipment. The IT equipment essential for the PMU operations was only made available for the PMU by the end of the second year. Initially, the equipment cost was expected to be covered by the local component of the implementing partner (ERA). However, ERA did not manage to provide the equipment as it does not have an independent budget. UNDP agreed to supply the IT equipment from its contribution to the project. The Project Implementation Reports (PIRs), and stakeholders' consultations pointed to delays (in 2020 and 2021) due UNDP financial processes, which had improved in 2022. The project received only 7 advances through its implementation period. The TE noted that reducing advance transfers was aimed to lessen the risk of aging advances and financial losses from devaluation, especially in 2020. The TE team emphasizes the importance of addressing risks and being accountable for funds, but that should not compromise implementation and delivery.

Project Finance and Co-finance:

The project's total cost is USD 7,376,000, including a USD 1,770,000 direct GEF grant and USD 5,606,000 in parallel co-financing from other national and international entities. Nevertheless, the project was implemented exclusively using GEF resources.

In the first year of implementation (2019), the project's delivery rate was nearly nil, and it only delivered US$96,000 in 2020. However, in 2021 (the project's de facto start year), the project significantly ramped up its activities, totalling US$644,015.4 and boosting its delivery rate to approximately 36 percent of GEF resources. The project's overall delivery stood at 46 percent at the time of conducting the evaluation.

Table 6- Budget vs Expenditure

	Budget	Source	Expenditure	Balance	Plan vs. Expenditure
Component 1: Development of a national strategy to advance energy efficiency in lighting and air conditioners as part of the National Energy Efficiency Action plan (NEEAP)	114,200	GEF	65,064.60	49,135.39	57%
Component 2: Adoption of regulatory mechanisms directing the market towards energy efficient lighting products and air conditioners, including minimum energy performance standards (MEPS), labelling scheme, testing and importing procedure	244,200	GEF	157,391.29	86,808.71	64%
Component 3: Adoption of monitoring, verification, and enforcement (MVE) system, to ensure that products in the market comply with the established MEPS	578,400	GEF	282,832.93	295567.07	49%
Component 4: Awareness-building of the new MEPS and regulatory mechanism	536,915	GEF	127,119.13	409795.87	24%
Component 5: Reduction/minimization of leakage of hazardous materials to the environment by reducing the input.	212,000	GEF	7,176.94	204823.05	3%
PMU	84,285	GEF	169,786.42	-117,966.42	201%
Total	1,770,000		809,371.32	960628.68	46%

Source: 2022 Annual report (The project did not produce a final project report)

Please consider the following information while reviewing the above table.: The table is indicative; it does not reflect an accurate performance measure of the project. All the project annual reports and the PIR have indicated that the project budget design did not consider the actual weight of the activities under the components.

Note: The programme officer informed the evaluation team that the PMU budget lines had been revised, and the project management costs had been integrated into the main budget last year.

The initial co-financing commitment was (US$ 5.6) **including US$ 5.35 million in cash** from government partners representing 72% of the overall project, 50,000 from UNEP and 200,00 from the National Lighting Test Centre (NLTC), China. However, during the implementation, the co-financing received/materialized is less than 15 percent. The project manager has compiled a report indicating that the cumulative co-financing received from various stakeholders totals US$ 670,000, all in the form of in-kind contributions.

Table 7- Co-financing Status[6]

Entity	Planned (US$)	Estimated materialized ((US$)	Type of Co-finance Confirmed and Explanation
1. UNEP	50,000	20,000	**In-kind:** UNEP/U4E contribution to the project included technical advice, linkages with international partners and helping in finding training opportunities.
2. Ministry of Energy and Oil (MEO) (formerly Ministry of Water Resources, Irrigation and Electricity (MWRIE))	1,000,000	200,000	**In-kind:** As part of the energy audit pilot (MEO) has replaced the conventional lamps with EE lamps in all the ministry offices. Cost related to the development and approval new law that includes the EE measures.
3. Electricity Regulatory Authority (ERA)	1,000,000	300,000	**In-kind**: following up the NEEAP implementation. The department of Consumer awareness and protection participated/ contributed to the awareness campaign organized by the project. Regulation related to EE are under development
4. Sudanese Standards and Metrology Organization (SSMO)	2,756,000	150,000	**In kind:** Technical support (MEPS and Labels for five appliances). Cost of training for electrical household appliances organized in cooperation with U4E and the project.
5. Sudanese Electricity Distribution Company (SEDC)	200,000	0	
6. Sudanese Thermal Power Generation Company (STPG)	200,000	0	
7. Merowe Dam Electricity Company (MDEC)	200,000	0	MDEC does not exist due to the restructuring of the ministries
8. National Lighting Test Centre (NLTC), China	200,000	0	The project tried to contact NLTC, but there was no response. Finally, U4E informed the project that NLTC is no longer committed to the project.

[6] Report on the cumulative co-cofinance (2022)

Regarding compliance with adequate accounting standards and UNDP financial rules and regulations, an audit of the project was conducted by certified external auditors. The audit concluded that the funds were being used in full compliance with the established accounting standards and UNDP's financial rules and regulations.

Stakeholders' Participation:
In the initial two years, the project board convened semi-annually. However, starting from the third year, meetings were scheduled annually, aligning with the approval of AWP. The meetings were attended by senior officials from national partners, including representatives from Ministry of Energy and Oil, ERA, SSMO, SEDCO, Sudan Custom, Ministry of Trade, the Higher Council for Environment, and the head of Branch Electrical Device Importers representing the private sector.

The project formed a technical committee comprising representatives from SSMO, ERA, SEDCO, The National Energy Research Centre (NERC), University of Khartoum, and Sudanese Consumer Protection Society other partners. The committee's responsibility was to review all technical studies submitted by individuals or companies contracted by the project. The project has a second technical committee dedicated only to the development of MEPS and Labels, comprising mainly ERA and SSMO and other technical experts. The two committees also are part of the project adaptive approach.

During implementation, the project established successful collaborations between ERA, SSMO, and the private sector (mainly Branch electrical device importers). It also created linkages with the Sudan Customs Authority and SEDCO. This collaboration is important and will help to sustain the initiatives and the work under the project. The TE team considers this an achievement for the project, as collaboration often demands extensive time and effort (usually undervalued).

Adaptive Management:

During the implementation phase, the project scope expanded to include three additional appliances: refrigerators, evaporative coolers, and fans, alongside lighting and air conditioners. The rationale behind this expansion is that these three additional appliances are the most common and considered major electricity consuming appliances. Consequently, the resulting energy and greenhouse gas savings would be greater than if the project had concentrated on just two appliances.

The project established two technical committees with representatives from relevant stakeholders (refer to stakeholder participation above). These committees played a crucial role in revising the MEPS and technical studies, enabling the project scope to expand to cover additional appliances without incurring extra costs. This approach fostered strong technical ownership, ensuring national partners gained the skills and knowledge to implement and sustain the projects. This technical ownership was reported as a significant change resulting from the project.

To address the implementation delays, in 2021 the PMU consolidated all the activities that can be implemented in parallel into one framework and consolidated most international consultancy tasks into a single Request for Proposal (RFP) issued as an international tender. A contract was then awarded to Habitat, Energy Application and Technology (HEAT GmbH) which has a comprehensive experience in the

field of energy efficiency. The approach had enabled the PMU to progress in implementation, compensate some of the delays encountered and lower implementation costs.

Under component 2, the project piloted an energy audit and replacement of lighting of three buildings namely UNDP, ERA, and SSMO as a demonstration of the benefit of installing the energy efficient lighting and appliances and to support the development of the financial mechanism to promote energy efficiency in lighting and air conditioning. The pilot fully completed for ERA building (audit and lighting replacement) and completed the audit for the SSMO building while the replacement of lighting being in progress when the war started.

In December 2022, Recognizing the crucial role of testing laboratories in achieving project goals and acknowledging changes in the project's operational environment that hinder SSMO from fulfilling its co-financing commitment, the project board suggested allocating some project resources to help establish testing laboratories within SSMO. However, being a major change necessitated the approval of UNDP HQ and GEF, which was unfortunately not secured.

Gender:

At the implementation, the project honoured its gender commitment as described in the PRODOC Specifically operational and targeting measures, including: (i) gender representation in project management structures (ii) inclusion of women in capacity-building training and workshops and study visits and iii) implemented inclusive Awareness Campaign targeted both male and female pupils as measure that both genders receive information about energy efficiency and sustainability.
While the Results Framework lacks gender-disaggregated indicators, the PIR successfully reported on gender results. Integrating gender-disaggregated data and indicators would enhance the tracking of gender outcomes.

M&E Implementation:

The project has followed most of the M & E activities as planned in the project document including, Annual Work Plan, Quarterly Work Plans, PIR which captured progress with the required sections.
As discussed under the stakeholder's participation, the Project Board convened semi-annually during the first two years. However, starting from the third year, meetings were conducted annually, aligning with the approval of the AWP. The project did not have a proper inception workshop (supposed to take place within two months of project document signature).
However, as part of the Heat contract (discussed in the adaptative management section), the project organised an inception workshop for the work under the contract. The workshop supported the development of a detailed work plan for the contract, which represents most of the project activities for 2021.

A detailed description of M&E activities, responsibilities, timeframe, and budget was included in the project document. The total M&E budget was estimated USD$ 60,500 – 88,500, including the following:
USD 5,000 for the inception workshop, which was not held
Terminal evaluation with an estimated cost between USD 20,000 - 40,000.
NIM Audit was to be conducted annually, with an estimated cost between USD 8,000 and USD 16,000. The evaluation revealed that only one audit was conducted.

The terminal evaluation did not receive a tracking tool for GEF Core indicators, and there is no evidence e that these indicators were tracked.

The PIR and Annual Progress Reports (APR) provided evidence that new risks were identified and managed during implementation. These included political risks due to the political transition and the impact of COVID-19 on implementation, with mitigation measures incorporated (as noted in the 2020 PIR). However, the Terminal Evaluation (TE) team also observed instances where risk management was inadequate. This included recurrent issues such as delays and low response rates from partners, including UNDP. Additionally, the lack of testing laboratories, which poses a risk to MEPS implementation, was only identified in 2022 APR, four years after the project's start.

The TE noted instances where M&E tools like meeting minutes and PIRs highlighted issues requiring prompt follow-up or action/ clarification from UNDP. For example, PIRs consistently cited UNDP's slow process as one of the factors affecting project delivery and stakeholder consultations also identified delays in UNDP's responses and follow-up.

The team also observed instances where there were misunderstandings regarding necessary actions between UNDP and stakeholders. For instance, the Project Manager indicated that the 2022 project board had approved using project resources to finance the laboratories. However, UNDP emphasized that such a decision could not be implemented without GEF approval, as it constitutes a significant change.
The TE team believes that effective follow-up is vital for ensuring progress, building successful partnerships, and effectively managing expectations.

The project did not produce a final project report, which would have served as a comprehensive record of the project's lifecycle. This report is crucial for summarizing the project's accomplishments and aggregating achievements over the project period. The absence of such a report has hindered the Evaluation.

Although a midterm review is not obligatory for this project, its absence represents a missed chance to assess performance and address challenges, particularly considering the project lacked a proper inception workshop.

Regarding **Knowledge Management**, the project took exposure to international experiences to gain valuable insights into best practices and lessons learned from other countries. The project established a website as a central repository of project resources to showcase project activities, training, and partnerships. However, at the time of evaluation, the website (https://www.seeal-sd.com) was not operational, preventing the evaluation team from assessing its quality. Some of the project work is published on the U4E website.
https://united4efficiency.org/resources/leapfrogging-sudans-markets-to-more-efficient-lighting-and-air-conditioners/
https://united4efficiency.org/resources/national-energy-efficiency-strategy-for-sudan/

The TE overall assessment of M&E and implementation is presented in table 8
Table 8- Assessment of M&E and Implementation

Monitoring and Evaluation (M&E)	**Rating**
M&E design at entry	**Satisfactory**
M&E plan implementation	**Moderately Satisfactory**
Overall quality of M&E	**Moderately Satisfactory**
UNDP Implementation/Oversight & Implementing Partner Execution	**Rating**
Quality of UNDP Implementation and Oversight	**Moderately Satisfactory**
Quality of Implementing Partner Execution	**Satisfactory**
Overall Quality of Implementation/Execution	**Satisfactory**

RELEVANCE

The relevance of a particular GEF-financed project has to be measured against (1) the will of the Government of a country as expressed in the National Plan and sectoral plans; (2) the coherence of the project with the international commitments that the government has undertaken; (3) the clear benefits it could bring to the country´s population; and (4) the coherence of the project´s objectives to the GEF Focal Areas.

Energy specifically electricity use is at the core of the strategies of successive governments in Sudan. The 25-Year National Strategy specifically mentions one of its sectoral objectives as: "***Enhancing electrical power generation and distribution methods in order to lessen electricity shortages".*** The project's alignment with government priorities is further evident in the context of Sudan's commitments as outlined in its 2021 NDC report, which includes mitigation targets to reduce electric transmission and distribution losses and energy-efficient appliances in the residential sector. Sudan's strategic roadmap of renewable energy policies and measures for poverty reduction (2020) includes six strategic objectives focusing on enhancing energy efficiency in urban areas and strengthening the capacity of increased efficient energy in the economy. As outlined in its 2021 NDC report, in the report entitled "Empowering Sudan: Renewable Energy Addressing Poverty & Development", and in the report entitled "Sudan 2018 VNRs for High-Level Political Forum" amongst other policy documents, there is a link between energy shortages and poverty as well as social conflicts.

Almost all the interviews during the project evaluation confirm that the project addresses important issues and is very relevant to the country. Senior Government officials have been expressing their desire to increase substantially the provision of electric power to the roughly half of the population that currently does not have access to this vital service. The Director of Sudan´s Electricity Holding Company has stated

the government´s objective of increasing electricity coverage to 100% of the population by 2035.[7] Private sector representatives agreed that the project was aligned with their priorities in terms of energy.

The project is designed to support directly SDG Goal 7 "Affordable and Clean Energy" as well as Goal 13 "Climate Action" and is indirectly SDG Goal 1 "No Poverty", Goal 4 "Quality Education", Goal 9 "Industry Innovation" Goal 10 "Reduce Inequality" Goal 11 "Sustainable Cities and Communities" and Goal 12 "Sustainable Production and Consumption".

The United Nations Development Assistance Framework for 2019-2021 under its ***"Focus Area 2: Environment, Climate Resilience and Disaster Risk Management",*** and UNDP Outcome 2: Populations vulnerable to environmental risks and climate change become more resilient and relevant institutions are more effective in the sustainable management of natural resource put great emphasis on the need to combat climate change and specifically says "...***households and communities will be encouraged to implement climate change mitigation measures through the introduction of renewable and alternative energy sources and technologies".*** In its First Nationally Determined Contribution dated October 2021, the country sets as its GHG reduction target for non-biomass energy sources, 12 million tons of CO_2e.

Clearly, reducing current electricity demand through the use of more efficient lighting fixtures and appliances would allow many more households, businesses, and industries to access power without the negative environmental effects of increasing fossil fuel generating capacity. This will directly improve the efficiency of commercial and industrial users and, more significantly, the lives of thousands of Sudanese citizens.

Lastly, the objectives of this project are fully in line with GEF´s Climate Change and Sustainable cities focal areas by promoting greater energy efficiency and use of renewable energy.

EFFECTIVENESS

Effectiveness is a term linked to a plan or project. There are two distinct aspects to be considered when attempting to judge the effectiveness of a project.

The first aspect related to effectiveness refers to the logic behind the project, where the ACTIVITIES planned sufficient to produce the OUTPUTS that were desired and in turn, were those OUTPUTS sufficient to produce the desired OUTCOMES. In other words, was the project design and its Theory of Change totally logical.

The Evaluation Team reviewed the Results Framework, reviewed the project documentation, and interviewed key persons in this regard. It is of the opinion that the ToC underpins the RF was consistent in establishing the necessary linkages and sufficient to achieve the objective of the project if properly implemented (see annex III of the evaluation report).

[7] Asharq-Al-Awsat 26 March 2024 edition.

The second aspect of effectiveness refers to how well the project was implemented and whether the goals (OUTPUTS) that were planned for, were produced. The assessment of implementation and progress is based on data provided in the PIRs, a review of technical reports produced by the project and the interviews with the project stakeholders. The overall achievement is based on the 2023 PIR due to the absence project Closure Report.

The project was structured around five components, and below is an evaluation of the progress made across these components:

Project Component 1

This component was conceived to design, test and sanction a national strategy to advance energy efficiency in lighting and air-conditioning to be integrated into the country´s NEAP. It was to achieve two OUTCOMES:

- the design of the Strategy itself and
- capacitate the ERA as the focal point for energy efficiency and the execution of the strategy.

This component was to produce four OUTPUTS which were:

1. *Strategic goals of relevance to lighting products and air conditioners under the NEEAP are defined, and a work plan to achieve them is developed in accordance with the integrated policy approach recommended by the United for Efficiency (U4E) initiative.* **THIS WAS FULLY ACHIEVED.**
2. *All actors working on project EE sector are identified, with description of their roles, mandates, and responsibilities in implementing the key tasks of the work plan.* **THIS WAS FULLY ACHIEVED.**
3. *Consensus is achieved by all energy stakeholders and policymakers on the goals, work plan, timeline, and the responsibility of each party in transforming the markets for EE lighting and air conditioners.* **THIS WAS FULLY ACHIEVED.**
4. *A focal point is operating, with official representations in the different ministries involved in the implementation of the NEEAP, collection and analysis of supplier-end data, sales data, and electricity consumption data, etc.* **THIS WAS MOSTLY ACHIEVED.**

Of the 15 activities to be carried out under this component, 14 were fully completed and 1 was partially completed.

It is the opinion of the Evaluation Team that this COMPONENT can be considered as having been successfully achieved. It can even be said that its targets were exceeded, as the project went beyond its original design of looking at two aspects (lighting and air-conditioning) and worked on an additional three appliances (refrigeration equipment, air coolers and fans).

THE OVERALL ESTIMATED COMPLETION OF COMPONENT 1 AS PLANNED IS ESTIMATED AT 95%

Project Component 2

This component was conceived to design and adopt regulatory mechanisms to direct the market towards energy-efficient lighting and air-conditioning products. It was to achieve two OUTCOMES:

- Internationally recognized regulatory mechanism is adopted, and the corresponding MEPS, label classification, energy performance test protocol, and import-related procedure are localized to be suitable for Sudan and
- Provide technical support for the identification and development of an appropriate financial mechanism to promote energy efficiency in lighting and air conditioning.

This component was to produce four OUTPUTS which were:

1. *Economic and financial cost/benefit analysis is performed, to determine the appropriate level of regulatory measures for the residential, governmental and commercial sectors, including an assessment of benchmark mechanisms, and suitability for adoption in Sudan.* **THIS WAS FULLY ACHIEVED.**
2. *MEPS legal framework has been selected, localized, and recommended for adoption by the SSMO including the accompanying labelling scheme and test procedure/certification.* **THIS WAS FULLY ACHIEVED.**
3. *Compliance checking on imports and pre-export inspections are integrated into import regulations.* **THIS WAS FULLY ACHIEVED.**
4. *A Financing mechanism is developed and implemented.* **THIS WAS NOT ACHIEVED**

Of the 18 activities to be carried out under this component, 14 were fully completed and 4 were partially completed.

It is the opinion of the Evaluation Team that this component can be considered as having been mostly achieved, as three of the four planned OUTPUTS were fully completed and preliminary work on the fourth was carried out.

The one OUTPUT not completed refers to the development and implementation of a financing mechanism for energy-efficient appliances. However, early-stage discussions have commenced with the Ministry of Finance and Economic Planning to create a specialized portfolio that offers financing options for acquiring efficient products through the banking system. Similarly, initial discussions with the customs authority to propose amendments to the customs fee structure to encourage energy-efficient imports. These changes aim at establishing an inversely proportional relationship between fees and efficiency, where higher efficiency would result in lower custom fees and vice versa. Preliminary discussions were also initiated with the Electricity Distribution Company to explore the possibility of incorporating the payment of instalments for energy-efficient products into their existing electricity billing system. All planned activities were scheduled for execution by the end of 2023, but regrettably, the conflict brought everything to a halt.

THE OVERALL ESTIMATED COMPLETION OF COMPONENT 2 AS PLANNED IS ESTIMATED AT 78 %

Project Component 3

This component was conceived to design and adopt the Minimum Energy Performance Standards (MEPS) as well as a labelling system. The component was to achieve two OUTCOMES which were:

- Adopt an Internationally recognized regulatory mechanism, and the corresponding MEPS, label classification, energy performance test protocol, and import-related procedure are localized to be suitable for Sudan; and

- Ensure mechanisms for the collection of market data are in place.

This component was to produce five OUTPUTS which were:

1. *Establish and implement an effective MVE programme using the six guidance notes developed under the U4E initiative.* As of the project´s end 2 of the 3 activities had been completed. As of the project´s end 2 of the 3 activities had been completed. **OUTPUT PARTIALLY ACHIEVED**
2. *In collaboration with technical experts from the U4E initiative, the personnel to be involved in the implementation of the MVE system across all relevant public stakeholders are trained and equipped with the tools necessary to ensure enforcement of the MEPS and associated regulations.* **OUTPUT FULLY ACHIEVED**
3. *In collaboration with technical experts from the U4E initiative, the developed testing protocol, including identification of appropriate in-country and out-of-country testing and certification, is implemented.* **OUTPUT FULLY ACHIEVED**
4. *Supplier, distributor and retailer surveys were undertaken at the end of the project in order to assess how much the purchasers overcome the higher initial purchase price of energy efficient products.* **NO ACTIVITIES UNDERTAKEN. OUTPUT NOT ACHIEVED.**
5. Household and business surveys undertaken at end of project to verify cost savings from adoption of new technologies. **NO ACTIVITIES UNDERTAKEN. OUTPUT NOT ACHIEVED.**

Of the 18 activities to be carried out under this component, 9 were fully completed and 9 were not completed.

It is the opinion of the Evaluation Team that this component can be considered as having been partially achieved, as only three of the five planned OUTPUTS were fully completed.

THE OVERALL ESTIMATED COMPLETION OF COMPONENT 3 AS PLANNED IS ESTIMATED AT 60%

Project Component 4

This component was conceived to make stakeholders and the public aware of the new MEPS and regulatory mechanisms. It was to achieve one OUTCOME which was:

- Increased capacities of local supply chain stakeholders and end users to comply with new MEPS and to bring energy-efficient products to the market at competitive and affordable prices.

This component was to produce two OUTPUTS which were:

1. *End users are aware of the benefits of energy-efficient lighting products and air conditioners, understand the benefits of appliance efficiency, and recognize the labels when they see it.* **OUTPUT PARTIALLY ACHIEVED**
2. *Governmental agencies, local distributors, and retailers integrate the labels and product-certification in advertisement campaigns and marketing material for lighting products and air conditioners.* **NO ACTIVITIES UNDERTAKEN. OUTPUT NOT ACHIEVED.**

Of the 7 activities to be carried out under this component, 1 was fully completed and 6 were not completed. Under this component, the project completed the development of information packages for consumers, users and industry explaining the new labels' scheme and the cost-effectiveness of purchasing energy-efficient lighting products and air conditioners. The project also conducted an awareness campaign targeting school children in four states, reaching 4177 pupils in six schools. The campaign distributed 5000 copies of an educational comic book designed to raise awareness amongst school children

Regrettably, the comprehensive public awareness campaign, intended to reach a substantial part of Sudan, was planned to launch in June 2023. To ensure its effectiveness, TORs were crafted for a consultant to facilitate campaign preparation and for a social media specialist to handle the online aspects. Additionally, an RFP was drafted to engage a company in executing the campaign. However, due to the ongoing war, all activities have been suspended.

It is the opinion of the Evaluation Team that this component can not be considered as having been achieved, given that of the two planned OUTPUTS one was partially achieved, and one was not achieved.

THE OVERALL ESTIMATED COMPLETION OF COMPONENT 4 AS PLANNED IS ESTIMATED AT 17%

Project Component 5

This component was conceived to enhance the sound environmental management of lighting products and air conditioners. It was to achieve one OUTCOME which was:

- *The reduction/minimization of leakage of hazardous materials to the environment.*

This component was to produce three OUTPUTS which were:

1. *Life-cycle assessments for lighting products and air conditioners are carried out to identify products containing hazardous material, and develop a national end-of-life appliance management plan, in line with global best practices and the recommendations of the U4E initiative.* **OUTPUT FULLY ACHIEVED**
2. *An end-of-life management plan is integrated in the national strategy for EE, the regulatory mechanism, the MVE programme, and the awareness campaigns undertaken as part of this project, where the key tasks of relevance to end-of-life management are assigned to the relevant authorities.* **OUTPUT FULLY ACHIEVED**
3. *Communication campaigns are delivered to stakeholders to raise awareness on the proper disposal of used products and the incentives/penalties developed in the new regulations.* **NO ACTIVITIES UNDERTAKEN. OUTPUT NOT ACHIEVED.**

Of the 9 activities to be carried out under this component, 7 were fully completed and 2 were not completed.

It is the opinion of the Evaluation Team that this component can be considered as having been mostly achieved, as two of the three OUTPUTS have been achieved.

THE OVERALL ESTIMATED COMPLETION OF COMPONENT 5 AS PLANNED, IS ESTIMATED AT 78%

THE PROJECT´S OVERALL COMPLETION RATE IS ESTIMATED AT 68 %

EFFICIENCY

Efficiency refers to: (1) the quantity of resources allocated, and the results achieved; that are used to achieve project results; (2) the timely manner in which resources were allocated and used; and (3) to the transparency with which those resources were managed. This project had a budget of U$ 1,770,000 that proceeded from the GEF through the UNDP. While there were important budgetary contributions from government sources, these were either in kind (counterpart salaries, space, parallel support activities etc) or given the war, those contributions foreseen in cash did not materialize.

While we do not have the final expenditures, as the project has not been closed yet, we can draw some relatively reliable conclusions as to the level of expenditures to date. TABLES 9 and 10 below, reflect our best estimate of expenditures/commitments to date as well as available remanent in dollars and % terms.

Table 9- Project Expenditures (by category and the source of information)

Expenditures to date appear to be as follows:

CATEGORY	US $	SOURCE
Reported as spent in 2023	808,022	PIR as of June 2023
ESTIMATED EXPND. TO DATE	**808,022***	

*Does not include any expenditures/commitments incurred in the 4th. Qtr. of 2023 or in 2024

TABLE 10- Spent and Unspent funds (both in U$ and % terms)

UNDP/GEF CONTRIBUTION	US $	% of funds
(A) Budget	1,770,000	100%
(B) Estim. Expend.+ Commit.	808,022*	46%
(A-B) Unspent/Uncommitted	**961,978**	**54%**

*Does not include any expenditures/commitments that may have been incurred in the 4th. Qtr. of 2023 or in 2024.

The Evaluation Team recognizes that not all project activities cost the same, nor contribute in the same measure to the success of a project. However, the quality of those outputs the project managed to produce were judged by all stakeholders during interviews, as adequate or above. Based on its review of the Outputs, the ET Team agrees with that assessment. A review of the two tables above reinforces that the

project has functioned efficiently in terms of the use of resources. As stated, it has completed 68% of the activities foreseen and to do so has spent only 46% of the allocated budget. The Evaluation Team, based on the information gathered during the three dozen or so interviews, attributes this to two factors:

1. good judgement on the part of the Project Manager, UNDP programme staff and the government counterparts in organizing the structure of the project around several committees, each with very specific tasks and composed of knowledgeable and committed individuals; and
2. the use of subcontractors and their careful review, selection and oversight.

In respect of the timeliness and use of resources, the Evaluation Team noted that there were significant delays in approving disbursements. This was explained as being the result of the need to take all the necessary precautions to ensure that project funds were adequately used and accounted for, given the very difficult situation in the country. The ET will make a recommendation in relation to approaching this problem.

In regard to the transparency in the use of funds, the Evaluation Team reviewed carefully the Audit Report/Audited Financial Statements done in 2021 that were prepared by MUBARAK Certified Public Accountants, an independent firm and noted that in the Audit Opinion therein, they endorsed fully the project accounting carried out by UNDP.

Table 11- Assessment of the Overall Project Outcome

Assessment of Outcomes	Rating
Relevance	**Of High Relevance**
Effectiveness	**Moderately Unsatisfactory**
Efficiency	**Moderately Satisfactory**
Overall Project Outcome Rating	**Moderately Satisfactory**

SUSTAINABILITY

Although the project has progressed well in developing institutional frameworks and systems and increased awareness, sustainability is the main source of concern for the Evaluation Team. Specifically, two different areas of concerns were identified.

Institutional Framework and Governance Sustainability

The first has to do with the loss of institutional memory and support that are required for the effective functioning of the Institutional framework. As a result of the civil unrest of the last year, many key project players from both government agencies and UNDP itself have left the country finding themselves in Cairo, the UEA, Saudi Arabia, and other countries. The risk to the sustainability of the project is that, if the civil war does not end soon, some of them may find permanent employment elsewhere. Similarly, others were forced to migrate within Sudan itself. Again, it is not evident that they will be able to return to the capital given the amount of destruction and looting that has taken place there. However, there is some hope that this risk might not necessarily materialize. The Evaluation Team specifically asked a dozen or so key players if they were committed to going back once the fighting stopped and all responded positively.

Financial Sustainability

The second has to do with a key project input which has been left unfinished and that is the capacity of the Sudanese Standards and Metrology Organization (SSMO) to measure the standards and enforce them through partner government agencies such as the Customs Office. As has been stated in the chapters above, there is clear evidence that despite the COVID 19 crisis and the civil war, the project completed 67% of the activities it was designed to carry out. The base for the substitution of traditional incandescent lighting and inefficient air conditioning, cooling and refrigeration appliances has been set. The country now has a National Strategy to move toward greater energy efficiency, it has established Minimum Energy Performance Standards that are adequate for Sudan, it has its own energy labelling system etc. However, the equipment that the SSMO requires to support changes in the energy consumption paradigm i.e. moving from inefficient to efficient lighting and appliances, has not been forthcoming. The funding for this was to come from government sources. The Evaluation Team fears that with the future need to spend enormous amounts of financing to reconstruct Sudan´s housing, road, communications, education, energy infrastructures etc., purchasing the equipment needed to ensure the attainment of the project´s objective (improved energy efficiency) will be low on the government´s priority. Without this component the SSMO will not be able to generate the required income to maintain such a system as the one designed under this project.

Socio-political Sustainability

The project successfully forged strong collaborations between ERA, SSMO and private sector stakeholders, particularly electrical device importers and other partners. This collaboration is crucial for sustaining project initiatives and efforts. The TE team regards this achievement (often underestimated) recognizing its importance, as well as the significant time and effort required to achieve collaboration. Based on stakeholder inputs, it can conclude that the project has led to increased awareness about the role of EE and the importance of EE appliances among the key national actors.

Environmental Sustainability

The social and environmental screening conducted during the project formulation classified the project as low risk. Under component 5, the project strategy included activities to address environmental threats that may occur because of project activities.
However, without the full completion of all major project components and data on the status of the objective-level indicators, there is little that the TE can say about the environmental impact that the project may achieve.

Table 12- Sustainability rating

Sustainability	Rating
Financial resources	**Unlikely**
Socio-political	**Moderately Unlikely**
Institutional framework and governance	**Moderately likely**
Environmental	**Moderately Unlikely**
Overall likelihood of sustainability	**Moderately Unlikely**

PROGRESS TO IMPACT

To date, the project has progressed well in most of the outcomes associated with energy efficiency appliances (refer to the discussion under effectiveness), which could be seen as an enabling environment for progress toward the expected impact. However, it is difficult to envision that the substantial investment done by the GEF and UNDP in staff time and financial resources deployed under this project, as having any significant impact without completing the two outstanding key components.
The ET emphasizes the importance of establishing a system for collecting and monitoring project impact data, currently there is no impact data beyond the baseline of the objective level indicators. The ET notes that they did not receive a tracking tool for the GEF Core indicators.

GENDER EQUITY AND WOMEN'S EMPOWERMENT

As discussed under the gender in Project Implementation, the report on gender results, defined as project results that have been found to be contributing to gender equality and women's empowerment, focuses on process indicators such as gender representation in project management structures, inclusion of women in capacity-building training and workshops and study visits; and inclusion in the Awareness Campaign targeted on both male and female pupils, as proof that both genders receive information about energy efficiency.
Although there are no gender outcome indicators within the results framework and no impact-level indicators, improving access to energy is a fundamental driver, influencing various aspects of economic development and providing opportunities for all population segments, including youth and women.

COUNTRY OWNERSHIP

The project was implemented under the UNDP NIM modality, and the Electricity Regulatory Authority was the national implementing partner. As discussed in sections 2 and 3, the project formulation and implementation benefited from a meaningful engagement of a wide range of national stakeholders. The collaborations between ERA, SSMO, the branch electrical device importers, the Customs Authority and SEDCO contributed to the advancement of the project outputs. Specifically, the project formed a technical committee composed of national partners, which played a vital role in developing MEPS and Labels. National technical experts played a crucial role in the review of all technical products and studies.
Almost all national stakeholders were actively engaged in project board meetings, meetings attended by senior officials from the national government and private sector partners, and in some situations, the national partners took a more proactive approach than UNDP.
At the formulation stage, government partners committed to contributing significant financial resources to the project, as indicated in Table 7—Co-financing Status. This early commitment demonstrated their initial support and country ownership of the project. However, due to the political upheaval in the country, this commitment was not honoured, further exacerbating the economic and financial challenges.
The TE team firmly believes there is strong country ownership and has found evidence to support this.

CROSS-CUTTING ISSUES

Cross-cutting issues explicitly mentioned in the ProDoc included South-South and Triangular Cooperation (SSTrC) and gender. The project design envisioned leveraging SSTrC primarily within the framework of the

U4E Energy Efficient Appliance global program. It also included plans for a partnership with NTC of China to provide technical support and remote assistance to strengthen MVE capacities for efficient lighting in Sudan. Unfortunately, support from NTC did not materialise during the implementation. During implementation, the project significantly benefited from U4E collaboration, best practices, and lessons learned from other Southern countries.

Additionally, while the project document did not explicitly mention other cross-cutting issues, the project was expected to support gender, poverty alleviation and climate change. Improving access to energy is a fundamental driver, influencing various aspects of economic development and providing opportunities for all population segments, including youth, women, and other vulnerable groups. Climate change benefits are among the key objectives of the project.

CATALYTIC EFFECT

The overall project strategy was composed of technical and capacity development support for the key EE sector actors, particularly those related to EE appliances. The project also implemented activities to promote awareness among key stakeholders, including government institutions, local distributors, and end users, to promote a wide deployment of EE appliances in Sudan. The project developed Sudan's Minimum Energy Performance Standards, which was approved by the SSMO technical committee and moved to the final step of being adopted when the war erupted. A national technical committee played a crucial role in revising the MEPS and has enabled expanding the project's scope to cover additional appliances without incurring extra costs.

The project piloted an energy audit and replacement of lighting of three buildings, namely UNDP, ERA, and SSMO, as a demonstration of the benefit of installing the energy efficient lighting and appliances and to support the development of a financial mechanism to promote energy efficiency in lighting and air conditioning. The pilot fully completed the ERA building (audit and lighting replacement) and completed the audit for the SSMO building while the lighting replacement was in progress when the war started.

As a child project, it greatly benefited from a close collaboration with U4E-UNEP. The collaboration facilitated the development and review of Sudan's Minimum Energy Performance Standards and helped in the sustainable public procurement process. Additionally, U4E generously shared the complete source code of the Product Registration System (PRS) with the projects. In terms of knowledge management, the project generated many knowledge products, some of the project work is featured on the U4E website. With COMESA support, the project organized a study tour to Ghana to gain insights from the Ghana Energy Commission's rich experience in energy efficiency.

GEF ADDITIONALITY

GEF additionality refers to the additional outcomes that can be directly attributed to the GEF-supported project in six specific areas. The Evaluation finds evidence that the project contributed to two areas of additionality: 1. Institutional and Governance Additionality, and 2. Legal/Regulatory Additionality. As discussed in the Evaluation Findings section, the project significantly strengthened the institutional capacity of the energy sector through training, exposure to best practices, and the development of knowledge products. This falls under Institutional and Governance Additionality.
Under Legal/Regulatory Additionality, the project developed key regulatory frameworks (such as NEEAP), regulations and standards, including MEPS for five appliances. These accomplishments were possible solely due to GEF financing (the only source of funds) and could be used as an indication of GEF's Financial

Additionality. However, it is worth noting that Financial Additionality, as per the GEF guideline, requires an assessment of the expected incremental/additional cost reasoning as explained in Justification in the PIF and the strategy in the ProDoc. The ProDoc does not include information about additional cost reasoning, as the project was formulated before the guidance on GEF additionality.

In terms of Environmental Additionality, the project aimed to provide climate change mitigation benefits by transforming Sudan's market for energy-efficient lighting and air conditioners. Using energy-efficient appliances is expected to result in significant energy savings and, consequently, substantial emissions reductions. While the project's logic is sound, there is currently no evidence that it has achieved mitigation benefits. This is primarily because it is still relatively early to assess the project's impact and because no data is available to track these outcomes. As discussed under the M&E subheading in the Evaluation Findings section, the ET did not receive a tracking tool for GEF Core indicators.

IV. Main Findings Conclusions, Recommendations, Lessons Learned

MAIN FINDINGS

The project has played a crucial role in driving forward the energy efficiency agenda in Sudan. Despite facing challenges during implementation, with the GEF resources notable advancements were achieved across all components.

On the project´s design: The Evaluation Team concludes that the project design took into account the risks that could be identified; proposed a Theory of Change that was consistent and logical; a Results Framework that again was logical and followed the correct causal relationship between activities, outputs and outcomes.

On the project´s relevance: The Evaluation Team found the project of relevance given that it was designed to solve the problem of energy shortages and CO_2 emissions. As outlined in its 2021 NDC report, in the report entitled “Empowering Sudan: Renewable Energy Addressing Poverty & Development”, and in the report entitled “Sudan 2018 VNRs for High-Level Political Forum” amongst other policy documents, there is a link between energy shortages and poverty as well as social conflicts. Per example this last document states: “The poverty incidence is highly susceptible to changes in the economic conditions, which have recently worsened due to shortage of energy” The Evaluation Team could refer to several more examples of this. The project is also consistent with the 2019-2021 United Nations Development Assistance Framework and as could be expected, with the UNDP Country Programme for 2018-2021 whose Development Priorities 3 and 4 are **Addressing Climate Change** and **Promoting equitable access to basic services.**

On the project´s effectiveness: The Evaluation Team concludes that the project did not reach the designed effect in terms of CO_2 emissions reduction and did not complete about a third of the planned activities it was to execute. This being said, given the enormous difficulties that the project was confronted with in 2019, 2020 and 2023, the Evaluation Team feels that the Government of Sudan and the UNDP managed to implement practically all activities that formed the base of the project concept. The two main areas that were not completed were the purchase and installation of the required testing equipment (which is central to the project´s success) and the design and implementation of a finance incentives scheme to support the migration from less efficient to more efficient lighting, air conditioning/cooling and refrigeration

equipment. To the future attainment of these two broad areas, the Evaluation Team makes a recommendation below.

On the project´s efficiency: As noted above, the project completed roughly 68 percent of the activities it had budgeted while spending only 46 percent of the allocated budget. While the original design was for the project to work on the promotion of lighting fixtures and air-conditioners, it in fact also covered 5 electrical fixtures/appliances (lighting fixtures, air-conditioners, refrigerators, air coolers and fans). Therefore, the Evaluation Team believes the project spent resources wisely and, in a manner, consistent with proper accounting practices and financial safeguards, as comes out of the Audit Report the project was subjected to in 2021.
Some issues with the delay in transferring funds to the implementing agent were identified and affected project implementation.

On the project´s sustainability: The Evaluation Team is greatly concerned that unless the Sudanese Standards and Metrology Organization (SSMO) obtains the necessary equipment to be able to measure compliance with and enforce the MEPS, the investment of the GEF/UNDP will have little to show for in a few years. The enormous financial burden that the Government of Sudan will have to make to ensure the reconstruction of the country makes it, in the Evaluation Team´s opinion, highly unlikely that funds will be found to complete this vital component.

On the project´s impact: As stated, it is difficult to envision the substantial investment in staff time and financial resources deployed under this project as having any significant impact without completing the two outstanding key components.

CONCLUSIONS

The project provided a well-structured response to the energy challenge in Sudan. The project sought to transforming Sudan's market for energy-efficient lighting and air conditioners and as such provide climate change mitigation benefits and decrease energy poverty.

As stated in Evaluation Findings section, in spite of the delays in getting the project off the ground, the impact of the COVID-19 pandemic and the civil strife of the last two years, some key project activities were completed and important Outputs such as the updating of the National Strategy for Energy Efficiency, the agreement on the MEPS to be applied in the country, the labelling system for appliances in Sudan etc. were produced as planned.

An important project success is the raising of awareness of the need to conserve energy through the use of improved energy efficiency, which has taken root within key governmental institutions in public sector power companies responsible for the generation, transmission and distribution of electric power within the private sector entities importing and/or manufacturing key appliances and to a more limited extent amongst consumers and the public at large. The project succeeded in building strong collaboration within the energy sector.

In spite of these advances, the ET team once again wishes to emphasize that the UNDP and GEF run a serious risk of losing the substantial investment made so far, if two of the remaining key outputs are not completed. These are: (1) the purchase and installation of the planned metrological equipment and (2) the establishment of market incentives to promote the replacement of lighting and appliances that are more energy efficient.

RECOMMENDATIONS

RECOMMENDATION No. 1 – Addressed to the GEF and UNDP (Programme Unit)

Realizing that the investment to date (over US$800,000) as well as the achievements of the project (Energy Efficiency Strategy, Minimum Energy Performance Standards for 5 categories, labelling reflecting the MEPS, trained staff ETC.) will only be of value if two vital sets of key complementary activities are completed (basic metrological equipment is bought and installed and a market incentives mechanism is in place). the Evaluation Team strongly recommends that either the project be extended for a period of one year to achieve this or include the remaining work within the framework of a new GEF-funded project.

RECOMMENDATION No. 2 – Addressed to the UNDP Sudan Office management.

The capacity of the UNDP Field Office should be reviewed and strengthened as required, to be able to assist the Government in implementing either the extension or the new project (as recommended in the previous point). The Evaluation Team is convinced that this recommendation should be seen in the current context, when the reconstruction effort of Sudan will in all probability require substantial UNDP involvement at a time when the Government is weakest and will require greater support from the field office in disbursing funds correctly and in a timely manner, as well as accounting for them appropriately.

RECOMMENDATION No. 3 – Addressed to ERA and the UNDP Office in Sudan

The project has produced a substantial volume of information, analysis, knowledge, standards, and regulations. All project materials, such as policy documents, analyses, best practices, and standards, must be documented, categorized, and transferred to pertinent partners and government bodies. It's imperative that the resources be made available and accessible to the EE stakeholders to motivate their utilization. **This could involve**:

I. Gather, categorize, and arrange all project materials, encompassing documents, studies, best practices, and standards.
II. Review and update the EE appliances stakeholder mapping to identify any changes that have occurred in the last months.
III. Deliver the pertinent product/documents to the appropriate organization and guarantee that ERA possesses a backup copy.
IV. Ensure that the website is operational.

RECOMMENDATION No. 4 – Addressed to SSMO

Follow-up to ensure the adoption of Sudan Minimum Energy Performance Standards through a phased approach. Phase 1 would focus on imported appliances, followed by phase 2, which would target domestically manufactured ones.

LESSONS LEARNED

- All funding offered by the government or third parties that is required to complete vital project components should be an integral part of the project budget and therefore should be received as a Cost Sharing contribution (not as Parallel Financing). This will guarantee that the funding for all vital project components is indeed available, are reflected in the project budget and that the corresponding OUTPUT and ACTIVITIES are included in the project´s Results Framework.
- Conflict and post-conflict environments present unique challenges to project implementation due to the rapidly changing environment and the socio-political complexities involved. As such, frequent engagement with project stakeholders is required to enable them to stay abreast of changes, assess their impact on project activities, and adapt plans accordingly. Moreover, more frequent meetings improve following up on meeting outcomes and improve partnerships. UNDP should consider increasing the frequency of project board meetings to more than once per year and establish a mechanism to follow-up the outcomes of these meetings as well as other meeting.
- Considering the extended GEF's programming duration, with a significant time between PIF, project document development, and project start, M&E tools like inception workshops and Mid-Term Reviews (MTR) hold heightened importance, particularly in complex situations. These tools are pivotal in enhancing the project's adaptive management and should be seen as more than a compliance requirement.
- Country ownership is essential for project results' success and sustainability. Fostering strong technical ownership, achieved through meaningful engagement and capacity development of national actors, enhances efficiency and enables country ownership, especially when financial ownership is weak due to limited national financial resources.

ANNEXES SECTION

I. LIST OF DOCUMENTS REVIEWED
II. LIST OF PERSONS INTERVIEWED
III. EVALUATION MATRIX
IV. DATA COLLECTION TOOL
V. ADVANCES IN RELATION TO THE RESULTS FRAMEWORK
VI. ESTIMATED LABORATORY CAPITAL AND OPERATIONAL COSTS
VII. TERMS OF REFERENCE (TOR) OF THE EVALUATION MISSION

ANNEX I- LIST OF DOCUMENTS REVIEWED

- Final UNDP-GEF Project Document for the project "Leapfrogging Sudan's markets to more efficient lighting and air conditioners."
- Minutes of Local Project Appraisal Committee meeting for the project "Leapfrogging Sudan's markets to more efficient lighting and air conditioners."
- Project Annex E: Social and Environmental Screening
- Gender Mainstreaming Study (Gender and Energy Saving and consumption)
- PIMS 5674_DoA for Initiation Plan for Project Preparation Grant (PPG)
- Letters of Co-financing from National Partners.
- GEF-UNEP PROGRAM FRAMEWORK DOCUMENT (PFD) for Efficient Appliances Global Partnership
- Report on the cumulative co-financing for the project ((2022)
- UNDP/GEF, Project Implementation Reports (PIR) for 2019, 2020,2021, 2022 and 2023
- Financial data based on the Combined Delivery Report for the years 2019-2023.
- Audit report for the project for 2022.
- Minutes of the Project Board Meetings
- Minutes of the Technical Committee Meetings
- U4E Project At-A-Glance: Sudan's Energy Efficient Appliances and Lighting
- National Energy Efficiency Strategy for Sudan: (Del4 – Tasks 5, 6 And 7)
- Baseline Assessment for The In-Country Capacity to Undertake the appliances and lighting energy and performance testing, and the cost efficiency of establishing a testing facility.
- Minimum Energy Performance Standard (MEPS) and Energy Labeling Requirements for Evaporative Air Coolers (EAC)
- Requirements and Cost Estimation of Lighting, Air Conditioning, and Refrigeration Testing Laboratories
- Energy efficiency regulation for electrical appliances and equipment (2023)
- EE Awareness Book for Children
- UNDP Country Programme Document (CPD) for Sudan for 2017-2021
- The United Nations Development Assistance Framework for 2019-2021
- Sudan's First Nationally Determined Contribution under the Paris Agreement Updated October 2021
- Empowering Sudan: Renewable Energy Addressing Poverty & Development
- Sudan 2018 VNRs for High-Level Political Forum
- Sudan First State of Environment and Outlook Report 2020

ANNEX II- LIST OF PERSONS INTERVIEWED

NAME	INISTITUTION	TITLE/ ROLE	MODE OF INTERVIE	LOCATION
Mr. Abdullahi Alkhalifa	Electricity Regulatory Authority (ERA)	Project Manager	Zoom	UAE, Oman, KSA
Mr. Abdelhafiz Babiker	Electricity Regulatory Authority (ERA)	Project Coordinator	Zoom	UAE
Mr. Tigani Fadul	Electricity Regulatory Authority (ERA)	Secretary-General	WhatsApp	Sudan
Mr. Nourallah Ahmed	UNDP	Programme Analyst	Zoom	Sudan and Egypt
Ms. Hanan Mutwakil	UNDP	Lead, Access to Energy and Climate Change Portfolio.	Zoom	Egypt
Ms. Amal Aldababseh	UNDP	Regional Technical Advisor	Zoom	Amman, Jordon
Mr. Saliou Toure	UNDP	Former Regional Technical Advisor Current position: Team Leader - Climate Change, Water, Energy, and Environment.	Zoom	Yemen (was based in Amman)
Ms. Rocio Soledad Garcia	UNEP/U4E		Zoom	Paris/France
Mr. Vijay Prasad Kesari	UNDP	Advisor Climate and Energy Specialist	Zoom	Amman/ Jordon
Mr. Mateo Salomon	UNDP	Principal Technical Advisor – Climate Change	Microsoft Teams	New York
Ms. Intisar Mohamed Osman Ahmed	Sudanese Standards and Metrology Organization (SSMO)	Member of MEPS committee Sudan		
Ms. Dalal Elhaj Ibrahim	t	Government project coordinator - Project Board member	WhatsApp	Sudan
Mr. Khalid Babikir	The Energy Efficiency Departments, under the Ministry of Oil	NEEAP committee member	Zoom	Kassala, Sudan
Ms. Ilham Salih Obeid	Sudanese Standards and Metrology Organization (SSMO)	Chairperson of the Testing Labs committee	Zoom	Port Sudan, Sudan
Ms. Intisar Abdalla Sidahmed Abusuwar	Sudanese Standards and Metrology Organization (SSMO)	Member of the Testing Labs committee & NEEAP committee member	Zoom	Saudi Arabia
Ms. Sarah Medani Mohammed	Sudanese Standards and Metrology Organization (SSMO)	Member of the Testing Labs committee Current Location: not sure	WhatsApp	Dungla, Sudan

NAME	INISTITUTION	TITLE/ ROLE	MODE OF INTERVIE	LOCATION
Ms. Tahlil Osman Ahmed Wini	Sudanese Standards and Metrology Organization (SSMO)	Engineer- Member of the Testing Labs committee	Zoom	Omdurman, Sudan
Mr. Alaeldin Adam Mohammed Ali	Electricity Regulatory Authority	Project Engineer, & Member of the Testing Labs & EE procedure & EE regulations, & MEPS committees	Zoom	Port Sudan, Sudan
Ms. Shima Yagoub Mastour Mohamed	Electricity Regulatory Authority	Project Engineer, & Member of the Testing Labs & EE procedure & EE regulations, & MEPS committees	WhatsApp	Cairo, Egypt
Ms. Howeda Osman Omer	Electricity Regulatory Authority	Department of planning and research -Member of EE procedure & EE regulations, & MEPS committees Sudan	Zoom	Cairo, Egypt
Mr. Mohamed Abdelrahim M. Ahmed	Electricity Regulatory Authority	Member of EE regulations committees & EE Campaign coordinator	Zoom	Cairo, Egypt
Mr. Yasir Abdallah	Hydro Renewable Energy Company	Director- Renewable Energy Department	Zoom	Cairo, Egypt
Ms. Mai Siddeeg	Consumer Protection Association	Project technical committee member,	WhatsApp	Khartoum North, Sudan
Mr. Ahmed Wagialla	Branch electrical devices importers	Member of Project technical committee member,	Zoom	UAE
Ms. Ayat Omer	CTC Group	Procurement Officer- Workshops participant, Current Location: not sure	WhatsApp	Cairo, Egypt
Ms. Ameera Eltayeb	Marafi Media Company (Campaign Organizer)	EE Campaign Organizer	Zoom	Istanbul, Turkey
Mr. Nader Hajj Shehadeh	Organization: Outside the Box (OTB Consultancy)	Managing Director & Principal Consultant,	WhatsApp	Lebanon/ Canada
Mr. Dietram Oppelt,	Habitat, Energy Application & Technology	Managing Director	Microsoft Teams	Koenigstein, Germany

ANNEX III. EVALUATION MATRIX

Evaluation Question	Performance Area/ Indicators	Data Sources & data collection tool	Data Sources and Data Collection Tools
Relevance: : How does the project relate to the main objectives of the GEF Focal area, and to the environment and development priorities a the local, regional and national level?			
• Are the project's objectives aligned with the priorities of the government of Sudan (National plans and UNDAF/ CPD)? • · Are the project objectives in line with GEF's strategic priorities? • · Are the project objectives in line with the priorities of the UNDP strategic plan? • How relevant are the project's interventions to the targeted institutions?	• Evidence of alignment between project objectives and the stated priorities of the government priorities in these documents. • Level of alignment between project objective and GEF strategic priorities. • Level of alignment between project objective and GEF strategic priorities. • The extent to which the interventions and implementation methods are aligned to the needs of institutions and adapted to the Sudan context.	• Desk review of the project documentation • Key Informant Interviews (UNDP, Project team, and national partners)	• Qualitative analysis of collected data. • Analysis of Theory of Change (TOC).
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
• To what extent have the expected results (outputs and outcomes) been achieved? Are there any gender results? • What are the challenges to achieving the outcomes? • What is the most significant change that resulted from the interventions? • Are there any additional achievements of the projects (beyond the results in the project documents)?	• The status of project indicators and targets as in the longframe • Results achieved beyond the log frame. • Measure of success (most significant change) as defined by the project team and partners. • Stakeholder's satisfaction with the quality of Outputs	• Desk review of the project documentation • Key Informant Interviews (UNDP, Project team, and national partners)	• Qualitative analysis of collected data. • Analysis of Theory of Change (TOC).

Evaluation Question	Performance Area/ Indicators	Data Sources & data collection tool	Data Sources and Data Collection Tools
Efficiency: Was the project implemented efficiently, in line with international and national norms and standards?			
• Were the projects Implemented within deadlines and cost estimates? • Have the implementation arrangements enabled timely delivery of activities and achievement of outputs? • What is the contribution of cash and in-kind co-financing from other sources (government)?	• Timeline of the milestones • Project delivery	• Desk review. • Key Informant Interviews (UNDP, Project team, and national partners)	• Qualitative/ quantitative analysis of data (AWPS, progress reports and financial data)
Sustainability: To what extent are there financial, institutional, socio-political, and/or environmental risks to sustaining long-term project results?			
• How strong is the level of ownership of the results by the government entities and the benefiting institutions? • How likely are the benefits to continue after the project? • Did the project develop institutional capacities? What systems or tools were created by the project? • How likely will the system continue after the project?	• The extent to which the project implementation is integrated in national systems? • Evidence of financing from government and national partners. • Degree of engagement of relevant stakeholders in project activities and results. • Evidence for the creation of systems / capacity • Existence and quality of the exit strategy	• Desk review. • Key Informant Interviews (UNDP, Project team, and national partners)	• Qualitative analysis of data. • Analysis of Theory of Change (TOC).
Impact: Are there indications that the project has contributed to, or enabled progress toward reduced environmental stress and/or improved ecological status?			

Evaluation Question	Performance Area/ Indicators	Data Sources & data collection tool	Data Sources and Data Collection Tools
• Are the anticipated outcomes likely to be achieved? • Are the outcomes likely to contribute to the achievement of the project objective and contribute to impact? • Are they likely to contribute to Environmental benefits (national/ global)	• The existence of logical linkages between project outcomes and impacts • l indicators' progress through the project's Theory of Change	•	• Qualitative analysis of data. • Analysis of Theory of Change (TOC).

ANNEX IV. DATA COLLECTION TOOL

This is a reference guide for key informant interviews aligned to three main groups of stakeholders. This tool is not a questionnaire, it serves as an informal aid to prompt discussion during the interviews. It was tailored and refined as the evaluation advanced to incorporate insights obtained from document reviews and consultations. The evaluation team adopted an adaptive approach to the interview, adjusting them as necessary and iterate to triangulate information where needed and deemed appropriate.

Internal (UNP and the Project Team)	Relevance	• How is the project aligned with global and national policies and programmes? • What was the rationale behind the choice outcomes and outputs? • What are the reasons for implementing the selected activities? • What are key partner insinuations, and how and why have they been targeted/ selected?
	Effectiveness	• What outputs and outcomes of the project have been achieved? How/can they be further expanded? • What has been the most significant change the project contributed to? • What kind of gender results were achieved, if any? • Which output/ outcome is least successful? What gaps remain (if any), including gaps in capacity development? • What strengths and weaknesses have you noticed during implementation? To what extent is it possible to capitalize on strengths and address weaknesses?
	Efficiency	• What expertise does UNDP bring? • When delays/ problems were encountered, how were you able to address and resolve them? • Were any linkages made between the project and other related interventions within the sector (explain)? • Was the project successful in leveraging additional in-kind and cash resources (government and others)?
	Sustainability	• To what extent is project ownership realized at the national institutions (government of Sudan) level? • Was the project successful in leveraging additional resources (government and others)? • Are there any exit strategies for the project? What actions could be considered to enhance sustainability? • Are the benefits of the project likely to be sustained after the project? Why or why not? • What significant changes occurred as a result of the project? Can you describe/ explain? • What capacities are being strengthened at the individua/ institutional level? • To what extent are the project results dependent on issues relating to specific governance structures? Will the results be sustained if the governance structure changes?

	Impact	• Have you realized any impact or potential of impact?
National Partners (Top-down Interventions)	• How does the project relate to your department/ institution and Sudan's development priorities? • What was your department/institution's role in the project? • Has your agency/ department been involved in selecting the activities/interventions? • What are the key objectives of the activities you have implemented/ participated in? • Were there any activities/ that you feel are important to achieve the objectives but need to be implemented? • Was the project able to respond to the needs of your institutions related to the project objectives? • What are the key achievements of the project? • What significant changes occurred because of the project? Can you describe/ explain? • What have been the major factors influencing the achievement or non-achievement of these objectives? • Do you think that the achievements will be continued after the project? Why? Why not?	
National Partners (Bottom-up	• What departments/ institutions involved/implemented the awareness raining activities? Why have they been selected? • Were they involved in selecting activities / reviewing the content, etc.? • What type of activities had been implemented, and who was the primary audience for the activities (campaigns, awareness materials, etc.)? • How were gender issues integrated into the activities? • What are the key achievements in this area? • What are gender results achieved? • Will the achievements be sustained after the project? Why? Why not?	

Additionally, the evaluation team will use the following questions to assess project design, implementation, and oversight:

- How effective was the Project Structure in facilitating coordination, communications, and implementation? Would you have changed anything in the structure?
- · Were any linkages made between the project and other related interventions within the sector (explain)?
- Did the project face annual work planning, budgeting, or implementation challenges?
- What steps did you take towards adaptive or results management and why (changes to the project design and key deliverables etc.)?
- What assumptions and risks were identified during the implementation of the project? How did the project manage the risks and assumptions?
- How is feedback from M&E integrated into the project implementation? Have indicators been used to report progress effectively?

What were the mechanisms the project used to capture knowledge and draw lessons?

ANNEX V. ADVANCES IN RELATION TO THE RESULTS FRAMEWORK

The project envisioned 5 components.

COMPONENT 1 - Development of a national strategy to advance energy efficiency in lighting and air conditioners as part of the National Energy Efficiency Action plan (NEEAP)

The first component contemplated producing three outcomes for which 15 different activities were planned:

OUTCOME 1.1. Strategic goals of relevance to lighting products and air conditioners under the NEEAP are defined, and a work plan to achieve them is developed in accordance with the integrated policy approach recommended by the United for Efficiency (U4E) initiative.

OUTPUT 1.1.1 Strategic goals of relevance to lighting products and air conditioners under the NEEAP are defined, and a work plan to achieve them is developed in accordance with the integrated policy approach recommended by the United for Efficiency (U4E) initiative.

All 4 activities designed to achieve this outcome were fully completed.

- The strategic goals of the NEEAP were reviewed and revised in relation to the lighting and air conditioners' sub-sectors.
- Based on the integrated policy approach recommended by the U4Ethe project´s work plan was drafted.
- The project collected baseline data. This was validated at the inception workshop of the Heat contract. The project results framework table was updated.
- The list of strategic goals, the draft work plan, and the updated project result framework, were shared among stakeholders.

OUTPUT 1.1.1 WAS FULLY ACHIEVED

OUTPUT 1.1.2 All actors working on project EE sector are identified, with description of their roles, mandates, and responsibilities in implementing the key tasks of the work plan.

All 4 foreseen activities were completed.

- A new draft Energy Efficiency Act was completed.
- A list of the stakeholders involved in the development of the NEEAP, and in the implementation of the work plan was prepared.
- Stakeholders' meetings were held to discuss the roles and assign responsibilities to representatives from each participating entity.
- The work plan was updated based on comments from stakeholders, distributed for approval together notification letters to the assigned personnel advising them of their roles and responsibilities.

OUTPUT 1.1.2 WAS FULLY ACHIEVED

OUTPUT 1.1.3 Consensus is achieved by all energy stakeholders and policymakers on the goals, work plan, timeline, and the responsibility of each party in transforming the markets for EE lighting and air conditioners.

All 3 foreseen activities were completed.

- The final work plan is distributed to stakeholder with a revised timeline, tasks and the names of personnel to be involved in the implementation were included.
- A workshop to present the final work plan to policymakers was held.
- Periodical meetings were held with stakeholders to review the progress of the working various teams on the tasks assigned to them.

OUTPUT 1.1.3 WAS FULLY ACHIEVED

OUTCOME 1.2 Electricity Regulatory Authority (ERA) is capacitated as a focal point responsible for promoting and overseeing all activities related to energy efficiency in Sudan

OUTPUT 1.2.1 A focal point is operating, with official representations in the different ministries involved in the implementation of the NEEAP, collection and analysis of supplier-end data, sales data, and electricity consumption data, etc.

Only 3 of the 4 foreseen activities were completed.

- A focal point was established to serve as a center of excellence for energy efficient lighting products and air conditioners (ERA)
- The organizational structure of the focal point was designed and the obligations and level of authority of its members were approved by EE stakeholders.
- The budget allowing the focal point to operate was identified, and the source(s) of finance were secured to allow for its operation.

The fourth activity outlined below was not fully completed as a result of the conflict:

- The capacity building needs were not fully assessed, and relevant training workshops were not all held.

OUTPUT 1.2.1 WAS PARTIALLY ACHIEVED

OVERALL ESTIMATED COMPLETION OF COMPONENT 1 AS PLANNED: 90%

COMPONENT 2 - Adoption of regulatory mechanisms directing the market towards energy efficient lighting products and air conditioners, including minimum energy performance standards (MEPS), labeling scheme, testing and importing procedure.

OUTCOME 2.1 Internationally recognized regulatory mechanism is adopted, and the corresponding MEPS, label classification, energy performance test protocol, and import-related procedure are localized to be suitable for Sudan

OUTPUT 2.1.1 Economic and financial cost/benefit analysis is performed, to determine the appropriate level of regulatory measures for the residential, governmental and commercial sectors, including assessment of benchmark mechanisms, and suitability for adoption in Sudan

All 5 activities foreseen were completed.

- Existing legislation and administrative procedures to select a regulatory mechanism were reviewed and appropriate actions taken.
- Relevant enforcement models were reviewed.
- Benchmark energy efficiency regulations and enforcement procedures from other countries reviewed and compared to those in Sudan.
- An economic and financial cost/benefit analysis to assess which of the selected regulatory measures provide positive economic benefit to consumers and is suitable for adoption in Sudan was carried out.
- The result of the cost/benefit analysis were shared with stakeholders, and an appropriate MEPS legal framework selected.

OUTPUT 2.1.1 WAS FULLY ACHIEVED

OUTPUT 2.1.2 MEPS legal framework has been selected, localized, and adopted, including the accompanying labelling scheme and test procedure/certification.

All 5 activities foreseen were completed.

- Comprehensive MEPS legal framework is set for lighting products and air conditioners.
- Based on the selected MEPS, minimum data needs were established, and a plan was developed for collecting the data necessary to conduct analysis to support the implementation of the programme.
- The labelling scheme and test procedure/certification were identified, localized, and published on a website accessible to manufacturers and traders.
- A legal and administrative foundation for monitoring of all manufacturing and trading channels supplying the Sudanese market with lighting products and air conditioners was established.
- The MEPS regulatory framework was approved by the government and is ready for implementation by the Sudanese Standards and Metrology Organization.

OUTPUT 2.1.2 WAS FULLY ACHIEVED

OUTPUT 2.1.3 Compliance checking on imports and pre-export inspections are integrated in import regulations.

All 4 activities foreseen were completed.

- The energy performance test procedures were harmonized with existing international protocols in order to facilitate testing and reduce barriers to trade.
- Verification processes were developed, including the procedure of pre-export inspections and the certificates to be submitted at the point of entry to the Sudan.

- These processes were integrated in the existing importing procedure and other relevant permissions, including actions required in case of non-conformity with the MEPS.
- Additional procedures were developed to help identify the authenticity of test certificates to be submitted by importers and manufacturers, including initiating contact with accredited labs to verify reference numbers, validity, etc.

OUTPUT 2.1.3 WAS FULLY ACHIEVED

OUTCOME 2.2 Provide technical support for the identification and development of an appropriate financial mechanism to promote energy efficiency in lighting and air conditioning.

OUTPUT 2.2.1 Financing mechanism is developed and implemented

All 4 activities foreseen under this OUTCOME have not been completed. However, some preparatory work was carried out as follows:

Early-stage discussions have commenced with the Ministry of Finance and Economic Planning to create a specialized portfolio that offers financing options for acquiring efficient products through the banking system. Initial discussions with the customs authority to propose amendments to the custom fees structure. These changes aim at establishing an inversely proportional relationship between fees and efficiency, where higher efficiency would result in lower custom fees and vice versa. Preliminary discussions initiated with the Electricity Distribution Company to explore the possibility of incorporating the payment of instalments for energy-efficient products into their existing electricity billing system. All planned activities were scheduled for execution by the end of 2023, but regrettably, the conflict brought everything to a halt.

None of the 4 activities foreseen were completed- These were:

- Eligibility criteria for selection of the beneficiaries are defined based on the consumer-sector with least access to finance yet a high impact on electricity consumption for the purpose of lighting and air conditioning.
- Assessment of financing mechanism previously implemented by the government of Sudan are studied, and modifications are proposed to develop a similar mechanism for energy efficient products.
- Based on availability of external sources of finance are available (not part of GEF fund), and provided that reliable means for re-collection and return of funds are in place, the project will provide technical support towards the implementation of the proposed financing mechanism. It is noted that GEF fund shall not be used as to finance the purchase or selling of equipment and that an agreement on the mechanism for collection of instalments from consumers and return of funds to co-finance sources must be signed prior to the implementation of the proposed financing mechanism.
- A system for consumption data collection for beneficiaries is developed and implemented to continuously monitor the effectiveness of the products supported by the financing mechanism.

OUTPUT 2.2.1 WAS NOT ACHIEVED

OVERALL ESTIMATED COMPLETION OF COMPONENT 2 AS PLANNED: 66%

COMPONENT 3 - Adoption of monitoring, verification, and enforcement (MVE) system, to ensure that products in the market comply with the established MEPS

OUTCOME 3.1 Internationally recognized MVE programme is established and adopted by trained personnel.

OUTPUT 3.1.1 Establish and implement an effective MVE programme using the six guidance notes developed under the U4E initiative.

As of the project´s end 2 of the 3 activities had been completed.

- The six guidance notes of the U4E initiative were studied, based on which the MVE programme is designed.
- Auditing processes (verification testing) were developed to determine actual performance of products in the market.

A third planned activity was not completed

- the collection of compliance data with the regulatory requirements through market surveillance activities.

OUTPUT 3.1.1 WAS PARTIALLY ACHIEVED

OUTPUT 3.1.2 In collaboration with U4E initiative, staff involved in the implementation of the MVE system across all relevant public stakeholders are trained and equipped with the tools necessary to ensure enforcement of the MEPS and associated regulations.

All 4 activities foreseen were completed.

- A series of training workshops to introduce the developed MVE programme, and how to implement the different stages were planned and undertaken.
- Stakeholder meeting held to Identify the entities to be involved in the implementation of the MVE programme and define their responsibilities.
- Manual standardizing the actions to be taken in response to non-compliance offences prepared.
- Training workshops for representatives of the relevant authorities who will be in charge of implementing the MVE programme undertaken.

OUTPUT 3.1.2 WAS FULLY ACHIEVED

OUTPUT 3.1.3 In collaboration with the U4E initiative, developed and implemented a testing protocol, including identification of appropriate in-country and out of country testing and certification.

All 3 activities foreseen were completed.

- A budget for the implementation of the MVE programme was approved.
- Baseline assessment for in-country capacity to undertake the required testing procedure was completed, including the cost efficiency of establishing a testing facility.
- This baseline assessment was presented to stakeholders, including manufacturers and traders, to achieve consensus on the tests to be carried out in-country, the available resources (equipment and personnel), and the budget assigned for this purpose.

OUTPUT 3.1.3 WAS FULLY ACHIEVED

OUTCOME 3.2 Mechanisms for collection of market data are in place

OUTPUT 3.2.1 Supplier, distributor and retailer surveys undertaken at the end of project, to assess how much purchasers overcome the higher initial purchase price of energy efficient products

None of the 4 activities foreseen were completed. They were:

- Develop a communication plan, including a grievance mechanism for the supply-side, through which complaints and recommendations can be received.
- Design a survey form to capture the information to be collected for the purpose of demonstrating the behavior of purchasers and the influence of the project activities on the sales value of energy efficient products.
- Undertake an end-of-project survey to collect feedback from sample suppliers, distributors and retailers, and document the findings.
- Develop a set of lessons learned through the implementation of the project.

OUTPUT 3.2.1 WAS NOT ACHIEVED

OUTPUT 3.2.2 Household and business surveys undertaken at end of project to verify cost savings from adoption of new technologies

None of the 4 activities foreseen were completed. They were:

- Develop a communication plan, including a grievance mechanism for the demand-side, through which complaints and recommendations can be received.
- Design a survey form to capture the information to be collected for the purpose of demonstrating the value and savings encountered by end-users as a result of purchasing energy-efficient appliances.
- Undertake an end-of-project survey to collect feedback from sample households and businesses and document the findings.

- Develop a set of lessons learned through the implementation of the project.

OUTPUT 3.2.2 WAS NOT ACHIEVED

OVERALL ESTIMATED COMPLETION OF COMPONENT 3 AS PLANNED: 50 %

COMPONENT 4- Awareness-building of the new MEPS and regulatory mechanism

OUTCOME 4.1 Increased capacities of local supply chain stakeholders and end users to comply with new MEPS and to bring energy efficient products to the market at competitive and affordable prices.

OUTPUT 4.1.1 End users are aware of the benefits of energy efficient lighting products and air conditioners, understand the benefits of appliance efficiency, and recognize the labels when they see it

A comprehensive public awareness campaign, intended to reach a substantial part of Sudan, was planned to launch in June 2023. To ensure its effectiveness, TORs were crafted for a consultant to facilitate campaign preparation and for a social media specialist to handle the online aspects. Additionally, an RFP was drafted to engage a company in executing the campaign. However, due to the ongoing war, all activities have been suspended

A pilot project was initiated which involved hiring a consultant to conduct an energy audit of the designated sites. The consultant also prepared the Terms of Reference (TOR) for the implementation of the pilot project. Unfortunately, due to the war, the project was halted along with other activities.

One activity foreseen under this OUTPUT was completed as follows:

- Develop information packages for consumers, users and industry explaining the new labels' scheme and the cost effectiveness of purchasing energy-efficient lighting products and air conditioners

Two of the 3 activities foreseen were not completed as follows:

- In consultation with stakeholders, produce guidance materials and support tools for sales-people, training them on how to encourage end-users make energy-considerate decisions regarding the products they purchase.
- A pilot-project is implemented to show case the cost of shifting to energy efficient lighting and air conditioning, and the resulting cost saving. The size of the pilot-project will depend on the available resources.

OUTPUT 4.1.1 WAS PARTIALLY ACHIEVED

OUTPUT 4.1.2 Governmental agencies, local distributors, and retailers integrate the labels and product-certification in advertisement campaigns and marketing material for lighting products and air conditioners

A comprehensive country wide public awareness campaign was planned to launch in June 2023. To ensure its effectiveness, TORs were crafted for a consultant to facilitate campaign preparation and for a social media specialist to handle the online aspects. Additionally, an RFP was drafted to engage a company in executing the campaign. However, due to the ongoing war, all activities have been suspended

None of the 3 activities foreseen were completed as follows:

- The focal point administers a public campaign promoting actions to phase out inefficient lighting and air conditioning in the different consumer-sectors.
- The government advocates the political road map towards phasing out inefficient lighting products and air conditioners in newspaper and media.
- The private-sector is incentivized to promote high performance products and contribute to the market's leapfrogging efforts towards energy efficiency.

OUTPUT 4.1.2 WAS NOT ACHIEVED

OVERALL ESTIMATED COMPLETION OF COMPONENT 4 AS PLANNED: 10%

COMPONENT 5- Enhancing environmentally sound management of lighting products and air conditioners.

OUTCOME 5.1 Reduction/minimization of leakage of hazardous materials to the environment by reducing the input

OUTPUT 5.1.1 Life-cycle assessments for lighting products and air conditioners are carried out to identify products containing hazardous material, and develop a national end-of-life appliance management plan, in line with global best practices and the recommendations of the U4E initiative

All 4 activities foreseen were completed as follows:

- Completed life-cycle assessment for available lighting products and air conditioners identifying those containing hazardous material and the baseline end-of-life destination.
- A national end-of-life management plan for lighting products and air conditioners was developed.
- The developed plan was reviewed to ensure conformity with global best practices and the recommendations of the U4E initiative.
- The final plan was presented to stakeholders, commented on and approved.

OUTPUT 5.1.1 WAS FULLY ACHIEVED

OUTPUT 5.1.2 In collaboration with the U4E initiative, the end-of-life management plan is integrated in the national strategy for EE, the regulatory mechanism, the MVE programme, and the awareness campaigns undertaken as part of this project, where assigned to the relevant authorities

All 3 activities foreseen were completed, as follows:

- A final end-of-life plan is integrated in the work plan developed to implement the national strategy for energy efficiency, and reflects the relevant roles and responsibilities are assigned to representatives of stakeholders.
- Compliance with recommendations of the U4E initiative were integrated into the regulatory framework.
- Verification procedure to ensure safe waste disposal at end-of-life were achieved and integrated in the MVE programme.

OUTPUT 5.1.2 WAS FULLY ACHIEVED

OUTPUT 5.1.3 Communication campaigns are delivered to stakeholders to raise awareness on proper disposal of used products and the incentives/penalties developed in the new regulations.

While there were some limited activities in schools, there were no major communication campaigns were undertaken. The following two activities were planned as part of the comprehensive awareness campaign that was intended to start by Jue 2023.

None of the 2 activities foreseen were completed, as follows.

- End-users are educated on how to recycle and re-use used lighting products, whether by introducing re-use options, creating recycling facilities, or trading used products with recycling facilities abroad.
- Information on the end-of-life management plan is incorporated in the awareness raising campaigns and communication plans with the supply and demand sides.

OUTPUT 5.1.3 WAS NOT ACHIEVED

OVERALL ESTIMATED COMPLETION OF COMPONENT 5 AS PLANNED: 70%

ANNEX VI- ESTIMATED LABORATORY CAPITAL REQUIREMENTS
OPERATIONAL COSTS AND ESTIMATED TESTING PRICES

Table 1: Summary of estimated laboratory capital and operational costs

Laboratory	Capital Costs (USD)		Operational Costs (USD)
	Low	High	
ACs	$363,000	$665,000	$12,000 + Staff & Space
Refrigerators	$265,000	$617,000	$4,000 + Staff & Space
Lighting	$ 74,000	$615,000	$7,000 + Staff & Space

TOTAL COST LOW OPTION = US$ 702,000
TOTAL COST HIGH OPTION = US$ 1,897,000

Table 2: Summary of estimated testing prices in the world (by region)

Laboratory	MENA		Africa		Asia		LAC		Other Regions	
	Low	High	Low	High	Low	High	Low	High	Low	High
ACs	$1,040	$8,057	N/A		$350	$6,825	$450	$3,360	$4,733	$11,101
Refrigerators	$480	$2,939	N/A		$885	$2,500	$930	$3,000	$1,770	$2,360
Lighting	$24	$422	$600		$18	$1,550	$360	$1,070	$18	$1,200

ANNEX VII. ORIGINAL TERMS OF REFERENCE OF THE EVALUATION

TOR UNDP-GEF-TE-Project- Sudan .docx.p