

Terminal Evaluation

Promoting Appliance Energy Efficiency and Transformation of the Refrigerating Appliances Market in Ghana project

Implemented by UNDP Ghana, and executed by the Energy Commission of Ghana

GEF PIMS 4003 / UNDP PID 00074729

This report presents the findings of a review of project documentation, interviews and site visits in Ghana for the evaluation of the project. Findings are listed according to the component of the evaluation they relate to (project design / formulation; Implementation; and Results), and are each based on information retrieved from documents, provided by one or more interviewees and/or through site visits. We are grateful for the assistance provided by UNDP Ghana, the Ghana Energy Commission and other representatives of the Government of Ghana and all stakeholders who shared their views and observations with us.

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Acronyms and Abbreviations

CFC	ChloroFluoroCarbon (gas)
ECOWAS	Economic Community of West African States
EECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
GEF	Global Environment Facility
GHG	Greenhouse gas
HPMP	HCFC Phase-out Management Plan
MEPS	Minimum energy performance standards
MLF	Multilateral Fund
ODS	Ozone Depletion Substances
S&L	Standards and Labels



1. Executive Summary

Project evaluations are based on the assumption that an agreed project document presents a reasonably accurate and comprehensive strategy and outline for the project and that it includes targets which are reasonable and SMART. Unfortunately, the project document for this project fell short in several important aspects (see section 1.4 for a further summary of this, and section 4.1 for a detailed discussion). As a result, this terminal evaluation worked with the former project team to re-establish a baseline for the project and targets for its core objective (which had not been defined), and these have been used to assess the project's impact and progress towards targets. The reader is advised to keep this in mind when reviewing this evaluation.

1.1. Project Summary Table

The following table provides key data about the project "Promoting Appliance Energy Efficiency and Transformation of the Refrigeration Appliances Market in Ghana".

Project Title:	Promoting Appliance Energy Efficiency and Transformation of the Refrigeration Appliances Market in Ghana			
GEF Project ID:	3881		<i>at endorsement (Million US\$)</i>	<i>at completion (Million US\$)</i>
UNDP Project ID:	PIMS 4003	GEF financing:	1.7	1.7
Country:	Ghana	IA / EA own:	0.2	0.43
Region:	Africa	Government:	3.0	0.78
Focal Area:	CCM	Other:	1.2	0.15
FA Objectives, (OP/SP):	CC-SP1	Total co-financing:	4.4	1.4
Executing Agency:	Energy Commission	Total Project Cost:	6.1	3.1
Other Partners involved:	Ministry of Energy; Environmental Protection Agency	ProDoc Signature (date project began):		July 2011
		(Operational) Closing Date:	Proposed: 30 June 2014	Actual: 31 December 2014

1.2. Project Description (brief)

The UNDP/GEF Full-sized Project "Promoting Appliance Energy Efficiency and Transformation of the Refrigerating Appliances Market in Ghana" started in July 2011 and was finalized in December 2014. The project was funded by the GEF (USD 1.7 million) with co-financing from the Government of Ghana (USD 3.0 million), UNDP (USD 0.2 million) and MLF (USD 2.0 million). The project falls under the GEF Climate Change Focal Area.

The primary objective of the project is to improve the energy efficiency of refrigerators marketed and used in Ghana through the introduction of a combination of regulatory tools such as Minimum Energy Performance Standards and Energy Labels (S&L), as well as rebates. The project aims at strengthening the regulatory and institutional framework, developing monitoring and enforcement mechanisms, and providing training to appliance professionals. The project is exploring and testing financial incentives for the replacement of working old refrigerators complemented by public outreach campaigns. Special attention is given to the safe and environmentally sound disposal of old refrigerators, in particular to avoid the release of GHG from the product's cooling fluid or its insulating casing.



1.3. Evaluation Rating Table

Several parts of the project have been rated for this evaluation, in accordance with GEF and UNDP evaluation guidelines. These ratings are summarised here, and are substantiated in the sections of the report discussing the various rated aspects. The rating for overall project results factors in all individually rated elements.

Rating project performance		
Criteria	Comments	Ratings
Monitoring and Evaluation: Highly Satisfactory (HS), Satisfactory (S) Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)		
Overall quality of M&E	(rate 6 pt. scale)	Moderately satisfactory (MS)
M&E design at project start up	(rate 6 pt. scale)	Unsatisfactory (U)
M&E Plan Implementation	(rate 6 pt. scale)	Satisfactory (S)
IA & EA Execution: Highly Satisfactory (HS), Satisfactory (S) Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)		
Overall Quality of Project Implementation/Execution	(rate 6 pt. scale)	Moderately satisfactory (MS)
Implementing Agency Execution	(rate 6 pt. scale)	Moderately unsatisfactory (MU)
Executing Agency Execution	(rate 6 pt. scale)	Satisfactory (S)
Outcomes: Highly Satisfactory (HS), Satisfactory (S) Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)		
Overall Quality of Project Outcomes	(rate 6 pt. scale)	Moderately satisfactory (MS)
Relevance: relevant (R) or not relevant (NR)	(rate 2 pt. scale)	Relevant
Effectiveness	(rate 6 pt. scale)	Highly satisfactory (HS)
Efficiency	(rate 6 pt. scale)	Moderately unsatisfactory (MU)
Sustainability: Likely (L); Moderately Likely (ML); Moderately Unlikely (MU); Unlikely (U).		
Overall likelihood of risks to Sustainability	(rate 4 pt. scale)	Moderately likely (ML)
Financial resources	(rate 4 pt. scale)	Moderately unlikely (MU)
Socio-economic	(rate 4 pt. scale)	Likely (L)
Institutional framework and governance	(rate 4 pt. scale)	Moderately likely (ML)
Environmental	(rate 4 pt. scale)	Likely (L)
Impact: Significant (S), Minimal (M), Negligible (N)		
Environmental Status Improvement	(rate 3 pt. scale)	Significant (S)
Environmental Stress Reduction	(rate 3 pt. scale)	Not applicable (N/A)
Progress towards stress/status change	(rate 3 pt. scale)	Not applicable (N/A)
Overall Project results	(rate 6 pt. scale)	Satisfactory (MS)



1.4. *Summary of conclusions, recommendations and lessons*

This was a good project, because it was the right project at the right time, focused on the right parties in the right context. Simply being the right project in a country that welcomed and embraced its objectives sets this project apart from many other GEF projects. Every party involved, and in particular the GEF executing and implementing agencies, deserve praise for recognizing what was needed in the country at that time, and setting out a concerted effort, binding together (a lot of) national work with international support to make that happen. Ghana seems, overall, to be well underway in transforming the market for refrigerators and freezers, through its ban on the import of used products and the energy efficiency standards and labels (S&L) that were implemented.

Project design and formulation for this project was seriously lacking in many aspects: a poor and erroneous baseline description for this project; not linking project activities with (planned and already implemented) national policy developments; incorrectly listing (a large part of) another internationally funded project as a source of co-funding; not presenting useful baseline and impact indicators for the project; reporting incorrect financial information on PPG spending to the GEF secretariat; and ignoring the timeline of Ghana's legislation's implementation dates for the planning of project activities. Most of this could have been concluded through a careful reading of the project document at the time it was conceived and approved, however, that does not seem to have happened.

Implementation management for this project was characterised by forward thinking, collaboration and a strong – and commendable – focus on working with stakeholders. These are all important assets for this project, and a similar focus would benefit any future project. These are important assets that tremendously helped this project, and stakeholders generally view the project as a success. More attention is needed for maintaining and updating an accurate project strategy and strategic framework and reporting on progress towards overall targets. The project included several dedicated components to enhance its impact, which under-delivered, and one important lesson might be that S&L projects are best served when they focus fully on the core objective of transforming the market through S&L with supportive measures, which in itself can generate impacts more than sufficient for any GEF project.

The project's overall environmental impact adds up to approximately 3,700 kton CO₂ equivalent direct impact. This impact far exceeds a reasonable target for the project and points to an excellent value for money for the GEF. This also creates the foundation for expanding Ghana's approach into other appliances with a high energy demand, such as other household appliances, televisions and electric motors.

The lack of delivery on co-financing in this project, partly due to a design error, is a concern. The project still has an excellent cost-effectiveness from a GEF-perspective, however, it is worrying that so much co-financing disappeared during the project, without this having consequences for the spending of linked GEF-funds.

The success of the project, overall, is mixed: It has contributed to the implementation of a ban on the import of used appliances and of S&L legislation, in particular by strengthening enforcement of both regulations at Ghana's main port, increasing consumer understanding of energy labels and working with retailers in the marketing of energy efficient appliances. These achievements are greatly beneficial to Ghana and include valuable lessons for other countries. This was largely done, however, based on a poorly elaborated project design with substantial gaps in baseline descriptions, the development of targets and indicators and an M&E plan to track progress. The project largely worked around this in its implementation, however, a good project needs a good foundation, in a well-formulated and regularly updated project design, and that was missing for this project. In addition, the project's co-financing remained largely undelivered – partly probably also a result of poor design choices, however, partly also a result of the main project partner, the Government of Ghana redirecting its cash co-financing to just one project component with the GEF and UNDP budgets essentially covering everything else. The project still achieved impressive results, however, more would have been possible with a better project design and with the full co-financing delivered.

This evaluation has resulted in the following recommendations for UNDP, the Energy Commission of Ghana and the GEF, for this and future projects:

- Specifically for this project, a review of budgets for and spending on consultancy and consultancy rates budgeted and contracted are needed, given the multitude of financial issues observed on this project.
- Improvements are urgently needed in UNDP and GEF project review approaches with better checks on the internal and external consistency of project strategies and budgets.
- Improvements are also needed in how project strategies are developed, with more attention for how a policy project will interact with existing legislation and institutions, the planning of actions in time and dependencies between actions of the project and of others, presented in a Gantt-chart or a similar tool.
- Better supervision is needed to make sure that projects adapt their strategies when circumstances change, with amended targets and monitoring, and not just change activities in an ad-hoc way.
- It is urgently needed to create a solution for ODS-containing materials collected and not disposed of during this project.
- Urgent action is also needed to make enforcing S&L legislation and a ban on importing used refrigerators a priority for Ghana's customs agency and to make sure that the test laboratory has the staff training and other infrastructure needed to withstand legal scrutiny of its test results.
- A summary overview of the project and its market transformation impact would be greatly beneficial to policy makers in Ghana and other countries to learn more about the successes that can be achieved with S&L projects. Information is available, however, it is neither well accessible nor comprehensively presented.
- Other countries contemplating a similar project should develop approaches to secure the involvement and buy-in of Customs early on in the project and develop alternative or additional enforcement strategies if needed, as well as secure the long-term means needed to enforce importing requirements.
- Product energy efficiency projects are probably stronger when to focus primarily on transforming markets through a combination of legislative measures (such as a ban on importing used products, and S&L) and related supply chain and consumer focused activities. Additional activities, such as early replacement schemes and ODS pilots, seem to diffuse attention and cost disproportionate shares of a project's budget, and are probably best only included if they contribute directly to the core market transformation objective.
- Continued consumer education about the benefits of energy efficient appliances and regional collaboration would help grow impacts from this project.
- There is good potential to extend Ghana's S&L approach to other types of appliances, in particular the implementation of new S&L the Energy Commission is currently developing. This project's experience in involving market parties and reaching the general public will be essential for ensuring that those new S&L reach their potential impact.
- Best practices demonstrated by this project include the importance of building a project strategy on an internationally developed policy framework; developing alternative approaches to engage with non-government stakeholders; training of staff of market parties involved in the project's topic; and multi-channel consumer education.

2. Introduction

2.1. Purpose of the evaluation

The terminal evaluation is intended to assess the relevance, performance and success of the project. It will look at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The terminal evaluation is also supposed to identify and document lessons learned and to make recommendations that might improve the design and implementation of other UNDP/GEF projects. Furthermore, the terminal evaluation is to make forward vision recommendations related to the sustainability of project outputs.

2.2. Scope & Methodology

The evaluation aimed at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects. For this, evaluation questions have been developed, based on the evaluation issues relevant for UNDP/GEF Final project evaluation. During the evaluation, fact-finding focuses on collecting data regarding these evaluation questions (next to general qualitative and contextual information about the project), and during the analysis the projects results are valued against project targets and their indicators, as well as evaluation questions. Information gathered through stakeholder interviews and site visits was combined with data obtained through the review of project documentation.

Aspects of the project have been rated according to the assessment of the project on achievement of targets and indicators, and performance on the various evaluation questions. Ratings, and the evaluation in general, have followed the UNDP-GEF Terminal Evaluation guideline “Project-level evaluation, Guidance for conducting terminal evaluations of UNDP-supported, GEF-financed projects”. In addition, GEF-guidance has been used for the calculation of energy and CO₂-impacts.

The results achieved with the project have been assessed against the project documents (GEF PIF, GEF CEO Endorsement Request and UNDP project document), and – as it was concluded that the overall target and objective for this project were poorly defined – also against what could be expected from a project with the given size and duration in the contexts of an Sub-Saharan African country. This latter assessment is not founded on a formal baseline, and as such is to be considered as indicative only. In the evaluators’ opinion, however, it is the only realistic assessment possible of the project’s achievement of its overall target, under the circumstances. It should be noted that this re-assessment of achievement of targets also takes into account new GEF-guidance on the calculation of the CO₂ impacts of energy efficiency projects.

The evaluation included the following steps:

- The desk review of (all kinds of) project documentation, including the project document, implementation and progress reports, and technical outputs. This review has served to (a) generate an overview of the project, its context, proceedings, outputs and outcome; (b) develop a list of evaluation questions for the assessment of the project; and (c) to collect data regarding the evaluation issues and questions. A review of the UNDP project archive has been conducted to track implementation issues and management decisions during project execution, and to track financial aspects of the project. A list of reviewed documents is included in annex 6.4 (List of documents reviewed).
- Interviews with project officers and (representatives of) major stakeholders involved in the project. The interview schedule is included in annex 6.2 (List of persons interviewed). These interviews have served to (a) complete the overview of the project, in its context, and the relevance and (future) impact of the projects outcomes according to the involved organizations and stakeholders; (b) complete the fact finding regarding the evaluation issues and

indicators; and (c) assist in the assessment of the project by asking the involved organizations about their impression of the projects results on specific issues (indicators), where relevant. A questionnaire, developed during the desk review phase, was used for these interviews (semi-structured interviews) (see annex 5).

- The analysis of the collected information, and assessment of the projects relevance, performance, success and potential impact. Collected data have been analysed and structured according to the evaluation indicators. Where target values for evaluation indicators exist (in the project document) the observed results of the project have been compared to these target values. Where these target values did not exist, a status quo description has been given and an assessment of the projects results based on a review of the project documentation (and the implied assumptions in it), reference information from similar developments in other situations, stakeholders opinions and the evaluators judgment. Ratings have been assigned based on this information. Together with the overview and contextual information, this formed the basis for this terminal evaluation report.
- After completion of a draft terminal evaluation report, the UNDP country office and the executing partner provided a significant amount of new information. This information was not made available earlier. This information shed new light on many of the issues addressed in the terminal evaluation, and the report was revised in light of this information. It should be noted that it is good practice for a country office to make available all relevant information at the start of a terminal evaluation.

This evaluation was conducted by a small team of experts. The lead evaluator was unable to visit Ghana to conduct interviews with stakeholders; instead, the second evaluator visited Ghana and conducted these interviews and site visits, after agreement with UNDP.

A draft terminal evaluation report has, via the UNDP Ghana country office, been circulated with the project team and the main stakeholders of the project. Comments and additions have been included in this final version of the report.

2.3. *Structure of the evaluation report*

This report presents, after a brief overview of the project (section 3), an overview of findings in three major areas: Project design & formulation (section 4.1); Project Implementation (section 4.2); and Project results (section 4.3). The final section presents Conclusions, recommendations & Lessons learnt (section 5).

Annexes for this report include: the Strategic Results Framework (Project Logical Framework, section 6.1); a list of persons interviewed (section 6.2); a summary of field visits (section 6.3); a list of documents reviewed (section 6.4); the questionnaire used for interviews (section 6.5); the evaluation consultant agreement form (section 6.6), and the terms of reference for the evaluation (section 6.7 – separate document).

3. Project description and development context

3.1. Project start and duration

The project was first conceptualised in September 2008 and, after various revisions of the project concept, included in the GEF work programme in June 2009. The intended start date was January 2010, with an intended duration of 3 years and 3 months. The CEO endorsement request was first submitted in June 2010, six months after the intended starting time of the project. It was revised 3 more times, and the final version was submitted in April 2011. The start date of the project was moved back by 1.5 years in the CEO Endorsement request, to July 2011, and the duration shortened to 3 years.

The project inception meeting was held in the final quarter of 2011, after the project coordinator started working, although project activities were started by the Energy Efficiency Unit of the Energy Commission a few months earlier. The main issues raised at the inception meeting included:

- Public outreach and education activities initiated by the Energy Commission in advance of the start of the project. The Energy Commission initiated this as part of its mandate for energy efficiency policy in response to the Government's decision to adopt MEPS and an energy label for refrigerators, and was expanding public education through media campaigns (without financial assistance through the GEF-funded project). Inception workshop participants suggested the use of more local languages in media campaigns to also reach people not speaking English or Akan (main local language).
- Uncertainty about the number of refrigerators actually in use in Ghana, and thus the actual baseline energy demand. Research was suggested to provide a more accurate update of this number, which was estimated based on refrigerator ownership levels and the number of households having access to electricity. This research has not been conducted. Had it been conducted, it is doubtful it would have provided a better estimate, and the decision not to spend resources on this baseline research was probably a wise one. The project, however, failed to address the related question of how rising levels of access to electricity would affect the market demand for refrigerators, and built its case on a (likely incorrect) steady number of refrigerators in homes in Ghana.
- Possibility of importers and/or retailers absorbing a share of rebates, through price increases for subsidised appliances. Inception workshop discussed this possibility, however, did not conclude a course of action. Similar suspicions have been raised, and occasionally demonstrated, in other countries and it has proven to be hard for a Government to counter such market responses. It should also be recognised, however, that market parties such as importers and retailers always adapt their prices to market demand, and that normal competition usually keeps such price increases at bay. The project seems to have conducted some checks on price developments with the retailers it worked with; however, there is no reporting of these actions and their outcomes – although it seems fair to say that, had the project found abusive pricing, it would have acted on it.
- Collection of discarded refrigerators at many points in the country rather than at a central location. Inception workshop participants felt that distributed collection was preferable, as it would reduce the burden of transporting bulky refrigerators, with refrigerants collected at those various points, metal parts being discarded locally and foam parts being reduced to pellets. This view suggests that participants were poorly informed about environmentally sound refrigerator dismantling practices, in which refrigerants are collected using specialised equipment and foam is treated to avoid leakage of the CFCs / HCFCs these contain (in old refrigerators). Luckily, the project did not follow this recommendation of the inception workshop.
- Allowing functioning and non-functioning refrigerators for trade-in rebates. Inception workshop participants feared that, if the rebate programme would allow the trade-in on non-functioning refrigerators, the energy consumption reduction goal of the programme would not be achieved. This fear has been expressed also in discussions about appliance trade-in programmes in other countries (most of which have only been mooted, and not implemented). It is unclear whether the Government of Ghana intended, prior to this discussion, to give rebates also for non-functioning refrigerators, however, the rebates as implemented applied only to functioning refrigerators. Participants pointed to a valid point, however, the proposed solution probably only is a partial solution: consumers will still trade-in a barely working refrigerator, or one they wanted to dispose

of anyway, and still claim the rebate. This “free-rider effect” is a well-known hindrance, intrinsic to trade-in rebate programmes and generally greatly reducing their effectiveness. Although there is little a project can do to mitigate this risk, it would have been better to assess this effect further and consider alternatives to a trade-in rebate programme before commencing with the scheme.

At the inception workshop, the Ghana Shippers Authority and the Used Refrigerator Importers Association pledged to support the project by informing their members of the legally introduced ban on the import of used refrigerators and the requirement that newly imported refrigerators comply with minimum energy performance and energy label requirements.

The project eventually lasted 3.5 years and finished at the end of 2014. A final report of the project has been planned as part of the project’s M&E plan, however, it was not prepared as there is no longer an outside requirement for this report. It is nevertheless good practice to prepare a project final report or overview at the end of the implementation period, as this is an important opportunity for the project team itself and involved stakeholders to report activities, document achievements and consider follow-on work and lessons learnt.

3.2. *Problems that the project sought to address*

The project concept note (PIF) and Project document state the problems that the project sought to address¹. The revised text of the Project document states this issue:

“Domestic refrigeration appliances accounts for a significant portion of the residential electricity consumption, and refrigerators are the first main appliances to be purchased by households. Domestic refrigeration appliances present a significant potential for energy efficiency improvement (typically 50% in cost effective energy savings) and appear always as a priority in any market transformation strategy. Refrigerating appliances consume an average of 1,140 kWh/year in Ghana, or approximately three times more energy than the maximum allowed in countries with robust standards and labelling programs. Such inefficient appliances result in US\$50 to US\$100 per year of potentially unnecessary electricity expenses for a typical owner which he/she can ill afford. The wasteful consumption of electricity results in more than 0.7 tons per year of CO₂ emissions per appliance, and uncontrolled release of ozone depletion substances (ODS) from used appliances can result in the equivalent of another 2 tons of CO₂ every time an inefficient, used appliance is improperly disposed of or replaced. With about 2 million inefficient refrigeration appliances in use throughout Ghana, the economic cost of such inefficiency is many hundreds of millions of dollars to the national economy, while the avoidable greenhouse gas emissions are many millions of tons of CO₂ over the long term.”

The project document includes some small adjustments to the data presented in the PIF, notably a change in the average annual energy consumption of refrigerators (from 1200 to 1140 kWh/year), and the amount of inefficient refrigerators in use in Ghana changed from more than 2 million to about 2 million. These are small corrections without a material impact on the project’s objectives.

The project document continues to state that:

“The project seeks to improve the energy efficiency of refrigeration appliances in Ghana through the introduction of energy efficiency standards for refrigeration appliances in Ghana, and demonstration of replicable and scalable equipment turn-in and replacement program that removes inefficient and environmentally damaging appliances from the market and replaces them with more efficient and environmentally friendly models.”

The PIF has also stated a goal of “an accelerated phase out of inefficient, obsolete and inappropriate refrigerating appliances”, which was not repeated in the project document. This was probably a wise decision, as international experience shows that accelerated phase-out of old appliances often requires cumbersome and costly policies, whereas the long-term benefits are small. Transforming the market through minimum energy performance standards and

¹ Note that the Mid Term Evaluation report copied this section from the PIF, not the (revised) text of the CER.

² 38.9 kiltons based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)



energy labels is a tried and tested way of reducing appliance energy demand, and has been proven to be the most effective and cost-effective way to achieve this goal.

The project document lists several barriers that need to be overcome to achieve this objective:

“Many barriers, however, prevent the implementation of labelling, minimum energy performance standards, and consumer education and incentive programs and the penetration of higher efficiency appliances in Ghana and they include the following:

- Customers lack information about the availability of energy efficient equipment and the cost effectiveness of investing in efficient appliances;
- Lack of sustainable financing mechanisms and systems for maintaining energy efficiency incentive, rebate and education programs;
- Local retailers are uncertain about the market demand of high efficiency models and lack the capacity to market these appliances;
- Lack of national experience and installations for testing household appliances according to international standards.

By removing the barriers that currently inhibit the adoption of efficient refrigeration appliances, the project will allow Ghanaian households and businesses to reduce their energy expenditures while improving quality of life. Estimated annual energy savings will range from 30% to 50% depending on the success level of market transformation incentives and programs. “

It is noteworthy that project document is split on the overall objective of the project. The main thrust of the project's strategy as well as its components are based on implementing energy standards and labels for refrigerators, whereas other parts of the project document and in particular its development goal and objective are solely based on the introduction of market transformation incentives and programs, and not the successful implementation of standards and labels. This misalignment between strategy and goal makes the project difficult to assess, as will be discussed further in section 3.6, expected results.

The PIF mentioned several other barriers, in particular a lack of knowledge within Government ministries and institutions about enforcing standards and label regulations, and a lack of capacity for manufacturing and understanding of the market for energy efficient refrigerators at local SME manufacturers. It is unclear why barriers related to lack of knowledge within Government were dropped, as the project later invested resources to build capacity within Government. The barrier related to SME manufacturers was probably dropped because information gathered during project preparation showed that those had stopped manufacturing refrigerators in Ghana some years before the start of the project.

3.3. *Immediate and development objectives of the project*

According to the Project document, “the project's global objective is to reduce Ghana's energy-related CO₂ and ozone depleting substance (ODS) emissions by mitigating the demand for energy in the country's refrigeration and air conditioning sector and by encouraging recovery, recycling and/or disposal of environmentally damaging refrigerants. This will be accomplished through the introduction of energy efficiency measures and standards for refrigeration appliances and also through the creation of a turn-in and replacement program for inefficient appliances and the ODS that they contain. The project activities will ensure that future refrigeration appliances meet acceptable efficiency, performance and environmental requirements in order to limit energy consumption and protecting the ozone layer.”

The current Energy Commission's business plan goes beyond minimum energy performance standard and energy label programmes with the aim to put in place and maintain long-term market transformation strategies through continuous staff training, creation of a database on consumption and profiles of appliances, market surveillance programmes, enforcement & verification, and regulating more products. The Ministry of Power shares this vision and these goals and committed a substantial amount of co-financing for monitoring & enforcement activities.

3.4. Baseline Indicators established

The project document lists four main indicators to monitor the impact of the project:

Impact to Be Monitored	Indicators	Verification Means
Economic benefits to households	Reduction in energy costs per household	Rigorous impact evaluation of pilot projects with randomized controls to measure economic savings
CO2 emissions reduction benefits	Decrease in energy consumption	Rigorous impact evaluation of pilot projects with randomized controls to measure decreased electricity consumption
ODS emissions reduction benefits	Mass of ODS substance recovered	Rigorous impact evaluation of pilot projects with randomized controls, to measure recovery of foam and ODS refrigerants
National poverty reduction benefits	Reduction in poverty gap for poor households	Rigorous impact evaluation of pilot projects with randomized controls to measure poverty gap reduction

There are no baselines mentioned for these indicators, nor target values. It also appears that the pilots mentioned have not taken place. There was no real need to include these indicators in the project document as the project strategic framework defines the overall targets and indicators, and it appears that this section was included or left in the document erroneously.

The Project strategic framework / Logical framework mentions targets for CO2 emission reduction from reduced energy demand and from ODS removal (presumably in CO2 equivalent). These targets are not linked to the main indicators mentioned in the project document, though two of the four indicators can be linked through the equivalent CO2 emission reduction targeted with the project. Means of verification bear no resemblance between the project document and the project logical framework.

Goals and objectives of the project as defined in the project strategic framework / logical framework are as follows:

Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification
<u>Goal:</u> To reduce Ghana's energy-related CO2 and ozone depleting substance (ODS) emissions	Cumulative amount of GHG reduced in kilotons of CO2	None	CO2 reduction- 251.6 kilotons comprising: - 129.6 kilotons CO2 abated from energy savings - 122.0 kilotons CO2 abated from CFCs (ODS) removal	Project implementation reports GHG inventories and reports to UNFCCC
<u>Project objective:</u> To improve the energy efficiency of	Reduced consumption of electricity by	Large number of refrigeration appliances with poor	Purchase of 50,000 energy efficient refrigeration	Refrigeration appliances imports / retailers survey



refrigeration appliances in Ghana through the introduction of energy efficiency standards, and demonstration of equipment turn-in and replacement program	households, institutions and commercial firms for refrigeration Tons of CO ₂ emissions reduction by year 3 of project implementation	energy efficiency and ozone depleting substances in Ghana	appliances by year 3 of project implementation Energy savings – 216,000 MWh CO ₂ reduction- 251.6 kilotons	Project implementation reports
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Target values for CO₂ emission reduction are overly precise, and should have been rounded, though that has no material impact on the usefulness of the targets. More serious issues include:

- The baseline for savings is poorly defined and follows the assumption that, without the project, there would be no energy demand reduction at all and no reduction in the emission of ODS from refrigerators. It seems reasonable to assume that, in the absence of policy, there would be no introduction of the environmentally sound disposal of refrigerators. It should also have been assumed, however, that the energy performance of refrigerators would have gradually improved over time, as a result of exporting countries tightening energy standards, restricting the export of used refrigerators and general technological improvement. This issue was not commonly included in impact calculations at the time of writing of the project document; however, it is a core part of new GEF guidance regarding the calculation of impacts.
- Projected energy savings are calculated incorrectly, given the calculation method in place at the time of writing the proposal (e.g., without factoring in baseline developments such as the impact of the adopted ban on the import of used refrigerators and improvements in the quality of used refrigerators being imported because of regulation in exporting countries), and do not differentiate between direct project, post-project and indirect savings. Had this been done correctly, then the majority of savings would have been attributed to indirect savings resulting from the introduction of MEPS and labels, with only the energy savings related to the accelerated replace of old refrigerators attributable as direct project and post-project savings. This would have resulted in a significantly lower target value for energy and energy-related CO₂ emission savings. NB the GEF calculation method for this type of project has changed drastically and a new calculation of projected and realized energy savings would be needed to reassess the impacts of the project. This will be further discussed in section 4.3.
- Project objectives and the target for its overall goal fail to mention what the project aims to achieve around the introduction of minimum energy performance standards and energy labels (MEPS and labels). Between drafting of the PIF and completion of the project document, Ghana's Parliament had adopted MEPS and Labels, making their development (a core part of the project strategy presented in the PIF, even if limited in budget allocation) redundant. Nevertheless, the project included many activities to support the actual introduction on these MEPS and Labels, which are very useful and effective. The project document failed to explain, however, how its interventions would contribute to the impact of MEPS and Labels on the market of refrigerators in Ghana, and failed to take into account that its other activities would now happen against the backdrop of this legal requirement already being in place. Leaving out these main factors, which also sets the new baseline for other project components such as rebates makes, in a way, the other indicators and target values useless.

On balance, the project did not define useful baseline indicators or target values, and actually failed to properly assess its baseline situation. Target values and achievements will need to be recalculated, taking into account the baseline situation as it actually was and the appropriate (old and new) calculation method for CO₂ impacts. See section 3.6, expected results, for a further discussion of this issue.

3.5. *Main stakeholders*

The main stakeholders of this project, as listed in the project document, include the Energy Commission, the Environmental Protection Agency (including its National Ozone Office), the Institute of Industrial Research, CSIR, the Ghana Energy Foundation, the Ghana Standards Board, the Customs, Excise and Preventive Service, Financial Institutions (Banks), the Repair and Maintenance: National Air-Conditioning and Refrigeration Workshops Owners Association (NARWOA), Refrigerator Importers, Refrigerator Retailers e.g. Somotex Ghana Limited, Consumer Groups and Other Development Partners.

Other Government departments are not listed as stakeholders, but have been involved in project steering committees and other relevant meetings.

3.6. *Expected Results*

The project had a stated goal of “an accelerated phase out of inefficient, obsolete and inappropriate refrigerating appliances” and of transforming the market through minimum energy performance standards and energy labels is a tried and tested way of reducing appliance energy demand, and has been proven to be the most effective and cost-effective way to achieve this goal. This was translated, in the strategic results framework, into the purchase of 50,000 energy efficient refrigeration appliances through a rebate scheme, with associated energy and CO₂ impacts of 216 GWh and 252 kton CO₂ equivalent. These targets, unfortunately, do not address the overarching goal of transforming the market and phasing out inefficient products. As a result, these targets fail to provide meaningful metrics for the success of the project.

This section sets out reconstructed targets for this project, based on the overarching market transformation goal. It follows the GEF-methodology as set out in “Calculating Greenhouse Gas Benefits of the Global Environment Facility Energy Efficiency Projects, version 1.0” (STAP, March 2013), Standards and Labeling module. Baseline data are derived from the project document, with additional assumptions regarding the efficiency of newly imported new and used refrigerators based on the project document for a similar project in Sub-Saharan Africa from the same period (Development and Implementation of (a) Standards and Labelling in Kenya, with replication in other East African Community Countries, UNDP, 2006; in particular section 2.1.3 baseline information for the most appropriate products). Input data that are different from those used for the project document are marked with an asterisk* and explained. Please also note that this target calculation factors in that the project would strengthen the implementation of a ban on the import of used refrigerators, which was adopted before the project’s implementation started, however, not yet implemented. Even though the project document does not specify specific actions to strengthen implementation of this ban, many activities specified would (or should) have this effect.

The following input data are used for this calculation of targets:

1. Length of analysis period: 13 years (3 years for project period, plus 10 years post-project impact period)
2. Useful technology lifespan: 10 years
3. Fuel type and emission factors: electricity, 0.56 kg CO₂/kWh* (rounded, and no compensation for T&D losses as these are typically already included in a grid-average CO₂-factor)
4. Target technology: imported new refrigerators, meeting MEPS
5. Displaced technology: a mix imported new refrigerators (no MEPS) and imported used refrigerators, as well as a limited number of old refrigerators in use. Assumed energy demand of imported high-end new refrigerators (approx. 10% market share) 320 kWh/a*; of imported low-end new refrigerators (approx. 15% market share) 635 kWh/a*; of imported used refrigerators (approx. 75% market share) 870 kWh/a* (the project document does not specify the average energy demand of imported products. These energy demand figures are copied from the Kenya project document which estimated energy demands based on global market trends and typical energy demand in exporting countries; market shares have been estimated based on market share estimates presented in project documentation). Assumed energy demand of old refrigerators in use 1160 kWh/a (as in project document).
6. Stock of refrigerators in use in base year: approx. 2 million units

7. Stock growth rate: approx. 100,000 units per year (the project document does not discuss stock growth; based on trends observed in the country over the years leading up to the project, it is reasonable to assume that appliance ownership is growing and it was assumed, in the absence of further data, that half of annual sales would be for the replacement of old refrigerators, and the other half would be new additions to the stock).
8. Annual sales of technology in base year: approx. 200,000 units* (the project document does not specify an estimated annual sales level; based on stock and lifespan, sales must exceed 200,000 units)
9. Sales growth rate: none
10. Annual reduction in energy consumption for the target technology: 1.5%* (the project document does not project an annual increase in energy performance of refrigerators in the absence of S&L or a project. It is reasonable to assume, however, that global markets for new products would continue to improve energy efficiency as they have done for many years without the project, approx. 1.5% p.a.)
11. Annual reduction in energy consumption for the displaced technology: approx. 1.5% p.a.* (same as for the target technology. In addition, it is reasonable to assume that the efficiency of imported used products would increase by a similar rate as average efficiencies in the exporting countries were following (or determining) this global trend).
12. Year the standard is put in place: year 2 of the project (NB. This is a simplification; S&L were in place from the start of the project, whereas the ban on the import of used refrigerators came into force 2 years after implementation. This simplification allows for an easier calculation of impacts with limited effects on calculation results)
13. Percent compliance with new standard: 80%* (the project document does not specify an expected compliance rate; 80% compliance is assumed based on experience in the EU and North African countries (assumed to be around 90%), moderated to 80% to account for the more challenging market structure in Sub-Saharan Africa).
14. Percent compliance with ban on the import of used refrigerators: 80%* (the project document does not discuss compliance with this ban; the compliance rate is assumed to align with compliance rate for MEPS)
15. Percent compliance with ban on the import of used refrigerators: 40%* (the project document does not discuss compliance with this ban; it is assumed that this ban, without the additional efforts of the project to ensure compliance, would still encourage importers to double the market share of imported new refrigerators from around 20% of the market to around 40% of the market).

The resulting market shares and annual energy consumption data are set out in the table below, for scenarios without and with the project, and for the project's base and target years.

	Without project		With project	
	Base year	Target year	Base year	Target year
Remaining pre-project old stock	2,000,000	1,700,000	2,000,000	1,650,000
Annual energy demand (kWh)	1160	1160	1160	1160
Imports - new high-end				
Market share	10%	20%	15%	40%
Annual energy demand (kWh)	320	306	320	306
Imports - new low-end				
Market share	15%	20%	15%	40%
Annual energy demand (kWh)	635	607	635	607
Imports - used				
Market share	75%	60%	75%	20%
Annual energy demand (kWh)	870	831	870	831

The resulting energy demand and CO₂ emission figures are as follows:

	Without project		With project	
	Base year	Target year	Base year	Target year
Total annual energy demand (GWh)	2,420	2,420	2,320	2,359
Total CO2 emissions (kton)	1,299	1,355	1,299	1,321

Based on this, reconstructed targets for the **project objectives** can be reconstructed as follows:

- Market share of imported new refrigerators of at least 80% (and maximum 20% used refrigerators)
- Reduction in average annual energy demand of 60 GWh/a, due to market transformation (including a rebate program) and a corresponding reduction in GHG of 34 kton/a
- 50,000 old refrigerators traded in and environmentally sound recycled through a rebate program.

Targets for the **project goal**, in line with these objectives, can be reconstructed as follows:

- Direct project emission reduction of 177 kton CO2 equivalent, of which 55 kton through energy demand reductions and 122 kton through CFC removal
- Direct post-project emission reduction of 1,230 kton CO2 equivalent, all through energy demand reduction.

Note: A simple stock model was created to calculate these impacts. It has been shared with the former project team for review.



4. Findings

4.1. Project Design & Formulation

This was a good project, because it was the right project at the right time, focused on the right parties in the right context. None of the technical project design issues identified below – and there are many – take anything away from that, and project design overall has to be rated in the range of satisfactory ratings simply as a result of this fundamental fact. Simply being the right project in a country that welcomed and embraced its objectives sets this project apart from many other GEF projects. Every party involved, and in particular the GEF executing and implementing agencies, deserve praise for recognizing what was needed in the country at that time, and setting out a concerted effort, binding together (a lot of) national work with international support to make that happen. Any unsatisfactory rating would simply not do justice to these fundamentals of good development and environmental policy projects.

Having said that, there are many technical issues on which the project design and formulation fell short, and project design professionals involved could – and should – have addressed these issues better at the time. The PIF for this project reads as a well thought out strategy for transforming the market for refrigerators in Ghana, and seems to present a timely, well-structured and well-embedded project, even if the project description is at times convoluted. It seems to get the main issues right and miss out on details and implementation planning, which is acceptable as those can be addressed during the PPG stage of a project. This PPG stage, however, failed to do this and left the project with a poorly developed project strategy.

Issues encountered in the project document include a poor and erroneous baseline description for this project; not linking project activities with (planned and already implemented) national policy developments; incorrectly listing (a large part of) another internationally funded project as a source of co-funding; not presenting useful baseline and impact indicators for the project; reporting incorrect financial information on PPG spending to the GEF secretariat; and ignoring the timeline of Ghana's legislation's implementation dates for the planning of project activities. Purely from the standpoint of good technical requirements of project development, this project's design and formulation stage was rather poor and it does not follow good professional standards. If project design was rated separately from a professional or technical point of view, it would be rated highly unsatisfactory, and UNDP and the GEF are recommended to review and critically discuss good project development practice and methodologies with the offices involved – after all, many of the issues were quite easily discoverable in project documents, and yet these were not only drawn up by the country and regional offices, but also reviewed and approved at various levels within UNDP and the GEF. One can only guess what has led to this collective lapse in critical review skills at the time, however, institutional procedures for project design and approval have failed for this project's design and formulation stage.

Overall, the project design and formulation stage performed just satisfactorily, solely because it was so spot-on for the country and so well embedded within the country's own development at the time. The poor quality of (detailed) project design work, however, casts a negative shadow over this stage.

Detailed observations related to the Project design and formulation stage

This section first presents findings relevant to the Project design and formulation stage of the project, followed by a discussion and assessment of various specific criteria, with a rating where required.

At the time of formulation – and to this day – the project design clearly matches the need of the country. Energy demand management was an integral part of the 1997 World Bank loan agreement when Ghana first introduced thermal energy (for power generation) as a result of which electricity prices increased: the country previously relied on the hydro-energy produced by their own dam near Akosombo. Ghana started work on the introduction of standards in 1996 with the support of Lawrence Berkeley National Laboratory as part of a US-Ghana cooperation. A baseline survey was carried out in 2006 led by the Institute for Industrial Research (CSIR-IIR), which identified refrigerators as the number one priority for MEPS and Energy labelling (S&L) because of their high energy

consumption. At the time the savings were estimated to be USD 750 million over 20 years. However, at the time politicians did not consider a ban on used refrigerators as acceptable and the Government decided to target lighting first. The successful ban of incandescent light bulbs cost USD 15.2 million and resulted in 6 million compact fluorescent lights (CFLs), an important energy saving lighting technology, distributed free of charge in 2007.

Before the start of the project, Ghana had adopted a ban on the importation of used refrigerators, with the ban coming into effect on 30th June 2013. Initially, the ban was planned to come into effect in 2010, which was pushed back to 2012 and eventually 2013 after strong lobbying by stakeholders. To prevent importers shipping large amounts of used refrigerators into the country before the ban took effect, a ceiling was set on the number of imports with allocated quotas for over 50 companies of various sizes. The delay in implementing the ban affected the speed at which the project could move towards the take-up of new energy efficient appliances with the voucher scheme.

The timing of the introduction of S&L for refrigerators, alongside demanding MEPS for air-conditioning, but also the ban imposed on importing used refrigerators and freezers and the introduction of the rebate programme built on the momentum of the successful introduction of CFLs nationwide. Having observed the success of the lighting programme and the energy saved by it, politicians were happy to give the go-ahead to continue with refrigerators and freezers.

The project offered, at the same time, an opportunity to address Ozone Depleting Substances (ODS), in particular CFCs and HCFCs, the use of which is banned or limited under the Montreal Protocol on Substances that Deplete the Ozone Layer. The Energy Commission, in charge of energy efficiency, and the Ghanaian Environmental Protection Agency (EPA), in charge of managing chemicals in Ghana, had a long standing collaborative spirit and decided to collaborate on domestic refrigerators with the aim of reducing their energy demand as well as reducing ODS emissions, through the environmentally sound dismantling of used refrigerators. This was to be stimulated via a rebate programme encouraging the trade-in of old refrigerators for new ones (without CFCs or HCFCs). The EPA sought, via UNDP, funding from the Multilateral funds for setting up an ODS management facility in Ghana, while the Energy Commission developed this refrigerator project.

The project initially aimed to develop S&L for refrigerators and then support their implementation through a variety of measures. This was altered when, during the project preparation stage, the Government of Ghana already passed S&L legislation. The S&L adoption process happened fast, in approximately three months, which seems to have taken everyone by surprise – understandably, as legislation of this kind often takes longer to move through the policy development and political approval process. The (relatively small) budget originally set aside for the development of S&L was reallocated mainly to increasing consumer awareness.

The project's strategy was not amended as a result of S&L having already been adopted before the start of the project, except for removing the component focused on S&L development and moving the related \$60k budget to consumer awareness. The project document should have better reflected this significant shift and should have gone through a redevelopment of its project strategic framework / logical framework, to re-assess the need for the project and realign activities. Given that developing legislation is often just the beginning of a successful market transformation and seeing it through its implementation typically takes far more time and effort, it is safe to assume that the strategic rationale for the project was unaffected by this move. The timing of activities could and should have been altered, however, to better align with the legal implementation date of both the adopted S&L and the ban on importing used refrigerators. Also, the M&E framework should have been redeveloped to focus on tracking the implementation of both the ban and the S&L.

The M&E framework, already poorly developed in the first instance, made virtually no effort to track the market for refrigerators during the years leading up to and following the introduction of S&L and the ban on importing used refrigerators and was not set up to provide meaningful management information about these aspects. This can partly be mitigated through good stakeholder interaction and adaptive management, but without good data such adaptive management will be based on anecdotal information, whereas funds were available to track the implementation of these policies in a structured way. Doing so would have provided the Government of Ghana with much more reliable

information about the success of its newly adopted policies and provided a much stronger case for other countries considering the introduction of similar policies. It is a big loss that the project design did not make a better effort to measure the success of the implementation of these policies, in particular since Ghana is often considered a good example (on energy efficiency) for other countries in the region.

The project design stage lasted relatively long for this project, much longer than anticipated. The PIF was revised several times over the course of almost one year. The CER and project document were first submitted one year after acceptance of the PIF, followed by a 10 month revision process during which three further versions of the CER and project document were submitted. There is no available record of the changes made to the project design during this time, and there is no overview or review of the project development stage in the midterm evaluation report. It is unclear why several iterations over a relatively long period of time were needed for both the PIF and the CER / project document, nor why this was not reviewed at the mid-term evaluation.

A Project Preparation Grant (PPG) was requested and approved for the development of the CER and project document, consisting of a \$50k GEF budget with \$80k from the Government of Ghana, both primarily for consultancy. The PPG request lists significant amount of Government co-financing for international consultancy which, if that had been applied as described in the PPG request, would have resulted in consultants receiving a fee of \$3,100 per day, well above the UNDP limit for consultancy fees. Also, the PPG is inconsistent in its presentation of consultancy fees, presenting weekly fees which add up to the GEF contribution to the PPG, and completely ignoring the Government of Ghana co-financing. This suggests that Government of Ghana co-financing was not integrated in the financial planning of the project. PPG spending was incorrectly reported in the CER; the budget table from the PPG request was copied into the CER as if this was actual spending – including the unrealistic co-financing amounts. This may have happened because the PPG budget was still being used at the time and whoever prepared the CER used these data in error. Current information from UNDP's financial records indicate that actual PPG spending had been \$ 43,064, and there is no information about any co-financing having materialised. Given that the planned co-financing was highly unconventional and that there is non record of any co-financing provided, it is at least likely that there has been no material cash co-financing from the Government of Ghana for the PPG stage, although there may have been in-kind co-financing. It is unclear whether having correct information about Government of Ghana co-financing would have affected the GEF's decision to approve the project at the time.

It is also hard to understand why the PPG request with inconsistent budgetary information as well as the CER with information that was obviously incorrect, for anyone who would have taken the trouble to compare the spending report with the budget request, has passed reviews by the UNDP country office, the UNDP regional office, UNDP headquarters as well as the GEF secretariat, without apparently anyone picking up on either of these issues. Organisations like UNDP and the GEF secretariat which are trusted with managing multi-million dollar budgets need to have better budget management and checking procedures in place.

The project strategy placed a strong budgetary emphasis on the early replacement of old refrigerators, in order to remove these from the market, capture the ozone-depleting substances present in these old refrigerators and benefit from the better energy performance of the new refrigerators with which these were to be replaced. While it is true that new refrigerators offer a much-improved energy performance, it is also true that old refrigerators have a tendency to fail on their own and that many of these are replaced by a different one – newly or used imports, simply because the owner wants to have a refrigerator available. This effect strongly undermines the benefits of an early replacement programme and early replacement rebates. This effect has been overlooked in the project design, leading to a substantial reduction in the possible impact of the project. To put this into perspective: The project aimed to provide rebates for the early replacement of 50,000 refrigerators over the 3 year duration of the project. Although 50,000 refrigerators over 3 years may sound like a substantial amount, it should be noted that the estimated number of refrigerators in use in Ghana was estimated at 2 million, and reported sales of refrigerators hovering around 100,000 units per year. (NB This would suggest that the average life span of a refrigerator in Ghana is at least 20 years, after (for imports of used products) its 10-15 year lifespan in the exporting country. These numbers thus appear inconsistent: a stock of 2 million refrigerators in use, many of which imported second hand, with a likely average life span of under 20 years, resulting in the need to replace over more than 100,000 refrigerators per year. It is likely that

reported sales numbers were substantially too low and that large numbers of sales happened via unregistered channels.) Even factoring in that many refrigerators are repaired several times over their life span, it is thus safe to assume that the number of refrigerators discarded each year in Ghana in the normal course of business is around 100,000 units – well over the 15,000 to 20,000 units the project aimed to replace through accelerated replacement. Thus, the project intended to remove some 50,000 old refrigerators, or around 4% of the stock, from the country a few years before these would be discarded anyway, and disregarded that over the course of the project some 15 - 30% of the stock would be replaced anyway. Simply focusing on capturing as many broken down refrigerators as possible for an environmentally sound disposal would probably have multi-folded the impact on ozone-depleting substances while only slightly reducing the overall energy savings, thus multiplying the GHG emissions impact. These downsides of early replacement programmes were well known in the expert community, as many countries around the world have designed and sometimes piloted early replacement programmes, but most never implemented these as costs usually far outweigh benefits and investments in regulatory tools and waste management systems usually far outperform early replacement programmes. Also, rebate programs without a trade-in component, to improve the sales of more efficient refrigerators (than required by a MEPS), were well-known policy tools with established effects and implementation approaches, which would likely have provided a more efficient and less-costly route towards market transformation.

Even accepting that the project may have wanted to test whether early replacement programs could work in a Sub-Saharan country context, and that some form of rebate program (even though not cost-effective on its own) can be necessary to start off a market transformation, it is unclear why the project chose to spend such a large share of its budget, and entirely build its direct GHG reduction target, on this doubtful strategy, when there are other strategies available with likely much larger impacts.

Component 7, Conduct of refrigeration appliance rebate and exchange program throughout Ghana that distribute at least 50,000 efficient appliances, had an assigned budget of \$1.6M, equivalent to \$32 per appliance to be exchanged. The UNDP project document states that “the refrigeration appliance rebate and turn-in program will include subsidies on new efficient refrigerators that will be mainly financed by the Government of Ghana, with equipment support from GEF”. The project document also lists a budget of \$0.49M in Government of Ghana co-financing as planned for these subsidies, as well as \$0.78M from other sources and assumed to be mainly for programmatic support, which results in a subsidy amount of \$10 per appliance exchanged (these were later revised upwards during project implementation). This planned amount is fairly small and much less than is common even for the promotion of energy efficient appliances without the need to exchange an old one. A discussion of the rebate amount needed and a comparison to other rebate programmes, which was not done during project preparation, would have revealed this discrepancy and might have triggered a revision of the project strategy.

The project strategy further emphasises supporting the Government of Ghana in the implementation of the newly designed S&L regulations, but fails to do the same (at least in the project’s strategy) for the ban on importing used products. This ban, agreed before conceptualisation of the project started, but was scheduled to come into effect during project implementation. It is safe to assume that implementing and enforcing a ban on importing low-cost used products, often arriving through less established importers, is more demanding but also brings more benefits than implementing and enforcing S&L for new products, often imported through well-established importers. During implementation, the project adapted its strategy and provided support to customs for the enforcement of the used refrigerator ban.

Since new refrigerators available on global markets already perform significantly better than the old, used refrigerators that were the main component of refrigerator sales and stock in Ghana, the average energy performance of products in use and the overall energy demand would have dropped significantly without the project’s planned intervention, through the implementation of this ban. Since the project strategy assumes that the ban would be implemented effectively without the project, it should also have factored in that its baseline was not the market situation before this ban was effective, but how the market would respond once the ban was effective. In this situation, it would have been reasonable to assume that new sales would have an energy performance of around the 1-star level mandated by the S&L regulation, equivalent to the EU C-class level which had been the minimum energy

performance in the EU since 1999 and similar requirements in other countries introduced before 2009. Also, it would have been reasonable to assume that new products would be CFC and HCFC-free, as global manufacturers had long stopped using CFCs and HCFCs as refrigerants in household refrigerators. Given that Ghana replaced at least 100,000 old refrigerators per year with newly imported ones anyway, this ban would greatly transform the market for and environmental impact of refrigerators in Ghana. It can easily be stated that this ban is far more important for household refrigerator energy demand as well as the volume of ODS brought into the country than any single component of the project as planned, and not building its strategy around this ban – and making sure it was implemented as effectively as possible – was a substantial failure in project design.

All this could and should have been foreseen and the project strategy would have been substantially stronger if it had paid more attention to the order and hierarchy of regulation coming into force in Ghana. The failure to properly address this also led to project impact calculations that are deeply flawed. Impact calculations are all based on the assumption that, without the project, old (sometimes very old) refrigerators would all continue to operate for another 10 years or be replaced by equally old and poorly performing products. The project then set out to replace 15,000 to 20,000 old products per year with new ones. It is highly unlikely that these replacements would not have happened anyway during the three years after the introduction of the ban (on importing used products), in which case these old products would have been replaced without project intervention. The project may have encouraged that some people replaced their refrigerator a little earlier than they would have done otherwise, however, the effect of this is limited to bringing forward the energy savings from using a new refrigerator by one or a few years – not to the lifetime energy savings of the new product. Project impacts need to be corrected for this, which results in a sharp reduction of attributable energy savings by 70% to 90%, depending on whether one assumes that early replacement rebates would bring forward the replacement of an old refrigerator by three or one years. There could be additional energy efficiency benefits if the project would promote the purchase of a more energy efficient refrigerator (than the market average for new products), however, this is not specifically included in the project strategy nor incorporated in impact calculations.

ODS savings come from capturing old refrigerators, not from replacing them with new ones as these come with less harmful refrigerants and foam blowing agents anyway. The project can still claim the benefits of the environmentally sound disposal of the old refrigerators it captures, as these would otherwise probably have gone to landfill, eventually leaking their ODS contents into the environment. Although these are relevant impacts, it is unsettling that the main impact of an energy efficiency project would be its waste reduction, which has an impact through the reduction of non-energy GHG emissions. It should also be noted that the aim of the project is not to simply safely dispose of a number of old refrigerators, but to initiate a market transformation for energy efficient refrigerators - and that is precisely where its impacts were already non-existent in the design stage.

It is further noteworthy that this failure to establish a good baseline for the project has not been noted at UNDP project preparation, UNDP review of the project or GEF secretariat review of the project. The STAP review for this project could not have picked this up, as the legally adopted ban on the import of used refrigerators was not mentioned in the PIF! It is hard to understand why the PIF does not mention the introduction of this crucial piece of legislation (NB the legislation was legally adopted just weeks after the first draft of the PIF was prepared, but was in place during three further iterations of this PIF). The project document and CER, finished approximately two years after this legislation was adopted, mention – rightly – the legislation as a demonstration of Ghana's commitment to energy efficiency, however, fails to assess how this might affect the market in Ghana. These omissions point to a lack of professionalism in the preparation of project documents. It is also remarkable that these omissions managed to sail through UNDP and GEF secretariat review.

The GEF-funded project was to work closely with a Multi-lateral fund (MLF) funded project for ODS management in Ghana. This project, focused primarily on building capacity and infrastructure for ODS handling and removal from commercial refrigeration systems, had goals somewhat similar to the GEF-project and there could have been important synergies. The UNDP Project document describes this as follows:

“On the already approved HPMP, the ExCom already approved the HPMP for Ghana at their July 2010 meeting. Its budget amounts to US\$ 1.356 million which can be broken down as in the table below (page 2). All activities are directly related to the GEF-effort except for:

- activity-5 which will “provide new refrigeration systems to some end-users” which is unrelated.*
- about 50% of activity 4 (recovery/recycling) which is only partly related to the GEF effort. All other activities clearly contribute to Ghana’s EE efforts as they include legislation, training and recovery/recycling operations related to its refrigeration sector. As such, the MLF-funded HPMP budget that is linked to the GEF efforts is US\$ 970,388.*

As mentioned, the above two projects which amount to US\$ 1,270,388 (of which US\$ 970,388 has already been approved) are all complementary to the GEF-funded activities. While the GEF-funded activities would focus on the end-of-life equipment, the MLF-funded activities focus on equipment still in service, but the target groups are clearly the same and interlinked. “ (UNDP project document, Section III, Total budget and work plan, Regarding the issue of co-financing from MLF, page 60).

A closer look at the HPMP project plan, however, reveals that this complementarity is not as large as was suggested in the project document. Both projects focus on refrigeration indeed, however, one (MLF-funded HPMP) primarily on changing refrigerants in already installed commercial sector air conditioning and (larger) refrigeration systems which undergo regular maintenance and repair; the other (this GEF-funded project) exclusively on the energy efficiency of domestic refrigeration sector which is characterized by imports of hermetically sealed products. When these domestic refrigerators are discarded, they still contain CFCs / HCFCs which could end up in the environment if not properly collected and handled, but that is where the overlap stops: the collection of domestic refrigerators is handled completely independently from the commercial sector activities of the HPMP project – rightly so, as these are different sectors, and there is no overlap in activities. The project document lists the full HPMP project budget as co-financing for this project, which is probably incorrect: this should largely be considered parallel funding, contributing perhaps to a better public awareness of ODS with refrigeration experts in the country, however, not contributing to this domestic refrigerator project.

Even if the overlap between activities had been stronger, there would have been another issue: The project document (for the GEF project) does not mention that implementation of the HPMP project would start around the same time as the GEF project, however, would be implemented largely after the intended end of the GEF project and many of the listed synergies could not possibly have occurred as the HPMP activities would be realised only after the GEF project would be concluded.

A topic of special relevance in the project document is spending on consultancy. The project document lists large amounts of spending on consultancy for this project, amounting to almost \$2M, or 32% of the total project budget. One quarter of this total cost would be covered by GEF funds, and the remaining 75% by co-financing. A simple calculation shows that more than half of the cash contributions of both the MLF and the Government of Ghana would be needed to cover the co-financing for planned consultancy, however, without any concrete plans for how these large amounts would be delivered. This very high consultancy budget is based, however, on high assumed rates for local consultants, several times normal UNDP rates. This has the combined effect of securing a high GEF contribution for local consultancy which, on its own, seem to be almost sufficient to cover local consultancy in the absence of co-financing. This is also what seems to have happened (see also section 4.3, on project financing). It is unclear why these budgetary choices were made at the time and why these strange assumptions were introduced, however, this level of coincidence, which follows after misinformation around the same topic in the PPG stage, should be sufficient to set off alarm bells and require that UNDP Ghana fully examines this sequence of events and puts in place additional safeguards to avoid recurrence in future projects.

4.1.1. Analysis of LFA/Results Framework (Project logic /strategy; Indicators)

The Project results framework / Logical framework has a sound foundation, and it is probably based on a good internationally recognised basis for activities needed in support of appliance energy efficiency (see for example the “CLASP S&L Guidebook”). Adaptation of that basis to the situation in Ghana was weak, however, with little thought

to how activities would build upon the legislatively adopted ban on the import of used appliances and the implementation (and, specifically, the implementation date) date of S&L for refrigerators. Although the project document correctly states that “There are minimal legislative risks related to this project. The Parliament of Ghana passed and adopted the Energy Efficiency Standards and Labeling (Refrigerator, Refrigerator-Freezer and Freezer) Regulations, LI 1958 in November 2009.” (CER, Section G, legislative risks), it also fails to discuss how this adoption and the implementation date of this regulation would affect the project’s strategy and activities and its timing.

In addition, project impacts and indicators are based on the erroneous expectation that without this project, the situation in Ghana would remain as they were in 2008. This already is a questionable assumption in any developing country, when discussing impacts that are expected to appear years later, it is particularly harmful in this situation, where the country had already adopted legislation that would drastically change the market for refrigerators before the project’s design was completed. From a professional as well as developmental perspective, this is inexcusable and it makes virtually every impact projection and indicator in the project document irrelevant. Thus, in a way, there is no way to compare this project’s results to its description of planned impact – since that planned impact, of transforming the market and increasing the market share of efficient products, is simply not discussed in a quantitatively or even qualitatively specified way.

4.1.2. Assumptions and Risks

The project document ticks several boxes for risk assessment, discussing several types of (minor) risks. The section is, however, inadequate as it fails to discuss the adopted legal ban on the import of used appliances – the single biggest factor affecting the market for refrigerators in Ghana, and arguably a much bigger factor than anything the project set out to do - and whether its implementation would be successful.

The risks and assumptions section further fails to address consumers as a stakeholder in this project, and whether there could be any issues with consumer acceptance of and consumer response to the new legislation. It also fails to discuss the effectiveness of customs control as a risk for the project, which relies largely on custom checks as the means of enforcement for the core legislative instruments at the heart of Ghana’s market transformation.

4.1.3. Lessons from other relevant projects (e.g., same focal area) incorporated into project design

There is no record of the project explicitly using results of other projects for the formulation of its strategy. There are various hints of the project having used the experience of Ghana’s earlier introduction of a ban on incandescent lighting and of S&L for air conditioners in this project’s strategy, and this strategy looks like it is based on a good international reference for the design of S&L projects. This, however, is based on the evaluator “reading between the lines” and there is no evidence to support this hunch. Nevertheless, the project’s strategy appears to be sound and factors in lessons of similar work in other countries.

4.1.4. Planned stakeholder participation

Stakeholder participation as planned for the project was good. The project document lists roles for the various stakeholders and ways of engaging with them. Stakeholders had roles in project design and implementation which were appropriate for each position and competencies and were, as far as can be established now, were supportive of the project.

Good stakeholder participation was a main success factor for this project and one that was designed well into the project’s strategy. It is likely that the resulting good stakeholder involvement is primarily a result of a strong stakeholder commitment to the project’s objective, supported by a project strategy that encouraged their participation.

4.1.5. *Replication approach*

This project had the potential of being an example of appliance market transformation in the region. Ghana was already a leader in sustainable energy and environmental policy in West Africa and a leading member of the ECOWAS collaboration in West Africa. Ghana has, for the region, strong institutions for energy efficiency policy and is a regional leader in introducing energy efficiency policy. This, combined with choosing the right project at the right time, sets the stage for a great regional example of energy efficiency policy and market transformation that many other countries could benefit from.

Successful replication, however, requires more than demonstrating that the idea was good for the country; it also requires a strong strategy that is well documented and replicable. And this is where the replication potential fails: Other countries can surely benefit from the concept that market transformation through S&L (and – at least as important – a ban on importing used appliances) is a manageable and greatly beneficial strategy for a country, also a West African country. However, to benefit from Ghana's project experience, that project would have had to be well elaborated with measurable progress indicators, a time line and a good discussion of the interaction of the pre-existing legal context with the project's activities. All that fails, as a result of which there is little others can really learn about how to set up a similar project and benefit from the experiences of this project's implementation.

4.1.6. *UNDP comparative advantage*

This project is a typical policy and institutional development project, at the heart of UNDP's competence. UNDP was in an excellent position to develop and execute this project and link it to other international initiatives and expertise.

4.1.7. *Linkages between project and other interventions within the sector*

The project document pays lip service to coordination with other projects and interventions, including for example coordination with a similar project in Nigeria and within ECOWAS and ECREEE. This suggested coordination is not specific, however, and there is nothing in the project's design and strategy that seems to be different as a result of that suggested coordination. The project builds on work on S&L development in many other countries, however, fails to discuss how those experiences will be brought into this project.

More importantly, the project document fails to discuss other interventions, most importantly the adopted ban on importing used appliances and S&L legislation. This section would have been an excellent place to address how this project interacts with and complements those already adopted policies and could make them stronger.

4.1.8. *Management arrangements*

Institutional and management arrangements for this project are good. The project correctly identifies the strong institutional structure for energy efficiency policy implementation in Ghana and places the Energy Commission, an established and effective government agency, in charge of implementing the project. This was a wise choice.

Other relevant stakeholders are correctly identified in the project document and their role in the country is correctly and adequately described. Their roles in the project are hinted at, however, and are described without much detail and without consideration as to how coordination with those stakeholders would occur – beyond involvement in generic project coordination mechanisms such as a steering committee. This does not need to hinder a project if it is well-implemented and project management arranges for ad-hoc coordination, however, a project strategy is an excellent place to elaborate on the role of various parties and plan ahead for coordination, eliminating the need for an ad-hoc approach – in short, a missed opportunity.

4.2. Project Implementation

Implementation of this project was characterised by an enthusiastic and committed project team, which recognised the importance of the project's overall goal and was eager to help Ghana improve on refrigerator energy efficiency in any way it could. The project's executing partner, the Ghana Energy Commission, was a great host for this project: well placed within Government, with the mandate to act, committed and capable to drive appliance energy efficiency forward. These are important assets that tremendously helped this project, and stakeholders generally view the project as a success.

For an outside evaluator, success is not so easy to discern. While it is clear that the project contributed to an important societal goal for Ghana, to reduce energy demand, and that it initiated many activities that stakeholders consider as valuable, it is entirely unclear whether the project did this in an effective and efficient manner. One reason for this is that the project operated from a starting point and strategy that does not match well with the project document, focusing more on smoothing out issues in the introduction of a ban on the import of used appliances and the market introduction of already agreed S&L legislation, one of which was not part of the original strategy at all, and the other which was a relatively small component of it. On two components where the project was working somewhat independently, the construction of a test laboratory and the introduction of a refrigerator trade-in rebate scheme, the project operated much less successfully. The test lab was semi-completed (but not yet operating in an internationally recognised manner) only at the very end of the project, far too late to be useful for its intended contribution to verifying compliance with S&L requirements. The rebate scheme was drastically scaled down in ambition level and then still not delivering, however, no consideration was given to conducting alternative approaches to assist consumers in purchasing new efficient refrigerators. Instead, a new element was added to the unsuccessful rebate scheme, possibly only aggravating the difficulties.

Financial management of the project focused on managing the GEF and UNDP components, virtually ignoring the co-financed parts of the project: Co-financing was not tracked (except for the rebate scheme), there was no plan for the delivery of co-financed activities (which were a large part of all project components) and the project's strategic framework was not kept up to date with important changes in the project's scope and co-financing. These are all important aspects, and the implementing and executing agencies should have provided management on these issues.

Nevertheless, the project did a good job of managing the introduction of refrigerator standards and labels in Ghana and to help transform the market for refrigerators. This, in the challenging setting of a low-income country, is a major achievement. The project team's enthusiasm, commitment and persistence have probably contributed in important ways to the overall result of the project. Shortcomings should not be neglected, and UNDP is recommended to stress the importance of properly updating project documentation and to provide training to specifically strengthen project management and reporting, however, the results achieved in Ghana deserve recognition and praise.

Project implementation, overall, was good but not great. Rated elements include:

- Overall quality of Monitoring and evaluation: moderately satisfactory (MS)
 - M&E design at project start-up: unsatisfactory (U)
 - M&E plan implementation: satisfactory (S)
- Overall quality of project Implementing and Executing agency implementation and execution: Moderately satisfactory (MS)
 - Implementing agency execution: Moderately unsatisfactory (MU)
 - Executing agency execution: Satisfactory (MS)

These ratings reflect that the project achieved some good results, though also failed on some aspects, managed the project very well in many aspects, however, also failed in some important aspects.

Detailed observations related to the Project implementation stage

This section first presents findings relevant to the Project implementation stage of the project, followed by a discussion and assessment of various specific criteria, with a rating where required.

Project inception appears to have been complicated, with the PMU starting with the implementation of the project before an inception workshop was scheduled and an inception report produced. An inception workshop was eventually scheduled 3 to 4 months after the actual start of the project, when the project manager and staff for the project started (it had previously been managed without a dedicated manager or staff by the Energy Commission). Meeting notes, and the lack of an actual project inception report, suggest that this inception workshop focused more on discussing specific issues raised by workshop participants about the implementation of the project than on a full review of the project design. It is unclear why project management opted for this limited review and missed the opportunity to fully review the project's approach. One former member of the PMU staff commented during the evaluation that this should have happened earlier and recommended making an implementation review standard practice for GEF projects – apparently unaware that this is already recommended practice.

Budgets were allocated on an annual basis through the PMU proposing a annual budget for approval by the project steering committee, with a breakdown into quarterly budgets which were frequently updated to reflect progress or delay on previously agreed budget items. This, in itself, is an appropriate process, although there are probably more efficient ways of recording budget updates than through quarterly budgets. Although quarterly budgets were in line with agreed annual budgets, budget allocations changed frequently and it is not easy to link quarterly planned spending to annual allocations or the overall agreed project budget. A more efficient process would have included a more regular comparison between overall project budget, agreed annual budgets and spending so far and it is recommended that UNDP and the Energy Commission explore a different, more streamlined budget process for future projects.

A member of the PMU also commented on the need for more flexibility in the use of project funds during implementation, apparently unaware of the possibility for a PMU to submit a request for changes to the agreed budget, obtain approval and report a revised budget in an annual project implementation report – provided, of course, that there is a clear need and good rationale for such a budget revision. In fact, there is no indication of the PMU ever requesting a formal budget revision. There have been deviations from the budget agreed in the project document, and although those changes seem reasonable on their own merits and have been discussed with and approved by the project's steering committee, there has been no updating of the overall project budget, even though this is required. The implementing agency should have been more careful to properly record budget amendments (and their rationale) where these include shifts between budget components, so that there is a complete financial record of the project.

Project implementation is characterised by a dedicated collaboration of the parties involved throughout the project, unfailing assistance and reliable contributions from UNDP Ghana, and integrity of participants despite pressures, threats and bribery. The cooperation between the Energy Commission, UNDP, EPA and relevant Ministries started at the time of project formulation and the dialogue remained open throughout the implementation. Strong ownership and leadership from the UNDP project officer (Mr Paolo Dalla Stella), PMU staff (Mr Eric Kumi Antwi-Agyei and Ms Anita Amissah-Arthur) and the Energy Commission (Mr Agyarko) was instrumental in delivering consistent results. The relationship with the Government Standards Authority (GSA), selected as the location of the testing laboratory the project built, to increase their pro-active involvement, was also important, as was the collaboration between three Ministries (Energy, Trade and Environment). Governmental stakeholders all understood the potential of the project in terms of energy savings and supported the project and its objectives, even though strong lobbying and constant pressure applied by the association of importers of used fridges on politicians slowed down progress and pushed back the implementation of the ban on importing used refrigerators several times (from 2010 to mid 2013). The project's Steering Committee involved all relevant parties including government organisations and implementing partners as well as civil society (Energy Foundation), consumers (Consumer Association), retailers and importers.

One main issue in the implementation of the project was the lack of support from the Ghana Customs authorities. Earlier in this evaluation, it was noted that customs was a notable missing party in discussing and securing stakeholder involvement in the project, and this turned out to be a major hindrance in its implementation. Under normal circumstances, the national customs agency takes responsibility for enforcing an import ban and import requirements of products, as this is the core task of any customs agency. In Ghana, however, this did not seem to happen in practice as some officers on the ground turned a blind eye when banned fridges were brought into the country via the two main ports. Customs, according to interviewed stakeholders, seemed to have been more interested in collecting revenues instead of doing their work in enforcing the S&L program. To address this, the Energy Commission, supported by the Ministry of Energy, opened an office at Ghana's Tema port to oversee the enforcement of the ban on importing used refrigerators and the labelling of imported products. Such a presence is deemed to be necessary to this day and stakeholders expect that closing this dedicated office will turn Ghana back to poor enforcement of both the import ban and labelling requirements. The Energy Commission has secured funding for this dedicated office until the end of the year, however, there are currently no means to continue this afterwards. Other countries contemplating a similar project should develop approaches to secure the involvement and buy-in of Customs early on in the project and develop alternative or additional enforcement strategies if needed, as well as secure the long-term means needed to enforce importing requirements.

Enforcement of the ban on importing used refrigerators remains a challenge in Ghana, even with the (temporary) additional efforts of this project. Some importers continue attempts to circumvent requirements and smuggle in second-hand fridges using various techniques, for example misrepresentation of refrigerators as used TVs, microwaves or bicycles stacked at the back of containers, fake documentation, cutting out the compressors from the units and probably bribery as well. Ghanaian stakeholders felt that they lacked support from European governments, where most used refrigerators originate from, to tackle exports to Ghana. The United Kingdom in particular is a problem: most containers (with used refrigerators) arriving at the ports were, and still are, originating from there. It is difficult to know with certainty the amounts of used refrigerators and freezers still entering Ghana. It is estimated that a total of 3,787,165 units of used and new refrigerating appliances were imported into Ghana for domestic consumption between January 2005 and January 2014 with 75% of those imports being used appliances (source: Energy Commission), or around 250,000 units per year. After the implementation of the ban, over 25,000 units were confiscated at Tema port between February 2014 and July 2015 and sent for destruction to Presank (data source: PIR). It remains unclear, however, how many banned used fridges and freezers are still being smuggled in. Data received from GCNet (Ghana Community Network Services Limited) shows a downward to non-existing trend of imports of used products, however, the officer on the ground believes that this data is misleading with some information not entered into the GCNet database in the first place. Given also that the imports of new refrigerators have not increased sufficiently to replace previous import volumes of used refrigerators, the most likely reality is that appliances are still being smuggled in significant volumes. This issue is also discussed in the results section (section 4.3).

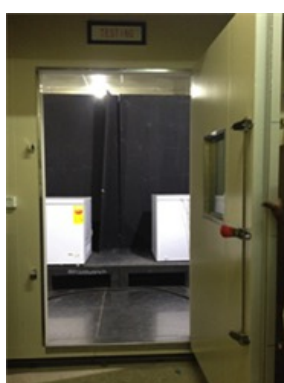
Some retailers were reticent at first (in their own words 'we thought it was a programme which wouldn't last, many are like that here') they realised in 2014 that enforcement was seriously carried out and that they had to comply or see their goods seized and re-exported when test results failed to reach requirements. One local retailer, Hisense, in contrast, saw a huge business opportunity and made it its mission to be part of energy reduction. Hisense advertises about energy efficiency every day, including prime time television adverts. It has also collected 4000 used refrigerators for replacement with new ones, half of the total number collected through the programme. Ghanaian government officials recognise the need to get more such businesses on board. In future, retailers – and to a certain extent importers – are more likely to get involved since it is now clear that there is effective enforcement and real Government commitment, and that there is a real business opportunity.

The project faces substantial difficulties with the establishment of a test laboratory. A test laboratory was set up for the enforcement of S&L for refrigerators and freezers involving the Ghana Standards Agency to help build their capacity. It should be noted that international experts have differing views on the pros and cons of constructing test laboratories for S&L developments in smaller countries: all agree that access for government enforcement agencies to a reliable test laboratory is essential for an effective S&L implementation. Many also agree, however, that constructing a test laboratory solely for compliance testing in a country without a manufacturing base or in-depth knowledge of

modern appliance operations is not a successful approach, as test laboratories can seldom operate effectively just on government compliance testing, which generally does not raise sufficient revenue to sustain a test laboratory and it does not present sufficient opportunity for test lab staff to build enough knowledge and experience to remain qualified in the long term.

In this project, lack of local expertise was a major stumbling block, as was the poor timing and extremely long procurement process for procuring a test laboratory. Trial tests were conducted in November and December 2014, with actual operations starting in January 2015 – after the end of the project. Public procurement was lengthy and unsuccessful and an external consultant was hired to help streamline the procurement process and find a suitable supplier for a test lab. This eventually resulted in a Chinese supplier willing to provide a test lab. This supplier provided some training on how to operate the equipment, however, they did not provide training in testing according to the test procedure Ghana had adopted and, to this date, test laboratory staff still rely on officials from the Energy Commission – who also lack experience in testing according to international standards – to understand Ghana's standards and interpret results. The laboratory was also quite costly, with one third of GEF funding (\$0.4M out of \$1.7M) being used solely for the purchase and installation of the test lab. While the facility is certified to ISO17025 (although it is unclear how this certification could have been obtained given the lack of operational expertise at GSA), its staff did not receive any certification and are worried in case they have to go to Courts to defend their assessment of a product not meeting Ghana's standard. Staff have put together a proposal for further training to GSA and the Energy Commission, so far without a positive response.

The newly built test laboratory was visited during the terminal evaluation. The laboratory can perform tests on 4 refrigerators and 2 chest freezers at a time. Work comes mainly from the port: if items are not labelled or improperly labelled they must be tested (a single test, with the importer having the opportunity to request another test). The Energy Commission recently carried out a compliance survey in shops and sent any appliance that they found suspect to the lab for testing. At the time of the terminal evaluation, the lab was working through a backlog of units (68 samples had been tested out of 87 received).

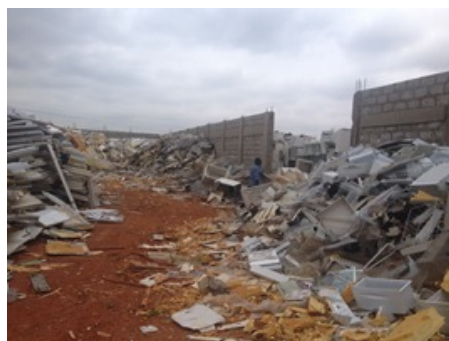


It should be noted that a good test laboratory consists of much more than a test room – which can indeed be procured from an international supplier – and that good test laboratories require an infrastructure around them to operate according to international standards, for example for calibrating their instruments and to conduct “round robin” testing to establish that the new laboratory is indeed operating as intended. In this case, the project left Ghana with a poorly functional test laboratory which only became available after the end of the project and without long-term sustainability. Stakeholders in Ghana felt that procurement of a test laboratory should have started earlier on, which probably would have helped in mitigating some of the issues encountered. Long-term sustainability, however, would probably require a more fundamental change in strategy, for example through collaboration with neighbouring Nigeria which was facing virtually the same issues at virtually the same time – and one would rightfully ask why UNDP did not encourage and facilitate collaboration between its two projects in neighbouring countries when it was actually needed.

The project experienced similar issues with the establishment of dismantling facilities for refrigerators in Ghana. One company (City Waste) was selected by the project for the dismantling of old refrigerators because it had some experience and equipment, in particular a degassing unit from Germany and the Energy Commission and EPA jointly hired this company. There were, however issues (which could not be fully investigated in this evaluation, also because it was not possible to interview City Waste during the evaluation mission) with this contract and the project signed a new contract with the company Presank, who started operations in April 2014. In any case, the relationship between the Energy Commission and the EPA on one side and City Waste degraded and the project team decided to find an alternative contractor to dismantle the units seized at the port, while City Waste handled dismantling of refrigerators handed in through the project's rebate programme. Stakeholders generally felt that more than one company should have been engaged from the start of the project to build sufficient dismantling capacity.

Presank's dismantling facility was visited as part of this evaluation, and several issues were identified with the dismantling and degassing of refrigerators at this site. It should be recognised that Ghana has no previous experience in the safe disposal of ODS gasses, however, it should also be recognised that organising this in a sound manner was an important task for this project and that UNDP also managed several MLF-funded projects with a combined budget well over \$1M, specifically designed to improve the management of ODS. It would be reasonable to say that there were sufficient resources available to arrange for the sound disposal of ODS from a limited number of refrigerators and that UNDP itself had considered that to be an achievable target.

Presank collects and segregates 3 types of gas (R12, R134a and R600a) using manual condensers (one for each gas) in which gas is transformed into a liquid, after which it is stored in canisters which are then collected by the EPA. Because there is always the danger of a gas burn (R12 is highly flammable) workers constantly check the gauges. If R12 (old-style CFC) is condensed manually in an open space, a fair bit of the gas will evaporate, so only part of the GHG mitigation effect is achieved. The lack of protective equipment for the workers and open air dismantling of the foams (blown with CFC/HFC which are released when the foams break) are some of the observed health & safety and environmental concerns. Presank are able to sell the metal and PP plastic (recycled into local plastic chairs), however for the other types of material (PS, ABS & SB plastics and foam containing ODS) they do not have any method of safe disposal or recovery so stocks are piling up in their yards. In particular the foam is an issue and the EPA is aware that they need to find a solution for the environmentally sound disposal of those. EPA is discussing a follow-up project with Germany's GIZ to develop a solution, however, in the meantime foam is bagged and left in Presank's yard. At the time of the evaluation, roughly one year after Presank started its dismantling of fridges, during which it dismantled some 14,000 refrigerators, foam in bags is taking up 1/6th of its total site – clearly an unsustainable situation and it must be expected that, since a long-term solution is not in sight, storage space alone will be presenting a barrier to continuation of the dismantling activities at this site. It is unknown whether this situation is less difficult at City Waste, however, this company also does not have a long-term solution for ODS containing foams. Photos below show some of the degassing and the piles of dismantled foams.



The project document sketches an integrated plan to bring about the convergence of 3 synergistic interventions: (i) the phasing out of HCFC based appliances (MLF); (ii) the promotion of energy efficient refrigerators through Market Transformation (GEF) and (iii) the complementary pilot project for the recovery and disposal of ODS (MLF). The

ultimate objective of this plan is to bring economic, social and environmental benefits to the people in Ghana through the scaling up of energy efficient appliances with low global warming potential (GWP). In this plan, MLF funded projects, which are listed as co-financing for the GEF project, would provide for ODS disposal facilities. As discussed earlier, some of the MLF funded projects were actually scheduled for implementation after the end of the GEF project, making this “integrated plan” less integrated than the project document presented. The ODS disposal pilot, however, should have been operational from late 2011 on, so easily on time for the disposal of ODS recovered in the EE refrigerator project - at least the refrigerants, as the ODS project did not include a plan to handle ODS in foam (apart from transport to a central location). In fact, the “integrated plan” did not consider ODS in foam at all – another indication that this plan is a lot less integrated than suggested – one might even question whether it is a synergetic plan at all. In the end, one batch of (1,300 kg) recovered ODS was shipped to Europe in July 2015 (7 months after the end of the GEF project) for destruction by, possibly, the ODS disposal pilot in conjunction with yet another GEF-funded project, this one focusing on PCB disposal. Clear information about which project did what and which specific contribution the various MLF-funded projects made to the GEF-funded project is missing, despite several inquiries with UNDP. It seems clear, however, that the actual contribution of the MLF-funded projects has been minimal, and probably has gone no further than the shipping of one batch of recovered ODS after finalization of the GEF project.

Raising consumer awareness was identified as an important topic for the project (in the project strategy), however, once the project started it became obvious to the parties involved that more work was needed on this than was foreseen in the project document. Communication strategies to reach out to the general public in particular were felt to be lacking in the original project strategy, and the project redirected funds to be step up consumer education activities. Many project stakeholders felt that, were they to engage in a similar project again, they would have put an even stronger emphasis on consumer education and outreach, and would have made this a priority in the project right from the start.

Several additional activities were put in place, such as targeting of non-readers through radio programmes, cartoons, talk-shows, publication of Top 10 refrigerators, billboards and newspaper adverts, project website and a Facebook page. Journalists were briefed and officials regularly called upon their ‘energy efficiency press ambassadors’. The Energy Commission has a good reputation in Ghana, and was able to mobilise many additional communication resources without having to pay for it, greatly leveraging the impact of project funds. Pictures below show some of the posters that the project used to communicate with consumers.



The project’s strategy included a rebate scheme for consumers trading in old refrigerators. While such rebate schemes are known to have little direct environmental impact, primarily because of the high share of “free riders”, the

relatively high costs of benefits and the relatively modest period by which they tend to bring forward the replacement of old products, they can be important as the “social lubricant” that helps a sector of the economy adapt to a new set of regulations and thus contribute indirectly to the overall market transformation. More commonly, however, rebates would be awarded for the purchase of refrigerators with an energy performance above the minimum performance level, thus aiding market transformation at a lower cost.

For this project, the Government of Ghana pledged \$607,080 to this rebate scheme, equivalent to around 900,000 Cedi at the time of writing the PIF (out of a total pledge of 3,000,000 Cedi, of which Cedi 2,100,000 was allocated to other project components). In addition, \$460,000 GEF funding and \$520,841 international cash co-financing were budgeted for the rebate scheme. The Cedi to dollar exchange rate remained fairly stable at around \$1 = 1.5 GHS through mid 2011, started to drop to around \$1 = 2 GHS by mid 2013, and dropped further to around \$1 = 3.2 GHS by the end of 2014 (end of project). The drop in the exchange rate probably also caused a spike in the purchase price of new refrigerators, making market transformation harder. During the project, the Government of Ghana decided, according to the Project Director, to move all of its \$3 million pledged co-financing to the rebate scheme (note that the project budget was not updated to record this change, nor was this checked with GEF rules which, for example, require co-financing also for the management cost of a project).

The amount of rebate originally awarded for the trade-in of a refrigerator turned out to be insufficient to convince would-be buyers. This is also discussed in section 4.1, about the project design, which shows that the budget available and the intended reach of the rebate programme did not match – in other words, it should not have come as a surprise that the rebate amounts were insufficient. At the start of the project, when the value of the Ghana Cedi was still roughly the same as when the project was designed, the project steering committee decided to revise plans for the rebate scheme so that fewer refrigerators would receive higher amounts of rebate: originally, 50,000 refrigerators would receive a rebate (of an undecided amount); this was revised to a target of 15,000 refrigerators receiving rebates of 200 Cedi (currently \$ 47 USD, however, around \$100 by mid 2013) for consumers buying a 2 star refrigerator and 300 Cedi (currently around \$70, however, around \$150 by mid 2013) for consumers buying a 3 or 4 star refrigerator as replacement of an old (still working refrigerator). Given the reported decision by the Government of Ghana to move all its co-financing of (originally) \$3 million to the rebate scheme, it is unclear why a lower target of 15,000 refrigerators was selected, since that budget would have allowed for more refrigerators to be subsidized. The mid-term evaluation already mentioned that the project needed to devise ways to bring its objective back to the originally stated goal, after reducing its target for the rebate scheme down. The project, however, never acted on this recommendation.

Some importers mislabelled their appliances to higher star levels through copying a label with 3 stars on it. It is unclear whether this represents a simple mistake, or an intention to claim higher rebate amounts – though it is obvious that a retailer offering a similar refrigerator as its competitor, with a higher rebate amount would stand to benefit from this mistake. Once the Energy Commission started to meet the importers on the field they understood what was required of them, and behaviour changed, and a lesson was that early training of and dissemination of information to importers and retailers is imperative, along with enforcement.

The rebate scheme was designed so that no money would change hands in the shops so retailers must cash in the vouchers at a commercial bank, Ecobank, upon verification that the used fridges collected were in working order and had reached the dismantling facility (City Waste). The PMU however had not envisaged the paper trail for the rebates to be so high and hired a new person to focus on data entry and the development of a database. One issue encountered by retailers was the lack of stock of new efficient refrigerators as they did not anticipate the take-up – it is unclear, however, how much of that was due to the rebate programme and how much to the introduction and marketing of S&L for refrigerators. A further issue was that any relaxing on advertisement led to drops in sales.

One of the reasons Ecobank were awarded the contract to handle the vouchers was that they did not charge the Government for administering the total amount of the rebate programme, and they created banking products to safeguard the interest of the project, for example loans for consumers to purchase the energy efficient refrigerators and credit packages for distributors/importers. In practice, however, they didn't award any loans, which they attributed

to lengthy and difficult procedures and a disconnect between the intention of some managers and operational activities in the local branches. This missed opportunity and lack of delivery from the bank means that households who could not pay upfront for a new appliance were not able to purchase a new efficient refrigerator on arranged consumer loans, as was intended.

In the terminal evaluation, the PMU attributed the need to scale back the number of refrigerators eligible for subsidy to the depreciation of the Cedi and inflation. This theory, however, is not substantiated by facts: the depreciation of the Cedi was marginal when the steering committee decided to scale back the target number of refrigerators, and the overall depreciation of the value of the Cedi reduced the overall available budget by only 10-20%, given that most of the planned budget was to come from US dollar sources (inflation, in excess of devaluation, was also marginal during the time of the project. In fact, wholesale prices of refrigerators have probably marginally dropped during the project). Project management did not ask the Government of Ghana to increase its budget for the rebate programme to bring it back to the original USD amount, recognising the financial difficulties the Government of Ghana was facing and its inability to free up more funds at the time.

In the end, it was not the lack of available budget that resulted in the underperformance of the rebate scheme. Even with the increased rebate amounts – rebates of this magnitude are rather high in comparison to rebate programmes in other countries – the programme fell far short of its objectives. At the end of the programme, only 7257 refrigerators had been traded in with a rebate, and additionally 805 first-time buyers had received a rebate (of Cedi 150, around \$40) when purchasing a refrigerator. This should be assessed against the background of around 2 million refrigerators being in use in Ghana before the start of the project, and annual sales in excess of 100,000 refrigerators. Thus, the original target of supporting the trade-in of 50,000 refrigerators had been scaled back to a target of 15,000 refrigerators, and of this less than half was achieved. There is no estimation of the free rider effect included in these numbers, however, international experience and the low share of consumer participating in the scheme suggest that the free rider share must have been high (international experience would suggest a free rider effect of at least 50%, and in the absence of project data, this evaluation will use this estimate). It seems therefore likely that the rebate scheme managed to encourage around 0.2% of Ghanaian households to trade in an old refrigerator, and has encouraged under 0.1% of new sales to opt for a more efficient refrigerator. Considering that the project had ample time to prepare the rebate scheme, that the rebate scheme was introduced on the back of an elaborate consumer awareness effort resulting in high consumer awareness about energy labels and refrigerator energy efficiency and that this component was a major part of the project, these results are insignificant. The rebate scheme may have contributed more indirectly to the impact of the project, through helping to raise consumer awareness for efficient products and drawing attention to this in the supply chain. Nevertheless, the rebate scheme has substantially underperformed and was probably not a good investment of time and budget.

4.2.1. Adaptive management (changes to the project design and project outputs during implementation)

The project has responded pro-actively to the needs of the country and has engaged in an effective dialogue with stakeholders. Project resources were devoted to newly emerging needs, to maximise benefits to the country. This is probably best exemplified by the decision to open an Energy Commission office at the Tema port, to assist Customs in the inspection of S&L requirements of imported refrigerators and enforcing the ban on importing used refrigerators. Similarly, the project redirected funds and efforts towards consumer education, thus enhancing the impact of the S&L regulation. These are important good steps taken by the project.

It should also be noted, however, that supporting the ban on the import of used refrigerators was not within the scope of the project – even though it should have been – and that there have been no efforts to develop a strategy to support that implementation as part of the project. Although adapting activities to the needs of the country is, itself, commendable, in this case the project undertook this action without a stated goal, nor a mandate, without explicitly considering if this action was more important than executing the actions already in the project strategy (from which budget had to be withdrawn), and without considering how this action would integrate with the rest of the project.

The project also went through other changes during the implementation phase, in particular a substantial shift in the allocation of Government of Ghana co-financing, which resulting in the withdrawal of large amounts of co-financing from all but one project component, and under-delivery of co-financing from the MLF-project. This should have triggered a revision of the project budget and strategy, to be able to adapt to those changes in a strategic way. And, when the rebate project component under-delivered, the project didn't seek to develop alternative approaches to compensate for this.

The project, in conclusion, has been very responsive to the country's needs with the objective of maximising impacts, however, failed to respond well to the needs of managing the project effectively and with accountability. As a result, while there was a great willingness to be adaptive and respond well to the needs of the country, implementation of adaptive management was weak and this harmed the project.

4.2.2. Partnership arrangements (with relevant stakeholders involved in the country/region)

The project did not establish formal partnership agreements with important stakeholders, except with the MLF-funded projects for (commercial) refrigeration systems also being implemented by UNDP in Ghana for which there is a formal description of collaboration, included in the project document.

Informal collaboration with stakeholders seems to have been effective, however, in particular with retailers, a key stakeholder in any market transformation strategy. There appears to have been regular informal consultations with stakeholders as well as through the project steering committee, in which stakeholders were involved. This is a good and effective alternative to a more formalised collaboration, possibly even more effective as commercial and government parties do not always speak the same language and do not always operate at the same pace.

The partnership with the MLF-funded projects has virtually not materialised. It is questionable how much of that pledged partnership could have materialised, given that the GEF- and MLF-funded projects had little overlap, however, even on parts where the two sides needed each other, in particular the disposal of ODS containing materials recovered from disposed refrigerators, collaboration seems to have been ineffective and key parties in the GEF project, such as the company gathering ODS containing materials, seem unaware of what is being done in the MLF-funded projects to help them move those ODS-containing materials to a party that can safely dispose of the ODS. Given that both projects are managed by UNDP's country office, and that the MLF project is, almost in full, listed as co-financing for the GEF-project, it was UNDP's and the project management's obligation to make sure that there was effective coordination between the GEF-and MLF-funded work, an obligation at which they failed with important negative impacts for the ODS removal objective of the project.

4.2.3. Feedback from M&E activities used for adaptive management

The project document included a rather limited M&E plan, focused more on delivering formally required documents than on tailored activities to establish what the impacts of the project were. Formally required documents were delivered, although the project did not follow up on the inception workshop with an inception report, thus missing out on an essential opportunity to realign the project's flawed strategy to the introduced S&L legislation and the ban on the import of used refrigerators.

During the project, some activities were undertaken to establish if project activities were having an effect, in particular a survey to establish recognition of the appliance rebate scheme. Awareness of the refrigerator rebate scheme as measured to be at 59% and 73%, which could signify a very high recognition (given the duration of the project and its setting in a low-income country). It is unclear, however, how this recognition was measured and reported results do not conform with international best practice, which would normally separate between unaided and aided recognition, and factor in whether people were actively considering a new refrigerator.

Towards the last year of the project, the Energy Commission monitored, in quarterly reports, the market for efficient refrigerators. It's not clear how these reports were used in project management, however, there was also no specific

follow-up needed since those reports suggest that the market was responding well to project activities and that no changes in activities would be needed.

The project monitored the use of the rebate scheme and gathered additional data from consumers participating in the scheme. It noticed the slow take-up of the scheme and the number of participants falling well behind the target, however, did not amend the scheme or take other actions to address this.

The Mid-Term Evaluation provided the following recommendations for the project:

1. CO₂ Emission Reduction Targets (corrective action). The project target for direct CO₂ emission reductions outlined in the Project Document is 251,600 tCO₂. In the project design this target is linked to the replacement of 50,000 refrigerators through the appliance turn-in and rebate program. Considering the variety of activities and results realized to date, it is recommended that detailed appliance sales surveys be carried out to better assess the impact of the project on the EE appliance market in Ghana.

End of project status: The project failed to develop alternative approaches to replace missed impacts due to the reduction of its target for the rebate programme. Market surveys and monitoring has been carried out, although these have not been used in formal reporting about the project.

NB The main text of the MTE report discusses the need to mitigate the lost CO₂ impacts through the reduction of the target for the rebate scheme; the recommendation in the recommendations sections discusses this without stressing the point; and the recommendation included in the MTE report summary leaves this out entirely. Although the project should not have needed an external review to trigger a rethinking of ways to achieve its objectives, the vagueness of this recommendation probably didn't help putting the project back on track.

2. Appliance Purchase Program (changes to project strategy). A variety of financing models need to be developed and marketed to attract a broad range of consumers to purchase energy efficient refrigerators instead of used refrigerators.

End of project status: The project considered interest free bank loans as a financing model, however, did not pursue this further nor did it consider other means of financing to promote the uptake of efficient appliances.

3. National Scale Exchange Program (changes to project strategy). The refrigerating appliance turn-in and rebate program should include more brands, more dealers and a broad regional base before project end.

End of project status: The rebate programme has gradually been extended to cover more retailers (and thus also more brands and regions)

4. Refrigerator Testing, Certification and Labeling (changes to project strategy). It is recommended that manufacturers have appliances certified at recognized international testing facilities before import. The Ministry of Industry and Trade should distribute a list of 8 to 10 international accredited test facilities where appliances can be certified.

End of project status: This recommendation doesn't seem to have received a follow-up, and its need disappeared when the test laboratory in Ghana was completed. Current practice is that importers have appliances tested pre-export, or at the test lab in Ghana. Note about the recommendation: It would be unusual for a government to select a subset of accredited laboratories, as this goes against the nature of the ISO accreditation system which works on the basis that all accredited laboratories can be trusted to deliver good quality test.

5. Publicity Campaigns (action to follow up or reinforce benefits). Financing of the campaigns requires considerable budget and it is recommended that the project seek in-kind support from sponsors (for example, radio and TV broadcasters, utilities, appliance manufacturers, wholesalers and dealers)

End of project status: The project has generated free publicity for efficient refrigerators, though this has not been recorded as co-financing.

6. Project Extension. In order to implement the remaining outputs and to properly consider and implement the recommendations above, it is recommended that the project plan for an extension of 6 to 12 months.

End of project status: The duration of the project was extended by 6 months.

7. Target EE Labels for All Appliances.

End of project status: This recommendation was out of scope for an MTE, and could not have been given a follow-up within the frame of the on-going project.

8. Regional Collaborations Explore opportunities for regional collaboration.

End of project status: This recommendation probably hasn't received the follow-up it deserved, given the good opportunities for collaboration through ECOWAS and with UNDP's project on refrigerator energy efficiency in neighbouring Nigeria.

9. EE interventions in other sectors. The Energy Commission should be actively involved in promoting and initiating legislative reforms to improve the energy efficiency in building, industry, transport and tourism.

End of project status: This recommendation was out of scope for an MTE, and could not have been given a follow-up within the frame of the on-going project.

Taking into account that the M&E framework of the project had design flaws, and that several useful indicators were not included in this, the project made fairly good use of the M&E information that was available. It probably also, informally, used market monitoring reports generated by the Energy Commission, which is commendable. A major flaw, however, was to not follow-up adequately to the loss of potential GHG emissions from the (reduced number) exchange of refrigerators through the rebate scheme, and loss of GHG emissions through incomplete solutions for ODS disposal. Neither of these two issues were described as a major issue in formal reporting by the project, even though these amount to a loss of 50% to 65% of potential achievements of the project – sufficient to warrant a clear warning about the project and to trigger a revision of the project's strategy.

4.2.4. Project Finance

Financial management of the project was fine as far as it concern adequately recording spending of GEF- and UNDP-provided funds, however, managing other funding for the project was virtually non-existent. Tracking of co-financing did not happen until after conclusion of the project, and comparisons of project spending, including co-financing, to the agreed budget has still not happened. When co-financing for some project components didn't materialise, largely through the decision by the Government of Ghana to provide co-financing only for rebates (and not for seven other project components and project management, as was agreed), the project decided to shift funds to those components at the expense of other components. None of these changes have been discussed in project implementation reports.

Reporting, in the GEF CER on PPG spending, was grossly inaccurate and very likely reporting (relatively) large amounts of co-financing that were actually not delivered. UNDP later reported the correct amount of GEF spending to the GEF, however, there is no indication that the incorrect amount of co-financing was also corrected. While there are no indications that this was done to deceive the GEF, these are mistakes that should not have been possible in a professional organisation.

It seems likely that the project used GEF funds to make up for gaps created by undelivered cash co-financing, for example on the construction of a test laboratory and that various items listed for funding from MLF-funded projects (listed as cash co-financing) were actually paid for with GEF-funds – thus pulling funds away from other activities.

Consultant rates listed for the project in the project document were rather high, between \$6,000 and \$8,000 per week for local consultants on multi-annual, full-time engagements, with three quarters of those fees listed as coming from cash co-financing. In the financial information made available for this terminal information, there is only summary information available about actual spending on local consultancy and no information about the rates used. UNDP Ghana indicated that no consultants were paid more than the common consultancy rates. This, combined with the observation that consultants were paid only from GEF and UNDP funds, leads to observation that there has been no (non-UNDP) delivery of the indicated (largely cash) co-financing on consultancy. There has been no reporting of this substantial deviation from the project document in UNDP's annual reporting.

Since this same inflation of consultancy rates in proposed budgets, followed by a reduction of rates to, roughly, what was planned as the GEF-contribution only of those rates, happened twice during this project, in the PPG stage and during implementation, UNDP Ghana is strongly recommended to provide a fully investigate this practice and put in place safeguard to prevent their recurrence.

UNDP requested annual audits for the project. These, however, only cover direct UNDP disbursements (including GEF funds) for the project, do not link payments to project activities, do not compare spending to the originally agreed project budget, do not track cash co-financing, do not track whether activities delivered the (in the project document) intended outputs and seem generally more concerned with tracking project assets of small value (largely whether all the tables and chairs purchased for the project are accounted for) than with providing a review of the finances of the project. UNDP, in a comment, indicated that it requests auditors to only cover disbursements made from GEF and UNDP funds "because that's what we are accountable for". This suggests a disregard for the nature of the agreement between UNDP and the GEF, in which UNDP promises to deliver a project, with GEF co-financing, and make sure that this contract delivers what is promised. Nowhere in a project document is there any indication that UNDP only takes responsibility for adequately disbursing GEF-funds. It is highly recommended that UNDP Ghana changes its instructions for its auditors, as well as its attitude towards its responsibilities for the projects it agrees to.

4.2.5. *Monitoring and evaluation: design at entry and implementation (*)*

The project's M&E plan was seriously lacking in contents, at design. The plan included all the usual formal progress review documents as well as a short activity for the development of a measurement methodology for measuring appliance performance, as well as the usual reference to PIRs which report on progress towards targets, however, it including literally no activity to specifically measure the project's outcomes and impacts. The M&E framework was, in essence, designed to underperform.

The project reported on its progress in the required documents (primarily quarterly and annual progress reports and annual project implementation reviews). Unfortunately, no targets had been defined for the actual market transformation the project aimed to set in motion and, although market monitoring data was available towards the end of the project, no reporting on market transformation was included in these formal reports – understandably, since this was not defined as a target. Repeating a comment made during the discussion of the project document, this underscores the importance of defining (and reporting on) meaningful targets for projects.

The development of a methodology for the measurement of appliance performance was conducted late in the project – too late to be of use during the majority project – and the project had not planned a follow-up of actually measuring that performance. Nevertheless, the project's Executing partner, the Energy Commission, has performed quarterly market monitoring since the end of 2014 which provides highly relevant information about the impact of the project. It is a mystery why this information has not been used to report about project impacts in its formal reporting. This evaluation, which was only provided late in this evaluation, has been used in section 4.3 Results to assess the project's results and impacts. It would have been much better if the project had assessed this information itself during implementation and used it to report on the impact of its market transformation efforts.

To its credit, the project did also conducted some unscheduled consumer surveys to measure recognition of project activities, in particular its rebate scheme, which was relatively well monitored. The project also kept track of

appliances seized at the port, and made some efforts to establish the average energy demand for new refrigerators, although only for those purchased with the help of the project's rebate scheme, and thus not a good representation of the larger market.

It is a shame that these additional, good M&E activities were not integrated in a coherent M&E framework, which would have given more direction to the use and reporting of monitoring results. In a way, the project conducted M&E much better than was scheduled, however, reporting on results remained weak. Resulting ratings are:

- Overall quality of Monitoring and evaluation: marginally satisfactory (MS)
 - M&E design at project start-up: unsatisfactory (U)
 - M&E plan implementation: satisfactory (S)

4.2.6. UNDP and Implementing Partner implementation / execution (*) coordination, and operational issues

The overview of the implementation of the project presented in this section points to several issues with the management of and reporting about the project, and several cases of the project not following the project document, or amending it where changes had been agreed. There are also instances of changes in the project's budget which likely don't comply with GEF rules, such as a decision to withdraw Government of Ghana co-financing from project management, leaving this cost entirely to the GEF and UNDP itself. It is UNDP's responsibility to oversee this and steer project management towards good practice, and it under-delivered.

UNDP is complimented by stakeholders on its pro-active and enthusiastic role in promoting this project in Ghana, and it is wonderful that it did. UNDP also failed, however, to steer the Ghana project towards a more active collaboration with a similar project UNDP was implementing in Nigeria, a nearby country, and to explore if more collaboration could be developed with the UNDP-managed MLF-projects also targeting the (commercial) refrigeration sector. As valuable as UNDP's enthusiasm and its efforts to bring together parties are, this does not fully compensate for missing out on these core responsibilities.

The executing agency focused primarily on contributing towards the overall mission of improving refrigerator energy efficiency and took initiatives and mobilised parties to contribute further to this mission, which is commendable. It undertook several monitoring efforts (not part of the M&E framework) to track the success of its market transformation efforts, however, did not include those results in formal reporting about the project. Overall, however, the executing agency seems to have done a good job in delivering a sustainable market transformation in Ghana.

Overall, both UNDP and the Energy Commission have been important in driving forward the project, making sure that it delivered on its main objective and that it built successful collaborations with stakeholders. Both, however, also share a responsibility for issues in the management and administration of the project and not sufficiently following up on budgetary and co-financing changes. Since UNDP has a unique responsibility to make sure that projects comply with GEF and UNDP internal rules for the management of projects, and has the skills and infrastructure to enable this, these issues are weighed more heavily for UNDP than for the Energy Commissions, resulting in the following ratings:

- Overall quality of project Implementing and Executing agency implementation and execution: Moderately satisfactory (MS)
 - Implementing agency execution: Moderately unsatisfactory (MU)
 - Executing agency execution: Satisfactory (MS)

4.3. *Project Results*

This project has contributed to the implementation of a ban on the import of used appliances and of S&L legislation, in particular by strengthening enforcement of both regulations at Ghana's main port, increasing consumer understanding of energy labels and working with retailers in the marketing of energy efficient appliances. The project document failed to set targets for these core objectives of the project, and targets were recreated during this final evaluation. Implementing the ban on the import of used refrigerators, a key component of the market transformation the project set out for, was added into the objective and a no-project baseline and project case were composed (see section 3.6). The project's overall result is evaluated against this reconstructed baseline and set of targets. Results for project components are assessed against the objective and targets formulated for each of these.

The project's main stated goal was to induce a transformation of the market for energy efficient refrigerators through the introduction of a ban on the import of used appliances, minimum energy performance standards and energy labels for new imports, raising consumer awareness about refrigerator energy efficiency, and several supporting components such as the construction of a test lab. The project also aimed to set up a rebate programme for the exchange of old refrigerators for new ones, with the added element of the safe disposal of (the ODS contained in) old refrigerators.

Ghana seems, overall, to be well underway in transforming the market for refrigerators and freezers, through its ban on the import of used products and the S&L that were implemented. Consumer and retailer awareness of refrigerator energy efficiency and energy labels seems strong enough to continue without international help, and the market sector has picked up on the advantages of marketing more efficient products. The project gathered data demonstrating the market transformation (although this was not included in its formal reporting), however, hasn't yet analysed this data to demonstrate to Ghana's parliament how much its forward-looking decisions to adopt legislation – it was the first country in West Africa to proceed with energy efficiency legislation, years ahead of others – is benefiting the country, and UNDP and the Energy Commission are recommended to analyse and clearly document all impacts of this market transformation to showcase its success and prepare the ground for further energy efficiency initiatives.

Available data indicates that the market in Ghana has transformed in a sustainable way, with more energy savings resulting from this coming in future years. This also creates the foundation for expanding Ghana's approach into other appliances with high-energy demand, for example other household appliances, televisions and electric motors.

The two main threats to the long-term success of Ghana's achievements in refrigerator energy efficiency are risks of lack of enforcement of regulations. At the moment, the Energy Commission is supporting Ghana's Customs with a dedicated office at Tema port, to check imported refrigerators for compliance with regulations. That, however, is a temporary situation, and there is no long-term funding for this support. It also seems only logical that, long-term, Customs would verify compliance with these regulations for imports as it is doing for all other imports. There was, at the end of the project, no long-term strategy to ensure that Customs is properly set up to perform this role. If the Energy Commission's support to Customs would stop without a firm transition of this role to Customs, market transformation in Ghana would not just stop, it would quite likely also roll back some of the progress made and possibly undermine the supportive landscape for future energy efficiency initiatives. UNDP and the Energy Commission have, after the end of the project, initiated discussions with Customs and secured their commitment to develop a long-term solution. This is commendable, however, more action is needed to make sure that this commitment also translates into strong enforcement at ports.

In addition, product compliance testing is not on a secure footing in Ghana. A test laboratory was constructed, however, without sufficient staff training and without embedding this laboratory in a supportive network of other test laboratories (the latter may not have been part of the project's design, however, is important for the sustainability of the testing in Ghana). So far, test results generated by this lab have not been challenged, however, the lab's own staff is worried that their results would not hold up in legal proceedings – and probably rightly so, given the set-up. It can only be a matter of time before an importer or retailer challenges test results, and if a court finds that the lab does not provide legally binding tests, Ghana's whole enforcement strategy might tumble, leaving the Energy Commission

with, effectively, an empty shell. Urgent action is needed to secure a more robust test set-up, which will probably require international collaboration given the size of Ghana's economy.

The project's overall environmental impact adds up to approximately 3,700 kton CO₂ equivalent direct and indirect impact, far exceeding the project's (recreated) target. This differs from the result reported by UNDP, which used a calculation based on the impact of the rebate and ODS removal scheme only (and which calculation includes some errors such as not discounting for the impact of the ban on the import of used appliances, for free riders and to assume that collected ODS is disposed of in a sound way, for which there is not yet a completed infrastructure).

The overall appreciation of project results is Satisfactory (S). This rating is based on the average of ratings for project outcomes (3.5 points, out of 6), project objectives (5 points out of 6) and the project goal (6 points out of 6), resulting in a score of 4.8 on a 6-point scale.

Individually rated criteria for project results are:

- Overall quality of project outcomes:
 - Relevance: Relevant (R)
 - Effectiveness: Highly satisfactory (HS)
 - Efficiency: Marginally unsatisfactory (MU)
- Overall likelihood of risks to Sustainability: Moderate likely (ML)
 - Financial resources: Moderately unlikely (MU)
 - Socio-economic: Likely (L)
 - Institutional framework and governance: Moderately likely (ML)
 - Environmental: Likely (L)
- Environmental Status Improvement: Substantial (S)
- Environmental Stress Reduction: N/A
- Progress towards stress / status change: N/A

These ratings reflect that the project contributed towards its overall objective, however, not as much as it should have and not as much as it could have. In particular the project's failure to build an effective and sustainable enforcement infrastructure and the lack of success with its rebate scheme contribute to this relatively low rating, as well as its inability to demonstrate market impact through good market monitoring. This is somewhat offset by the project's good results in reaching out to and working with the retail sector and its efforts to educate the general public, leading to the overall rating of moderately unsatisfactory.

Detailed observations related to Project results

This section first presents findings relevant to results of the project, followed by a discussion and assessment of various specific criteria, with a rating where required.

While the project was in its design stage, the Government of Ghana adopted S&L legislation (LI 1958) requiring that new refrigerators sold in Ghana are labelled to indicate their energy performance on a scale from 1 to 5 stars, and that these have an energy performance at least equal to a 1 star energy label level. The Ghana energy label is based on the European Union approach to energy labelling for refrigerators, and the Ghana 1 star and minimum performance level is equivalent to the EU C-level (the 5 star rating in Ghana is equivalent to the EU A++ level). This level was required as minimum performance in the EU from 1999 on, and has since been revised to the equivalent of Ghana's 4 star level. This performance level is roughly similar to a basic energy performance level required in other countries when they started with S&L for refrigerators, however, it is by now lacking somewhat in ambition: international manufacturers have upgraded their product ranges to the requirements of many large economies and virtually all refrigerators available from international suppliers will meet this performance level, or better. It is thus likely that Ghana's minimum energy performance standard is keeping out some particularly poor energy-performing products, however, it is probably doing little to lift the energy performance of new products.

Ghana's S&L legislation is, unfortunately, not very well formulated. The legislation does not describe an enforcement procedure and measurement tolerances (if any) to be used; it does not describe an effective date from which its requirements must be implemented; and its description of the label to be used leaves room for interpretation. These are important aspects on which the S&L legislation could have been improved through the planned – but probably not executed – expert review of the legislation by the project. At the time of the evaluation, the Ghana Energy Commission website did not list refrigerator S&L as being in effect, making it unnecessarily difficult for stakeholders to know which requirements they have to meet.

In 2014, the project initiated a pilot survey to determine the average energy demand of refrigerators. This survey consisted of deploying Watt meters to over 400 households to measure the energy consumption of refrigerating appliances. The metering exercise was done in collaboration with four tertiary institutions to build their capacity in the conduct of survey metering and analysis of the data. Initial results show that as a result of the project, there has been a significant drop in the energy consumption of appliances compared to the project benchmark of 1,140kWh/annum per refrigerating appliance which was recorded in 2006. Preliminary analysis indicated that the average consumption of refrigerating appliances (in use) have dropped by 400kWh/year as a result of the project, which would constitute an important impact of the project. (NB, when assessing impacts, this drop should be corrected for the drop already occurring through the increased sales of energy efficient refrigerators, to avoid double-counting of impacts). During the evaluation, project team members mentioned that the average energy demand of new refrigerators had dropped to 352 kWh per year.

During this terminal evaluation, three shops were visited to observe if, after the conclusion of the project, energy labels were present as required by the S&L legislation. All shops visited had labelled all appliances, although some labels were placed incorrectly, for example on the side and not on the front of a refrigerator. It was also clear that some of the shops visited actively used the energy label in their marketing.

Consumer awareness of Ghana's energy label is good, according to stakeholders. Energy efficiency education was non-existent prior to this project and many efforts were required to make the general public aware of the energy efficient refrigerators. The project mainly engaged the general public through media, and through a helpdesk. A helpdesk phone number was listed on flyers, billboards and adverts in local languages, and the project could notice the effect of adverts based on the number of people calling straight after: the hotline would receive up to 50 calls a day after a successful advert, mainly about the star rating. Consumer feedback helped to direct adverts to the radio stations that proved to draw the most people to stores for the trade-in rebate programme.

At the time of the terminal evaluation, most established retailers and a majority of importers have made refrigerator energy efficiency part of their normal business practice, and generally comply with S&L requirements. Market parties single out competitors that try to circumvent rules by smuggling in used refrigerators. Used refrigerators can still be found, in significant numbers, in the market, however, prices have gone up. This is exemplified by one of the participating retailer's shops located in Lapaz, right in the middle of the used refrigerator sellers. This store ended up also switching to the sale of new appliances because that became financially more interesting, after the average new unit price dropped to around 500-550 Cedi.

Financial status of the project

The project's budget as set out in the project document was already inconsistent and probably not a correct representation of actual commitments (see also section 4.1). Actual spending on the project is clear as far as GEF and UNDP funds are concerned, for which UNDP tracked spending by project component and with a comparison to the original (GEF and UNDP TRAC) budgets. Spending per component deviates substantially from the project budget in the project document, with changes ranging from -96% to +107%. This, in itself, is within the remit of project management and the project seems to have used funds where they were most needed, however, reporting on the changes made and the rationale for it is somewhat limited: Budget proposals and their rationale were presented on an annual basis to the project steering committee (for discussion and approval), which is good practice, however, multi-

annual tracking and reporting was limited. A comprehensive multi-annual budget overview, as part of annual budget and progress reporting, would have been a useful addition.

The tables below present the project budget by component as set out in the project document, actual spending by the GEF and UNDP TRAC, and the most likely actual spending by the MLF and the Government of Ghana, the parties that committed funds to this project. It should be noted that MLF and Government of Ghana co-financing was not tracked systematically during the project and was tracked retroactively by UNDP after the project's end. The reliability of that information is thus less than if it had been tracked at the time. Regular tracking of all spending would have been a better option, as this would also have allowed the project steering committee, as well as UNDP and the GEF, to follow that part of the project and take delivery of co-financing into account in their discussions and reviews.

Actual spending for the GEF and UNDP contributions reported here is based on UNDP financial records, via a comprehensive summary overview of Atlas records provided by UNDP. Funding by other parties is based on a co-financing overview prepared by UNDP for this terminal evaluation, reassessed by the evaluator. It is noteworthy that several stakeholders pointed to the Energy Commission having mobilised free publicity and media coverage for energy labels and refrigerator energy efficiency. This can represent significant sums of (in-kind) co-financing, however, as amounts were not tracked, it is impossible to monetise this contribution.

Co-financing amounts as reported by UNDP Ghana have been amended however, where those amounts are not calculated in accordance with GEF rules. There are three specific instances where amounts have been corrected:

- A large sum was reported that the Government of Ghana has committed to rebates, however, of which only a share was spent during the project. Only amounts actually spent should be counted, as other amounts can be withdrawn in future when plans change.
- A large sum of co-financing by MLF-funded projects was reported. However, there has been virtually no contribution of the MLF-funded HPMP project to this one. In fact, many of the activities that, according to the project document of this project, would be contributed by the MLF-funded project never materialized or were paid for by GEF funds.
- Large sums are listed as co-financing by contractors. These sums, however, are investments those contractors made in order to win and be able to execute the contracts that they bid for, and are normal investments by project-paid service providers, not co-financing.

In addition, it seems that UNDP is listing some of the cost of staff managing the project as co-financing, which is incorrect, as this should be covered by UNDP's management fee. The specific amount of this could not be established, however, the reader should note that UNDP's reported co-financing amount is probably inflated.

Project budget - planned

OUTCOME	GEF	MLF	UNDP Ghana	Ghana Gov't	Total
1 Structures and mechanisms for implementation of appliance energy efficiency standards and labels (S&L) strengthened	\$50,000	\$63,869	\$5,000	\$190,000	\$308,869
2 National testing, certification, labelling and enforcement mechanisms adopted	\$60,000	\$202,758	\$5,000	\$155,000	\$422,758
3 Increased consumer's and retailer's awareness and improved marketing of appliance EE standards and labels	\$150,000	\$0	\$10,000	\$460,000	\$620,000
4 Establishment of refrigerating appliance test facilities	\$300,000	\$0	\$10,000	\$240,000	\$550,000
5 Establishment of used appliance and ODS collection and disposal facilities	\$300,000	\$198,000	\$0	\$710,000	\$1,208,000
6 Development of efficiency program evaluation and	\$150,000	\$302,920	\$0	\$200,000	\$652,920



	monitoring capacity					
7	Conduct of refrigeration appliance rebate and exchange programs throughout Ghana that distribute at least 50,000 efficient appliances	\$460,000	\$400,841	\$120,000	\$617,080	\$1,597,921
8	Development of various feasible finance models for national scale follow-up of pilot rebate and exchange program	\$90,000	\$30,000	\$50,000	\$85,000	\$255,000
9	Project Management	\$162,727	\$0	\$0	\$342,920	\$505,647
	Not assigned					
	TOTAL	\$1,722,727	\$1,198,388	\$200,000	\$3,000,000	\$6,121,115

Project budget – spent

OUTCOME		GEF	MLF	UNDP Ghana	Ghana Gov't	Total
1	Structures and mechanisms for implementation of appliance energy efficiency standards and labels (S&L) strengthened	\$57,954				\$57,954
2	National testing, certification, labelling and enforcement mechanisms adopted	\$2,397				\$2,397
3	Increased consumer's and retailer's awareness and improved marketing of appliance EE standards and labels	\$311,113				\$361,113
4	Establishment of refrigerating appliance test facilities	\$453,476				\$453,476
5	Establishment of used appliance and ODS collection and disposal facilities	\$81,804	\$146,000			\$227,804
6	Development of efficiency program evaluation and monitoring capacity	\$149,588				\$149,588
7	Conduct of refrigeration appliance rebate and exchange programs throughout Ghana that distribute at least 50,000 efficient appliances	\$365,455		\$65,156	\$376,412	\$807,023
8	Development of various feasible finance models for national scale follow-up of pilot rebate and exchange program	\$106,639		\$129,405		\$236,044
9	Project Management	\$161,275		\$239,861	\$400,000	\$801,137
	Not assigned	\$12,121		\$100,000		\$112,121
	TOTAL	\$1,701,822	\$146,000	\$534,423	\$776,412	\$3,208,657

NB Spending includes 2014, as well as \$100,000 spent by UNDP during 2015 for project-related follow-up activities.

Project co-financing - planned and delivered

	Planned	Delivered	Notes
Government (cash)	\$2,200,000	\$376,412	The Government of Ghana committed 3 million Ghana Cedis for the project. The project document indicates this as distributed among many components, for example a significant cash amount for constructing a test lab. In the end, the Government of Ghana only contributed cash to the project's rebate scheme. The planned Government contribution to actual rebates was \$487,080. Taking into account the depreciation of the Cedi, this has been more than delivered. Contributions to all other activities, however, have not materialised.
Government (in-kind)	\$800,000	\$400,000	UNDP estimate of the value of staff time, housing the project, providing sitting allowances and other in-kind expenditures.



UNDP	\$200,000	\$455,000	This probably also includes UNDP cost for staff managing the project
MLF	\$198,000	\$146,000	MLF co-funding for the ODS pilot scheme has been partially delivered; the HPMP project had virtually no relationship with the GEF project and its budget should not be considered co-financing.
	\$970,388	\$0	
Participating Shops	\$0	\$50,000	Four retailers Somovision, Appliance Masters, Melcom and Hisense have committed budgets for publicity
TOTAL	\$4,368,388	\$1,427,412	

In addition to the various items mentioned earlier about the project's finances, these items are also relevant:

- The project document lists all four financiers of the project (GEF, UNDP, MLF, Ghana Gov't) as contributors to the rebate scheme; in the end, it seems that only the Government of Ghana contributed.
- The value of the Ghana Cedi changed considerably during the final two years of the project, which has reduced the US dollar value of Government of Ghana spending.
- Government of Ghana co-financing was listed as contributing to the whole of the project, including the purchase of equipment and consultancy. It appears that, during the project, the Government of Ghana decided to shift all its co-financing (except for in-kind support of the project) to the rebate scheme, out of apparent concern for the available budget being insufficient. The original endorsement or co-financing letter from the Government of Ghana, which might have shed light on this, is not part of the project's documentation, however, the Project Director was able to clarify this issue. It should further be noted that only a small portion of the overall amount of Government of Ghana co-financing was used for the rebate scheme, even when taking into account the depreciation in the value of the Cedi (approximately Cedi 1M, out of Cedi 3M committed).

4.3.1. Overall results (attainment of objectives) (*)

The project's main objective was to reduce Ghana's energy and ODS-related GHG emissions through the introduction of S&L for refrigerators and the demonstration of a product trade-in rebate scheme. For this, it set out to achieve 8 outcomes:

1. Structures and mechanisms for the implementation of appliance S&L strengthened: This outcome has largely been achieved, with important improvements in market interaction, consumer education and enforcement infrastructure. (5 points)
2. National testing, certification, labelling and enforcement mechanisms adopted: This outcome has been partly achieved. Good test and certification procedures were adopted, although not well described in legislation, and there has been some training of staff, though not sufficiently. Compliance with label requirements is good in shops working with the project, however, enforcement capacity at Ghana's customs and training of test lab staff remain weak. (4 points)
3. Increased consumer and retailer awareness and improved marketing of S&L: This outcome was well achieved, with good levels of consumer awareness and excellent involvement of retailers. This outcome provides Ghana with a strong foundation for the future. This outcome has also received important in-kind support from national parties. (6 points)
4. Establishment of refrigerator test facility: This outcome has partially been achieved. The facility was built, however, so late that the project could not benefit from this anymore. In addition, staff training remains weak and the lab is not embedded in a necessary supportive environment (e.g. participation in inter-laboratory comparisons). More work is needed to bring the test lab to an internationally accepted level of performance. In addition, this outcome was achieved mainly with GEF funding; co-funding for this equipment does not seem to have materialised. (3 points)
5. Establishment of used appliance and ODS collection and disposal facilities: This outcome has partly been achieved. Collection of old refrigerators was set-up, however, only in conjunction with the project's rebate scheme, and without a strategy to extend this to the much larger pool of regularly discarded refrigerators.

Dismantling of refrigerators has been arranged, however, in open-air facilities which probably leak considerable amounts of ODS. Disposal of ODS has not been arranged. The project arranged for an ad-hoc shipment of collected refrigerant to a destruction facility in Europe, through collaboration with another internationally funded project and not the HPMP project which was supposed to arrange for this. There is no set infrastructure for the destruction of more refrigerants, and there is not even a start of a strategy for the safe disposal of ODS-containing, bulky foams which break open when refrigerators are dismantled. (2 points)

6. Development of efficiency programme evaluation and monitoring capacity: This outcome has been partially achieved. There is no record of formal training of professionals, however, market monitoring has been developed and conducted in a systematic way from late 2014 onwards and there has been a further metering study to establish in-house energy demand of refrigerators. The project generated good-quality quarterly reports tracking the market, which are very helpful in assessing the progress made in transforming the market. This could be further strengthened by the description of a specific strategy with targets for market transformation, allowing management and political decision makers to assess whether efforts are on track and/or changes are needed. (5 points)
7. Conduct of refrigerator rebate and exchange programme throughout Ghana that distributes at least 50,000 efficient appliances. This outcome has not been achieved. The rebate scheme underperformed considerably, it lacks appeal to the general public and has limited potential to extend its scope and reach. Attempts to increase its reach have been limited to (unsuccessfully) increasing rebate amounts and extending rebates to new purchases (also with very limited impact). Other options such as loan guarantee schemes have not materialised. (2 points)
8. Development of various feasible finance models for national scale follow-up of pilot rebate and exchange programme: This outcome has not been delivered. There is no record of the project having developed these financial models or other forms of national scale-up of its rebate scheme. (1 point)

All outcomes have been rated on a 6 point scale, with 1 point representing no or severely lacking achievement of the outcome, 5 points representing achievement of the outcome as planned and 6 points representing better achievement than planned. On this scale the project overall scores 28 points, or 3.5 points per outcome on average.

The evaluation rating for the overall quality of project outcomes is moderately satisfactory.

4.3.2. *Relevance (*)*

The project focused on delivering cost-effective energy efficiency improvements in appliances, by focusing on one type of appliance with high ownership levels and high nationwide energy demand. This is a proven and effective way of addressing national energy demand and energy-related emissions, and an excellent fit with the objectives of the GEF Climate Change programme and its strategic objectives. The project included a minor component on delivering GHG emission reductions through the removal of ODS. This is a relevant side benefit of improving the quality of refrigerators, and supports the key climate change objectives.

The project was implemented with the core climate change objectives in mind and its impacts contribute directly to reducing Ghana's energy demand and energy-related emissions. The national government and national stakeholders are supportive of these objectives.

The evaluation rating for the project's relevance is Relevant.

4.3.3. *Effectiveness & Efficiency (*)*

The project has been largely effective in reaching its objectives. The market transformation of the refrigerator market has probably been achieved to a large extent, although there still appears to be a sizeable amount of smuggled, non-complying appliances being sold in Ghana (according to stakeholders, and also suggested by the large volume of non-compliant refrigerators intercepted at ports). The nature of illegal imports makes it difficult to substantiate such hunches with data, however, which is insufficient to conclude that a project of this size and duration has been partially effective. Many of the project's intermediate objectives (outcomes) have been only partially achieved, such as

the project's rebate scheme (implemented, however, reaching a much lower number of customers than planned, despite increased rebate amounts) and the test laboratory (built, however, too late and with insufficient training of staff). Since several of the project's most expensive components under-delivered significantly, and Ghana was already on its way to transform the market for refrigerators (through its ban on the import of used refrigerators), it is impossible to say with certainty to what extent the project has contributed effectively in reaching its overall goal. It is clear, however, that the project achieved and exceeded its energy efficiency objective and greatly helped reducing Ghana's GHG emissions from refrigerators, beyond expectations (See section 4.3.7, impact, for details). On this overarching objective the project performed well and it has managed its resources effectively to achieve this result, and this warrants a high rating of effectiveness.

There are some issues, however, with the project's efficiency. The project has spent a large share of its resources on activities without a substantial contribution to its overall goal. This applies in particular to the rebate scheme and the recovery and dismantling of old refrigerators, both of which took up a lot of time and resources for a small overall impact during the project and no strategy for large-scale continuation afterwards. The project has definitely not been cost-effective from a GEF-perspective, using GEF- and UNDP TRAC-funds, however, virtually none of the pledged co-financing (with the exception of the project's rebate scheme, which received around 1/3 of the pledged Government of Ghana co-financing). Even though results achieved are very cost-effective from a GEF point of view, part of the project set-up was that other partners would contribute substantially to the project and this needs to be factored in to a rating on efficiency as well.

Based on this, the evaluation rating for the project's effectiveness is Highly satisfactory (HS) and for its efficiency Marginally unsatisfactory (MU).

4.3.4. *Country ownership*

The project was well received within the country and it is well embedded in and supported by the Government's institutions and private sector stakeholders. The project was implemented by the national Energy Commission, a dedicated state agency for energy efficiency policy, and supported by the relevant Ministries. The project also received important and extensive in-kind support from various parts of Government and from Ghanaian market parties.

The project fits with Ghana's strategy of improving energy efficiency through a mix of policies, and builds on its earlier work on the energy efficiency of air conditioners and light bulbs. Policy makers support these policies, exemplified by the Parliament's adoption of energy efficiency legislation. Market parties, hesitant at first because of uncertainty whether the Government would be serious about implementation of the legislation linked to this project, adopted and embraced the project's objectives and are supportive of its wider goals.

4.3.5. *Mainstreaming*

The project contributed to mainstreaming appliance energy efficiency and the use of S&L in Ghana. Appliance energy efficiency and S&L were not new to Ghana, as it had already implemented S&L for light bulbs and air conditioners, and already had a dedicated Government agency for energy efficiency policy (the Energy Commission). The project, however, helped cementing appliance energy efficiency as a main factor in the appliance retail sector and helped educate the wider public about appliance energy efficiency.

The project may also have helped mainstreaming appliance energy efficiency legislation within Government, although observations are less clear for this. The Energy Commission seems to have developed a strong position in policy making for energy efficiency, however, was well established already before the project. The Government of Ghana enacted S&L legislation, however, had also done so already several times before this project and the project may have made little difference on the Government's interest in pushing forward appliance energy efficiency. The project has not succeeded in convincing a non-related Government agency like the customs agency to give priority to energy efficiency legislation.

Overall, the project seems to have contributed small steps to further mainstreaming appliance energy efficiency in Ghana.

4.3.6. Sustainability (*)

Sustainability of the project's direct results, energy and emissions reductions through the replacement of a limited number of old refrigerators by new ones, is excellent. 7,200 households that used to have an old refrigerator now have a new one, and they are very unlikely to switch back to an old one after the project.

The more important overall objective of the project, however, was a transformation of the market. There is a lack of data about Ghana's appliance market before and, in particular, after the project, and it is impossible to say whether the market has shifted towards new, labelled products in a way that makes shifting back to selling imported used refrigerators unlikely. Information gathered during this evaluation suggests that main retailers have firmly moved towards selling new, labelled products. There are also indications (stakeholder comments, and also the volume of non-complying refrigerators being captured at Ghana's ports) suggesting that there still is substantial smuggling of used refrigerators into Ghana, and that this still makes up an unknown but sizeable portion of the market.

Enforcement of S&L legislation, crucial to secure that the market keeps moving towards selling products meeting S&L requirements, is not yet fully developed. The Energy Commission has conducted shop surveys to enforce labelling requirements, which is an important step. This, however, does not cover unofficial sales of smuggled appliances. Customs checks at the port are still relying on the Energy Commission arranging its own checks, which is not a long-term sustainable solution. Besides, the Energy Commission's office covers only one port (the main one), and not various other entry points for imports. Product compliance also depends on importers and retailers correctly indicating the energy performance of products, and on compliance testing to check this. Issues with the newly constructed test lab imply that Ghana may not be able to remove products from their market when there is a suspicion of incorrect data, as there is a concern that test results from the new test lab will not stand up to scrutiny.

The project collected ODS containing materials from old refrigerators and found ways to safely destroy some of this, however, large amounts of ODS containing materials are lying in open-air depots in Ghana, gradually deteriorating and probably leaking small amounts of ODS every day. Equally important, there is no mechanism in place, or even in preparation, to safely dispose of the much larger stream of old refrigerators discarded every day when these break down and need to be replaced.

- Overall likelihood of risks to Sustainability: Moderately likely (ML), primarily as a result of significant financial risks (lack of funds for continuation of critical activities).
 - Financial resources: Moderately unlikely (MU). This is primarily because funding for enforcement of import requirements, for the safe disposal of ODS-containing materials and for training and quality improvements of the test laboratory are critical for the sustainability of the project's results and are not secured, although discussions are on-going to provide a stable infrastructure for compliance checking and enforcement.
 - Socio-economic: Likely (L). There are no indications of significant socio-economic risks to the project's results. On the contrary, the socio-economic embedment of the project appears strong.
 - Institutional framework and governance: Moderately likely (ML). There are no major risks visible to the project's results. There are, however, smaller risks related to insufficient commitment of the Customs agency to the project and some parts of the S&L legislation being not sufficiently specific.
 - Environmental: Likely (L). There are no foreseeable environmental risks that could harm the project's results.

4.3.7. Impact

The impact of the project is assessed following the new GEF-methodology as set out in "Calculating Greenhouse Gas Benefits of the Global Environment Facility Energy Efficiency Projects, version 1.0" (STAP, March 2013), Standards and Labeling module, and with a recreated baseline and targets as described in section 3.6.

The project's main objective is to create "an accelerated phase out of inefficient, obsolete and inappropriate refrigerating appliances" and to transform the market through minimum energy performance standards and energy labels. Based on this, reconstructed targets for the **project objectives** can be reconstructed as follows:

- Market share of imported new refrigerators of at least 80% (and maximum 20% used refrigerators)
- Reduction in average annual energy demand of 60 GWh/a, due to market transformation (including a rebate program) and a corresponding reduction in GHG of 34 kton/a
- 50,000 old refrigerators traded in and environmentally sound recycled through a rebate program.

Targets for the **project goal**, in line with these objectives, are as follows:

- Direct project emission reduction of 177 kton CO₂ equivalent, of which 55 kton through energy demand reductions and 122 kton through CFC (ODS) removal
- Direct post-project emission reduction of 1,230 kton CO₂ equivalent, all through energy demand reduction.

Project monitoring reports show the following high-level impacts of the project:

- Label compliance in shops (determined through inspections by the Energy Commission of randomly selected shops) ranges from 77% to 93% (source: Energy Commission Compliance Monitoring Report, 1st, 2nd, 3rd and 4th quarter 2015). Although a national (sales-weighted) average has not been established, highest compliance rates were observed in the populous greater Accra region, and it seems fair to say that compliance rates across the country are over 80%, even factoring in that there may be smaller-scale illegal trading (of smuggled products) going on. Highest compliance rates are reported later in 2015.
- The average energy demand of refrigerators in households dropped from approx. 1,140kWh/a to approx. 740kWh/a (source: Monitoring survey pilot, 2014). This represents a significant drop in average energy demand, through a combination of the introduced ban on the import of used products, energy standards and labels, the rebate programme to exchange old refrigerators for new ones and consumer awareness campaigns targeting the energy efficient use of (already installed) refrigerators by the general public.
- Appliances sold, on average, have an energy rating well above the minimum performance level required, with the 3 star class having highest sales levels, and even some sales in the most ambitious 5 star class. The star rating, on average, was 2.3 stars, or roughly 25% more energy efficient than the minimum performance level (for reference: the average energy performance is comparable to between the A-class and B-class level in the EU). The average energy demand for new refrigerators was estimated to be around 350kWh/a (source: project communication). This represents an important achievement in the transformation of the market in Ghana.
- Market data indicates that price premium for 2 star appliances is less than 200 Cedi, for the most common type of refrigerator (fridge-freezers, source: Compliance Monitoring report 4th Quarter 2015), with price premiums for other appliance types and further efficiency steps varying. The availability of products of various energy label star levels, with a range of process, points to an established market for energy efficient products, and is also an important indicator of a successful market transformation.
- Replacement of old appliances for new ones, through the rebate scheme, amounted to only 7,257 refrigerators, far below the amount planned for the project. These refrigerators were transported to recycling facilities for safe disposal. The project further collected approx. 25,000 illegally imported used appliances for safe disposal, bringing the total to around 32,000. Recycling of collected refrigerants, however, has not been structurally arranged, and there is no recovery of ODS from foams and no plans to address this in future. This implies that only half of the ODS in refrigerators can be safely collected, and that the safe destruction of that ODS has not been fully arranged. The emission reduction from ODS removal is thus much lower than targeted.

Calculation of Energy and GHG impacts

For this evaluation, Energy and GHG impacts of the projects have been calculated, using a simple stock model developed for the reconstruction of baseline and targets, however, with project results as input variables for the calculation. The input variables used (differences from the baseline values are in bold) are:

1. Length of analysis period: 13 years (3 years for project period, plus 10 years post-project impact period)
2. Useful technology lifespan: 10 years
3. Fuel type and emission factors: electricity, 0.56 kg CO₂/kWh* (rounded, and no compensation for T&D losses as these are typically already included in a grid-average CO₂-factor)
4. Target technology: imported new refrigerators, meeting MEPS **and with an average energy performance of 2.3 stars (approx. 25% better than standard), and the average annual energy demand of new refrigerators around 350kWh/a.**
5. Displaced technology: a mix imported new refrigerators (no MEPS) and imported used refrigerators, as well as a limited number of old refrigerators in use. Assumed energy demand of imported high-end new refrigerators (approx. 10% market share) 320 kWh/a*; of imported low-end new refrigerators (approx. 15% market share) 635 kWh/a*; of imported used refrigerators (approx. 75% market share) 870 kWh/a* (the project document does not specify the average energy demand of imported products. These energy demand figures are copied from the Kenya project document which estimated energy demands based on global market trends and typical energy demand in exporting countries; market shares have been estimated based on market share estimates presented in project documentation). **Assumed energy demand of old refrigerators in use has dropped, and the combined average of old (pre-project) refrigerators and new sales is reported to be 740kWh/a by the end of the project; this would represents a reduction in the energy demand of old (pre-project) refrigerators of 34%, through education about better use and maintenance. Energy saving impacts from better refrigerator use and maintenance are poorly researched, however, impacts exceeding 20% are not known internationally (see Home Energy Magazine, <http://www.homeenergy.org/show/article/id/914>, for some research setting out a maximum improvement range). Since in-home measurements are known to have complications, a more conservative 20% improvement rate (for the energy demand of old refrigerators) will be used to assess impacts of the project.**
6. Stock of refrigerators in use in base year: approx. 2 million units
7. Stock growth rate: approx. 100,000 units per year (the project document does not discuss stock growth; based on trends observed in the country over the years leading up to the project, it is reasonable to assume that appliance ownership is growing and it was assumed, in the absence of further data, that half of annual sales would be for the replacement of old refrigerators, and the other half would be new additions to the stock).
8. Annual sales of technology in base year: approx. 200,000 units* (the project document does not specify an estimated annual sales level; based on stock and lifespan, sales must exceed 200,000 units)
9. Sales growth rate: none
10. Annual reduction in energy consumption for the target technology: 1.5%* (the project document does not project an annual increase in energy performance of refrigerators in the absence of S&L or a project. It is reasonable to assume, however, that global markets for new products would continue to improve energy efficiency as they have done for many years without the project, approx. 1.5% p.a.)
11. Annual reduction in energy consumption for the displaced technology: approx. 1.5% p.a.* (same as for the target technology. In addition, it is reasonable to assume that the efficiency of imported used products would increase by a similar rate as average efficiencies in the exporting countries were following (or determining) this global trend).
12. Year the standard is put in place: year 2 of the project
13. Percent compliance with new standard: **85% (based on reported compliance rates), further dropping to 10% in the year after the project**
14. Percent compliance with ban on the import of used refrigerators: **85%* (based on reported compliance rates), further dropping to 10% in the year after the project**
15. Percent compliance with ban on the import of used refrigerators: 40%* (without project)

In addition, the rebate scheme removed 7,257 old refrigerators from the stock before their replacement was due, and supported their replacement with new products. This resulted in additional annual energy savings of around 790kWh/a (difference in average annual energy demand between old stock, at 1,140kWh/a, and new sales, at 350kWh/a), for a period of several years. There is no country-specific data about the help estimate the number of years by which the rebate scheme brought forward replacement decisions. Rebate schemes are known to bring forward the replacement of old products, however, not by the full technical lifespan of products as consumers commonly trade-in products that are at least approaching the end of their useful life. In the Ghanaese context, where repairing old refrigerators is more common than in many other countries, the resulting reduction in lifespan for old refrigerators may have been up to 10 years in some cases, however, a life span reduction of 5 years seems to be more prudent given the range of old products traded in, between fairly well working and already falling apart. As a result, the rebate scheme resulted in an overall energy demand reduction of 5.7GWh annually, and 29GWh cumulatively, with a resulting reduction in GHG emissions of approx. 16kton CO₂. Note that this amount is already included in the overall energy demand reduction achieved (through increased sales of new appliances, as well as reduced energy demand of old stock), and will thus not be added to the overall impact calculation to avoid double-counting.

The project further set out to reduce the emission of CFCs (as refrigerants and as blowing agent for the insulating foam of refrigerators). 7,257 old refrigerators were captured through this route and additionally 25,000 old refrigerators were intercepted at ports. Refrigerants from these 32,257 refrigerators were captured, although partly in open-air facilities with some leakage, and ODS contained in foams were not captured (one facility stores foams sealed, the other unsealed in open air). Safe destruction of refrigerants captured has not been systematically arranged, however, a good ad-hoc solution was found for a first batch of ODS and for this impact calculation it is assumed that UNDP and the Energy Commission find a sound solution for remaining batches as well (possibly through the HPMP project). It is assumed (based on project estimates) that 0.28 kg refrigerant per unit is captured, representing 0.85tCO₂e per unit. This results in a total impact of 27 kton CO₂-equivalent, which is additional to the energy-related GHG impacts of the project.

The resulting energy consumption data are set out in the table below, for scenarios without the project (baseline), the project as it was designed (target) and results achieved (result).

	Base year	Target year		
		Base case	Target	Result
Remaining pre-project old stock	2,000,000	1,700,000	1,650,000	1,693,000
Annual energy demand (kWh)	1160	1160	1160	928
Imports - new high-end				
Market share	10%	20%	40%	76%
Annual energy demand (kWh)	320	306	306	306
Imports - new low-end				
Market share	15%	20%	40%	12%
Annual energy demand (kWh)	635	607	607	607
Imports - used				
Market share	75%	60%	20%	15%
Annual energy demand (kWh)	870	831	831	831

The resulting energy demand and energy-related CO₂ emission figures are as follows:

	Base year	Target year		
		Base case	Target	Result



Total annual energy demand (GWh)	2,320	2,420	2,359	1,968
Total CO ₂ emissions (kton)	1,299	1,355	1,321	1,102

A comparison of targets versus results shows:

Target	Result
Market share of imported new refrigerators of at least 80%	Market share of imported new refrigerators is over 80% (6 points)
Reduction in average annual energy demand of 60 GWh/a, due to market transformation (including a rebate program) and a corresponding reduction in GHG of 34 kton/a	Reduction in average annual energy demand of 450 GWh/a, due to market transformation and a corresponding reduction in GHG of 250 kton/a (6 points)
50,000 old refrigerators traded in and environmentally sound recycled through a rebate program.	7,257 old refrigerators traded in through a rebate program; 32,257 old refrigerators and environmentally sound recycled. (3 points)
Direct project and post-project emission reductions of 1,277 kton CO ₂ e, of which 122kton CO ₂ e through CFC (ODS) removal	Direct project and post-project emission reductions of 3,700 kton CO ₂ e, of which 27kton CO ₂ e through CFC (ODS) removal (6 points)

Note: The results column include a rating for the overall goal and each of the objectives of the project, using the same 6-point scale as for the outcomes of the project. These goal, objective and outcome ratings together result in a rating for the overall performance of the project.

These impacts represent impressive results of the project, far exceeding its (recreated) objective. It should be noted that impacts derive almost exclusively from introducing and implementing legislative instruments (a ban on importing used products, and energy standards and labels), with important accompanying measures such as consumer awareness raising and working with market parties as well as from consumer education about better use and maintenance of old appliances (almost 50% of total impact each). Related measures in the project, such as the safe disposal of ODS and a rebate scheme for the early replacement of old refrigerators, contributed only marginally to this overall objective.

Measurements of the impact of better use and maintenance have higher uncertainties than those for the legislative measures, since these measurements have only been conducted once, and these are intrinsically difficult measurements with higher margins of error. Each of the impacts (from legislative instruments, and from better use and maintenance) on its own already exceeds the project's target, however, and the combination certainly does.

A further impact not expressed in GHG emissions calculations is Ghana's capacity to implement appliance energy efficiency requirements. Ghana had proven to be able to do so already, and this project has strengthened its capacity to implement and enforce legislation and even more its capacity to successfully engage with market parties in rolling out such legislation. This is an important foundation for future work on energy efficiency and the reduction of GHG emissions.

Based on these observations, the project's impact is rated as follows:

- Environmental Status Improvement: Substantial (S)
- Environmental Stress Reduction: N/A
- Progress towards stress / status change: N/A

5. Conclusions, Recommendations & Lessons learnt

This was a good project, because it was the right project at the right time, focused on the right parties in the right context. Simply being the right project in a country that welcomed and embraced its objectives sets this project apart from many other GEF projects. Every party involved, and in particular the GEF executing and implementing agencies, deserve praise for recognizing what was needed in the country at that time and setting out a concerted effort, binding together (a lot of) national work with international support to make that happen. There are also, however, many technical issues on which the project design and formulation fell short: a poor and erroneous baseline description for this project; not linking project activities with (planned and already implemented) national policy developments; incorrectly listing (a large part of) another internationally funded project as a source of co-funding; not presenting useful baseline and impact indicators for the project; reporting incorrect financial information on PPG spending to the GEF secretariat; and ignoring the timeline of Ghana's legislation's implementation dates for the planning of project activities. Most of this could have been concluded through a careful reading of the project document at the time it was conceived and approved, however, that doesn't seem to have happened.

Implementation of this project was characterised by an enthusiastic and committed project team, which recognised the importance of the project's overall goal and was eager to help Ghana improve on refrigerator energy efficiency in any way it could. The project's executing partner, the Ghana Energy Commission, was a great host for this project: well placed within Government, with the mandate to act, committed and capable to drive appliance energy efficiency forward. These are important assets that tremendously helped this project, and stakeholders generally view the project as a success. The project successfully assisted Ghana in rolling out its S&L legislation for refrigerators and resulted in important reductions in electricity demand and related GHG emissions. The successful way in which S&L was introduced with the help of this project, with a lot of attention for working with the supply chain and educating consumers, provides a good example for other countries wanting to curb energy demand and GHG emissions. This success also creates the foundation for expanding Ghana's approach into other appliances with high-energy demand, for example other household appliances, televisions and electric motors.

The project included several dedicated components to enhance its impact, in particular a rebate scheme to speed up the replacement of old refrigerators with new ones and a pilot for the removal of ODS from old refrigerators, which were not successful, with the rebate scheme drastically scaled down in ambition level and then still not delivering, and the removal of ODS being only half implemented. One important lesson of this might be that S&L projects are best served when they focus fully on the core objective of transforming the market through S&L with supportive measures, which in itself can generate impacts more than sufficient for any GEF project. One S&L related component of the project, the construction of a test laboratory, wasn't fully successful either: The test lab was semi-completed only at the very end of the project, far too late to be useful for its intended contribution to verifying compliance with S&L requirements.

Ghana seems, overall, to be well underway in transforming the market for refrigerators and freezers, through its ban on the import of used products and the S&L that were implemented. Consumer and retailer awareness of refrigerator energy efficiency and energy labels seems strong enough to continue without international help and the market sector has picked up on the advantages of marketing more efficient products. The project gathered data demonstrating the market transformation (although this was not included in its formal reporting), however, hasn't yet analysed this data to demonstrate to Ghana's parliament how much its forward-looking decisions to adopt legislation – it was the first country in West Africa to proceed with energy efficiency legislation, years ahead of others – is benefiting the country, and UNDP and the Energy Commission are recommended to analyse and clearly document all impacts of this market transformation to showcase its success and prepare the ground for further energy efficiency initiatives. This would probably benefit Ghana, through feed back to Ghana's parliament how much its forward-looking decisions to adopt legislation – it was the first country in West Africa to proceed with energy efficiency legislation, years ahead of others – as well as neighbouring countries considering similar steps.

Implementation management for this project was characterised by forward thinking, collaboration and a strong – and commendable – focus on working with stakeholders. These are all important assets for this project, and a similar focus would benefit any future project. More attention is needed for maintaining and updating an accurate project strategy and strategic framework and reporting on progress towards overall targets. Although the project took care to discuss strategic options and decisions in its steering committee, it failed to amend its strategic results framework when doing so, resulting in a framework that only partially represented what was going on, and without indicators to measure success. A project final report was cancelled because the GEF requirement to do so was withdrawn, however, this also resulted in there not being a single document or narrative laying out what the project had done and achieved – and it is much harder to claim success when that success is only visible in snippets of information hidden in a variety of sources.

The two main threats to the long-term success of Ghana's achievements in refrigerator energy efficiency are risks of lack of enforcement of regulations. At the moment, the Energy Commission is supporting Ghana's Customs with a dedicated office at Tema port, to check imported refrigerators for compliance with regulations. That, however, is a temporary situation, and there is no long-term funding for this support. It also seems only logical that, long-term, Customs would verify compliance with these regulations for imports as it is doing for all other imports. There is, however, no long-term strategy to ensure that Customs is properly set up to perform this role. If the Energy Commission's support to Customs would stop without a firm transition of this role to Customs, market transformation in Ghana would not just stop, it would quite likely also roll back some of the progress made and possibly undermine the supportive landscape for future energy efficiency initiatives. UNDP and the Energy Commission have, after the end of the project, initiated discussions with Customs and secured their commitment to develop a long-term solution. This is commendable, however, more action is needed to make sure that this commitment also translates into strong enforcement at ports.

In addition, product compliance testing is not on a secure footing in Ghana. A test laboratory was constructed, however, without sufficient staff training and without embedding this laboratory in a supportive network of other test laboratories. So far, test results generated by this lab have not been challenged, however, the lab's own staff is worried that their results would not hold up in legal proceedings – and probably rightly so, given the set-up. It can only be a matter of time before an importer or retailer challenges test results, and if a court finds that the lab does not provide legally binding tests, Ghana's whole enforcement strategy might tumble, leaving the Energy Commission with, effectively, an empty shell.

The project's overall environmental impact adds up to approximately 3,700 kton CO₂ equivalent direct impact. This differs from the result reported by UNDP, which based its calculation on the direct impact of the project's rebate scheme and ODS removal pilot (and made some incorrect assumptions in that calculation), whereas this evaluation uses the (relatively) new GEF methodology designed for S&L projects. This impact far exceeds a reasonable target for the project and points to an excellent value for money for the GEF. The lack of delivery on co-financing in this project, partly due to a design error (through the inclusion of a large amount of MLF-funding as co-funding without a good integration of that funding in this project), is a concern. The project still has an excellent cost-effectiveness from a GEF-perspective, however, it is worrying that so much co-financing disappeared during the project, without this having consequences for the spending of linked GEF-funds.

This evaluation has resulted in the following recommendations for UNDP and the GEF, for this and future projects:

- Specifically for this project, a review of budgets for and spending on consultancy and consultancy rates budgeted and contracted are needed, given the multitude of financial issues observed on this project.
- Improvements are urgently needed in UNDP and GEF project review approaches with better checks on the internal and external consistency of project strategies and budgets.
- Improvements are also needed in how project strategies are developed, with more attention for how a policy project will interact with existing legislation and institutions, the planning of actions in time and dependencies between actions of the project and of others, presented in a Gantt-chart or a similar tool.

- Better supervision is needed to make sure that projects adapt their strategies when circumstances change, with amended targets and monitoring, and not just change activities in an ad-hoc way.
- It is urgently needed to create a solution for ODS-containing materials collected and not disposed of during this project.
- Urgent action is also needed to make enforcing S&L legislation and a ban on importing used refrigerators a priority for Ghana's customs agency and to make sure that the test laboratory has the staff training and other infrastructure needed to withstand legal scrutiny of its test results.
- A summary overview of the project and its market transformation impact would be greatly beneficial to policy makers in Ghana and other countries to learn more about the successes that can be achieved with S&L projects. Information is available, however, it is neither well accessible nor comprehensively presented.
- Other countries contemplating a similar project should develop approaches to secure the involvement and buy-in of Customs early on in the project and develop alternative or additional enforcement strategies if needed, as well as secure the long-term means needed to enforce importing requirements.
- Product energy efficiency projects are probably stronger when to focus primarily on transforming markets through a combination of legislative measures (such as a ban on importing used products, and S&L) and related supply chain and consumer focused activities. Additional activities, such as early replacement schemes and ODS pilots, seem to diffuse attention and cost disproportionate shares of a project's budget, and are probably best only included if they contribute directly to the core market transformation objective.
- Continued consumer education about the benefits of energy efficient appliances and regional collaboration would help grow impacts from this project.
- There is good potential to extend Ghana's S&L approach to other types of appliances, in particular the implementation of new S&L the Energy Commission is currently developing. This project's experience in involving market parties and reaching the general public will be essential for ensuring that those new S&L reach their potential impact.
- Best practices demonstrated by this project include the importance of building a project strategy on an internationally developed policy framework; developing alternative approaches to engage with non-government stakeholders; training of staff of market parties involved in the project's topic; and multi-channel consumer education.

Detailed recommendations and lessons learnt are set out in the following sections.

5.1. *Corrective actions for the design, implementation, monitoring and evaluation of the project*

Project strategies and documents need careful reviews, including checks on internal consistency and whether baseline information is complete and has been adequately addressed in the project's strategy. Basic financial crosschecks should be part of this review, to avoid situations where budgets are not aligned with a project's strategy and/or do not properly represent the true nature of co-financing sources. It is advisable that UNDP and GEF reviews focus much more on such topics, using external expert reviewers if needed. For this project, as for many other ones, many issues could have been avoided if proposed strategies and budgets had been reviewed better, which would have led to a much better project.

Specifically for this project, UNDP Ghana should conduct a full financial review of financing and co-financing for local and international consultancy; to clarify why the project initially proposed inflated consultancy rates (for all consultancy in the PPG, and for local consultancy in the project document); which rates were paid in the end; whether any of this has been co-financed as was planned, and if not why not and why was this not reported; and why these inflated rates were not picked up on in internal reviews. This review should be done as a matter of priority, as financial management on this project sheds doubts on UNDP Ghana's capacity to responsibly manage the funds entrusted to it.

Project preparation stages need to invest more time and effort into developing a detailed strategy for a project, and project documents need to better reflect these. Part of this should be a better mapping of existing legislation and the institutional landscape of a new project, and setting out how the new project will build on this and where the real

risks are. This needs to come with the acceptance that projects cannot eliminate all risks and that there are unknowns when developing a project, and that the proper approach to that is not to ignore unknown circumstances and risks, but to monitor them and develop an adequate response during project implementation.

Project strategies need to be time-sensitive, with a calendar and hierarchy of activities set out. Currently, logical frameworks only ask for an overview of all activities to happen within a 3 or 4 year period, which is not a SMART approach to project management. At the least, project documents should include a Gantt chart or similar overview of activities, ideally also showing dependencies between activities and of outside events, and plans to manage the timing of activities in response to changing external and internal time lines. Project managers and supervisors should be trained in using basic project time management tools.

Project supervisors, such as UNDP country offices, should be aware of the need to check and update project strategies and logical frameworks when the situation in the country changes – or simply if that turns out to be different than set out in the original project document. All too often, project activities are changed in response to a reality that deviates from what was planned in an ad-hoc way. That is not good adaptive management, as it leaves out essential elements such as considering how a change in activities matches the rest of the project; what the desired outcomes of those changes are; and how progress can be monitored. Project supervisors need to make sure that projects update their strategy when they need to change activities, and that this is adequately documented and reported.

5.2. *Actions to follow up or reinforce initial benefits from the project*

Urgent action is needed to make enforcing S&L legislation and a ban on importing used refrigerators a priority for Ghana's customs agency and to make sure that the test laboratory that the project built can withstand legal scrutiny of its test results. The lack of a long-term solution for the Customs agency not fully enforcing this legislation threatens to undermine the country's success in transforming its appliance market, as does the risk that courts will invalidate the results generated by the test laboratory built by the project. The Energy Commission is in the process of training additional staff to work at the port, however, that does not provide long-term financing for this additional staff nor ensure that the Customs agency will take up enforcement of S&L as part of their normal operations. It is essential that the Energy Commission, possibly with UNDP support, develops sustainable strategies for both issues as soon as possible.

Action is also needed for the safe disposal of collected refrigerants and ODS containing foams. There is currently no sustainable solution for the safe destruction of ozone-depleting refrigerants nor for ODS-containing foams recovered from discarded refrigerators, and the longer this remains the case, the more ODS will leak into the environment. UNDP should urgently take up this issue as part of its HPMP project, to ensure that safe disposal options are created.

Continued consumer education campaigns would be helpful to remind the general public of the benefits of energy efficient appliances and continue to create momentum for further market transformation. Without continued consumer outreach, interest in energy efficiency may gradually slip and impacts may, over time, reduce or even disappear. Long-term consumer education could take many forms, for example by integrating education about energy consumption in school curricula.

If other West African countries could be encouraged to develop legislation similar to Ghana's, for example through ECOWAS/ECREEE collaboration, some loopholes for smugglers and importers of non-complying products could be sealed. A regional approach would shut off the option to import sub-standard units into Ghana marked for re-exporting to neighbouring countries. It might also allow for regionally coordinated compliance tests of refrigerators, with the larger volume of work providing more resources for the test laboratory to upgrade staff training and the quality of testing.

5.3. *Proposals for future directions underlining main objectives*

There is good potential to extend Ghana's S&L approach to other types of appliances. Ghana's Energy Commission and Ministry of Power are receiving funds from the US (Millennium Challenge Compact II) to develop standards for Motors, Fans and TVs, however, this budget covers the development of standards only, and not their implementation. Projects supporting S&L implementation, if well designed and implemented, can make a huge difference in the eventual impact of S&L.

Another option would be to revisit Ghana's existing S&L for air conditioners, with a view to updating those S&L as well as educating the (air conditioning using) public about good practice use, in particular about selecting useful temperature settings. Issues related to this, which could be covered in a project, are the safe recovery and disposal of refrigerants used in air conditioners and gaining access to a test facility for compliance testing. Since air conditioner test facilities tend to be large, expensive and requiring a substantial level of technical skills, it may be necessary to find a regional solution for air conditioner testing rather than build a laboratory in Ghana.

5.4. *Best and worst practices in addressing issues relating to relevance, performance and success*

This project seems to have built its strategy on a framework for S&L that was developed by an international NGO expert group (CLASP). This is a smart strategy, which has provided this project with a good foundation for achieving impacts. This and similar policy frameworks are a reflection of many years of policy development and include many lessons and avoided pitfalls that often turn out to be major stumbling blocks for projects, and it is recommended that development agencies use such frameworks where possible. International frameworks need to be carefully adapted to the national situation, based on a detailed assessment of the country's baseline, to also be ready for a successful local implementation.

The project developed an approach of regular informal consultations with stakeholders as well as through the project steering committee, in which stakeholders were involved. This is a good and effective alternative to a more formalised collaboration, possibly even more effective as commercial and government parties do not always speak the same language and do not always operate at the same pace. Developing and implementing tracking tools for stakeholder views of and involvement in the project, for which stakeholder assessment tools provide a good basis, can further reinforce this approach.

Projects need strategies to engage with government agencies not directly involved in the project. This project, for example, relied heavily on the customs agency freeing up capacity to enforce new legislation. This project temporarily mitigated the Customs agency's lack of commitment by opening its own inspection office, however, developing a permanent solution needs to be part of a project's strategy for long-term success.

The project built an effective collaboration with market parties, primarily appliance retailers, which has been essential in transforming the market for refrigerators. Training of retailer staff and dissemination of information were crucial elements in achieving this good result, and should be considered for other market-focused projects. Providing staff training and dissemination of information early on in a project, before there is a legal requirement in place, could further strengthen this approach.

The project reached out extensively to consumers and educated them about S&L and the benefits of energy efficient appliances during the project. It used a customised approach for this, using a variety of channels and even languages to reach out to various segments of the market. This approach would ideally be set out in a media strategy, which can be managed and adapted as early results of outreach activities are received, and taken up as a priority from the start of implementing a project.

6. Annexes

6.1. Strategic Results Framework (Project logical framework)

Strategy	Indicators	Baseline	Target	Sources of Verification	Risks and Assumptions
GOAL: To reduce Ghana's energy-related CO ₂ and ozone depleting substance (ODS) emissions	Cumulative amount of GHG reduced in kilotons of CO ₂		CO ₂ reduction- 251.6 kilotons comprising: - 129.6 kilotons CO ₂ abated from energy savings - 122.0 kilotons CO ₂ abated from CFCs (ODS) removal	Project implementation reports GHG inventories and reports to UNFCCC	The policy / institutional / regulatory framework in Ghana is fully supportive of the project objectives
PROJECT OBJECTIVE: To improve the energy efficiency of refrigeration appliances in Ghana through the introduction of energy efficiency standards, and demonstration of equipment turn-in and replacement program	Reduced consumption of electricity by households, institutions and commercial firms for refrigeration Tons of CO ₂ emissions reduction	Large number of refrigeration appliances with poor energy efficiency and ozone depleting substances in Ghana	Purchase of 50,000 energy efficient refrigeration appliances by year 3 of project implementation ² Energy savings – 216,000 MWh ³ CO ₂ reduction- 251.6 kilotons	Refrigeration appliances imports / retailers survey Project implementation reports	The policy / institutional / regulatory framework in Ghana is fully supportive of the project objectives Strong involvement for project from retailers and consumers of refrigeration appliances Project is implemented as per plan
OUTCOME 1: Structures and mechanisms for appliance energy efficiency standards and labels (S&L) strengthened	Policy / institutional / regulatory framework on energy efficient refrigeration appliances	Poor policy / institutional / regulatory framework	Policy / institutional / regulatory framework on energy efficient refrigeration appliances is fully operational	Survey of major stakeholders	Major stakeholders are willing to support the project objectives
Output 1.1: S&L implementation regulations reviewed through stakeholder consultations	Stakeholders engaged in consultations	None	Majority of stakeholders fully review S&L implementation regulations	Stakeholder consultation reports	Stakeholders actively participate in the review of S&L implementation regulations
Output 1.2: Consulting and advising provided to enforcement authority staff and government ministries, departments and agencies (MDAs),	Enforcement authority staff and provided with consultancy and advisory services	None	Enforcement authority staff and MDAs involved in the S&L program build adequate capacity to implement the program	Performance Reports on enforcement authority	Enforcement authority staff and MDAs involved in the S&L are willing to

² 38.9 kilotons based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

³ 36.6 kilotons based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

⁴ 15,000 based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

⁵ 64,000 MWh based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)



Strategy	Indicators	Baseline	Target	Sources of Verification	Risks and Assumptions
involved in S&L program				y staff and MDAs involved in the S&L	support the project objectives
Output 1.3: Monitoring and data collection studies performed for end-use sales and appliance energy use	Launching of monitoring and data collection studies	None	Detailed database on end-use sales and energy use of refrigeration appliances	Report on end-use sales and energy use of refrigeration appliances published	Consumers and retailers of refrigeration appliances, and MDAs involved in the S&L are willing to cooperate in data collection
OUTCOME 2: National testing, certification, labeling and enforcement mechanisms and infrastructure adopted	Framework for national testing, certification, labeling and enforcement mechanisms and infrastructure	None	Framework for national testing, certification, labeling and enforcement mechanisms and infrastructure is fully operational	Survey of retailers and consumers of refrigeration appliances	Retailers and consumers of refrigeration appliances support the project objectives
Output 2.1: National testing and certification procedures defined	Framework for testing and certification procedures on refrigeration appliances	None	National testing and certification procedures are published	National testing and certification procedures documents	Key stakeholders involved in testing and certification procedures cooperate in project
Output 2.2: Verification and enforcement procedures developed and state inspectors trained	Number of state inspectors trained on verification and enforcement procedures	None	At least 150 state inspectors trained nationwide on verification and enforcement procedures by Year 3 of project	Project implementation reports	State inspectors cooperate to be trained on verification and enforcement procedures
OUTCOME 3: Increased consumer's and retailer's awareness and improved marketing of appliance energy efficiency standards and labels	Consumers and retailers who become more aware of appliance energy efficiency standards and labels and retailers who improve their marketing	None	Majority of consumers and retailers become more aware of appliance energy efficiency standards and labels and retailers improve their marketing	Consumers and retailers survey Project implementation reports	Retailers and consumers of refrigeration appliances support the project objectives
Output 3.1: Enhanced awareness and knowledge of retailers' management and retail staff trained in appliance energy efficiency issues and sales rationales	Number of awareness sessions offered to retailers' management Number of training sessions offered to retail staff Attendance rate	None	3 awareness sessions / year 5 training sessions / year 75% attendance rate	Program implementation reports	Retail companies of refrigeration appliances participate in awareness and training sessions
Output 3.2: Enhanced consumers' awareness of appliance energy efficiency	Number of dissemination activities offered to	None.	500,000 households become aware of characteristics of more	Consumer surveys Program	Effective awareness activities are offered to consumers of

Strategy	Indicators	Baseline	Target	Sources of Verification	Risks and Assumptions
characteristics, standards and labels, and of costs and benefits of more efficient products	consumers Number of consumers covered by dissemination activities		efficient refrigeration appliances in Year 3	implementation reports	refrigeration appliances
OUTCOME 4: Establishment of refrigerating appliance test facility	Appliance test facility	None	Commissioned test facility	Operational test facility	Pre-construction processes proceed as per plan
Output 4.1. Refrigeration appliance test facility designed and budgeted	Design drawings and budget on refrigeration appliance test facility	None	Design drawings and budget on refrigeration appliance test facility completed	Technical and financial proposal from a firm for the design and cost estimates of refrigeration appliance test facility	Bid documents for design and cost estimates of refrigeration appliance test facility are appropriately prepared in good time
Output 4.2. Refrigeration appliance test facility built and commissioned	Refrigeration appliance test facility	None	Commissioned refrigeration appliance test facility	Fully operational refrigeration appliance test facility	Building and commissioning of refrigeration appliance test facility are undertaken within time and budget limits
OUTCOME 5: Establishment of used appliance and ODS collection and disposal facilities	Collection and disposal facilities	None	Commissioned collection and disposal facilities	Operational collection and disposal facilities	Pre-construction processes proceed as per plan
Output 5.1. Ghana refrigeration appliance industry understands environmentally friendly technologies and procedures for the collection and disposal of appliances and ODSs	Number of capacity building sessions offered to refrigeration technicians Attendance rate	None.	500 refrigeration technicians undergo capacity building by year 3 of program implementation	Consumer surveys Project implementation reports	Refrigeration technicians are interested in building capacity on the collection and disposal of appliances and ODSs
Output 5.2. Bid documents formulated for Used Appliances Collection and Disposal Facilities (UACDFs)	Bid documents for ODS and used refrigerator collection and disposal	None.	Completed bid documents for ODS and used refrigerator collection and disposal	Completed bid documents	Bid documents are appropriately prepared in good time
Output 5.3. Contract signed for UACDFs	Contract document	None	Contract documents signed with firm with winning bid	Signed contract document	Contract documents are appropriately prepared in good time
Output 5.4. ODS Disposal Centre designed and implemented	ODS Disposal Centre	None	Commissioned ODS Destruction Centre	Fully operational ODS Disposal Centre	Building and commissioning of ODS Disposal Centre are undertaken within time and budget limits
OUTCOME 6: Development of efficiency program evaluation and monitoring capacity	Skilled Ghanaian professionals in efficiency program evaluation and monitoring	None	Adequate no. of skilled Ghanaian professionals	Project implementation reports	Full commitment of Ghanaian professionals

Strategy	Indicators	Baseline	Target	Sources of Verification	Risks and Assumptions
Output 6.1. Professionals are trained in energy efficiency program monitoring and evaluation study design, methods, technologies and procedures	Number of professionals trained in energy efficiency program monitoring and evaluation	None	30 professionals trained by year 3 of program implementation	Project implementation reports	Ghanaian professionals are interested to be trained
Output 6.2. Promising monitoring technologies and metering equipment are tested and well-known in Ghana	Monitoring technologies and metering equipment	None.	Good awareness and availability of proven monitoring technologies and metering equipment	Project implementation reports	Experts adequately review monitoring technologies and metering equipment and make recommendations
Output 6.3. Pilot rebate and turn-in program evaluation and monitoring services are bid and contracted to qualified local professionals	Number of local professionals contracted for program evaluation and monitoring services	None		Contractors' evaluation and monitoring services reports	Selected contractors have appropriate skills in evaluation and monitoring services
OUTCOME 7: Conduct of refrigeration appliance rebate and exchange program throughout Ghana that distribute at least 50,000 efficient appliances ⁶	Framework for refrigeration appliance rebate and exchange program	None	Large no. of households exchange for efficient refrigerators	Refrigerator consumers and retailers survey	Refrigerator consumers and retailers support project objectives
Output 7.1. Carbon finance options for Pilot Rebate and Exchange Program are accurately estimated and well known	Number of evaluated carbon finance options for Pilot Rebate and Exchange Program	None	Sustainable carbon finance options for Pilot Rebate and Exchange Program are well-documented	Project implementation reports Business Plan on sustainable carbon finance options	Experts adequately review carbon finance options for Pilot Rebate and Exchange Program and make recommendations
Output 7.2. Designs for loan guarantee and capital financing programs that can facilitate implementation of Pilot Rebate and Exchange Program are known and available	Number of loan guarantee and capital financing schemes that facilitate Pilot Rebate and Exchange Program	None	Sustainable loan guarantee and capital financing schemes are well-documented and adequately disseminated	Project implementation reports Business Plan on sustainable loan guarantee and capital financing schemes	Experts adequately review loan guarantee and capital financing schemes and make recommendations
Output 7.3. The refrigeration appliance rebate and turn in program is documented and available	Comprehensive document on refrigeration appliance rebate and turn in program	None	Document on refrigeration appliance rebate and turn in program is well-documented and adequately disseminated	Project implementation reports	Progress of the S&L program is well-monitored and documented
Output 7.4. The organizational and logistical feasibility of the appliance rebate and turn-in program is demonstrated	Operational appliance rebate and turn-in program	None	The appliance rebate and turn-in program is feasible in organizational and logistical terms	Project implementation reports	Progress of the S&L program is well-monitored and documented

⁶ 15,000 based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

Strategy	Indicators	Baseline	Target	Sources of Verification	Risks and Assumptions
OUTCOME 8: Development of various feasible finance models for national scale follow-up of pilot rebate and exchange program	Finance models for national scale follow-up	None	Finance models for national scale follow-up ready for implementation	Documents on finance models for national scale follow-up	Finance models are feasible
Output 8.1. Business plans are available for several program follow-up scenarios	Business plan	None	Comprehensive business plans prepared by the end of third year of program	Business plan documents Project implementation reports	Adequate data for business plans becomes available from program implementation

6.2. List of persons interviewed

- Mr. Paolo Dalla Stella – UNDP
- Mr. Kofi Agyarko – Energy Commission
- Anita Amissah-Arthur – UNDP
- Eric Kumi Antwi-Agyei – Energy Commission
- Staff at Presank HQ
- Dr Alfred Ofori Ahenkorah – Ministry of Power
- Ebenezer N. Kotey – Institute for Industrial Research (CSIR-IIR)
- Mr. Musa Sallah – Ecobank Ghana Limited
- Nana Ernest Asare – Ghana Energy Foundation
- Staff at the testing laboratory and Emmanuel Kwa-Kofi at the Government Standards Authority
- Georgina Arthur – rebate scheme beneficiary
- Emmanuel Osae-Quansah – EPA
- Nour Seklaoui – Electroland shop
- Amadu Yahaya – Hisense shop
- Hubert Zan – Energy Commission officer at Tema Port.

6.3. Summary of field visits

Site visit to Presank (refrigerator dismantling facility), 14th August 2015

Presank is located close to the ports and they collect the seized fridges at their own cost. They collect and segregate 3 types of gas (R12, R134a and R600a). They sell on the metal and PP plastic, however for the other types of material (PS, ABS & SB plastics and the foam) they do not have any method of disposal. Foams are supposed to be stored in polyurethane bags, however, here they were left in the open air and took up ¼ of the 2nd yard's volume. All this foam has been collected since they started dismantling in April 2014. The EPA is aware of the issue and are trying to find technological solution (GIZ project in the making), however, foam are not properly stored and the lack of space is affecting the amount of units that can be received to be dismantled on site.

Workers on site did not wear any protective gear. They demonstrated how to degas a refrigerator using one of the three manual condensers they have, one for each type of gas. There is always the danger of a liquid gas burn so they constantly check the gauges. Workers mentioned a moveable machine (supposedly the one presented on their billboard at the entrance of their site) but said they didn't find it reliable and it was sent for repair anyway.

Site visit to test laboratory, 17th August 2015

The test laboratory is located within the grounds of the Government Standards Authority (GSA), with four staff members working there, all having been reallocating from other posts with GSA. They understand the importance of the quality and efficiency of products and would also like to start testing air conditioners as well as test refrigerators for neighbouring countries. Currently, importers have tests done here by order of the Energy Commission, and suppliers pay for these tests.

Testing is done at 25 and 32 C, for four fridges and two freezers at a time, though staff feels that the facility is too small for the work required. GSA has land space and would welcome a larger facility. According to staff, the test facility works ok except for the issue of power variation from the grid¹. It takes them 3 to 4 days to run a cycle for 2 freezers and 2 to 3 days for 4 refrigerators². They have a local company carrying out maintenance of the testing lab. Trial testing was done in November and Dec 2014, actual work started in January 2015. 68 samples have been tested to date (33 freezers and 35 refrigerators) out of 87 received from around 20 different clients.

Although the supplier of the test facility provided technical training on how to use test equipment (and the facility itself is accredited to ISO17025³) staff itself feel that they do not have the know-how and rely on the Energy Commission to interpret and double-check test results. Staff would like to receive a certification, in case test results have to be defended in Court. So far they rely on the Energy Commission for results interpretation/double-checking too.

¹ Test laboratories are supposed to have power stabilisers to even out grid fluctuations; it is unclear why this one doesn't have such equipment, in particular as this one was purchased for use in a country with a relatively weak power grid.

² Refrigerator tests performed under the test procedure used in Ghana often take longer to perform, as lab staff first has to stabilise the operation of a refrigerator and often has to reinitiate a test one or twice to make sure they find the right temperature measurement locations within a refrigerator. Run times of 1 to 2 weeks are not uncommon.

³ It is unclear why the test facility was accredited and by whom. Normally, staff training, calibration of the test facility and participation in "round robin" (inter-laboratory) testing are all required for accreditation, however, none of these seem to be in place. In addition, Ghana is not a member of ILAC and the accreditation of this test lab may not be recognised by other countries.

Shop visit, Electroland, 11-19 August 2015

Electroland at first declined to sign up for the project's rebate scheme as it expected that the initiative would not last. When information about the project's activities kept flowing in, however, it realised that the Government was serious about refrigerator S&L and the shop reverted its position: it started complying with S&L requirements, which caused difficulty with several smaller brands that did not comply with requirements.

When customers started asking about rebates, the shop also decided to sign up for the project's rebate scheme to not lose business. The Energy Commission is offering help in training staff about product energy efficiency. The shop initially started with 6 or 7 models that carried a rebate, as it needed space to store old refrigerators being traded in. Clients now ask for products with a specific energy rating and the shop started a discussion with its suppliers to upgrade the range of products.

The shop mentioned that suppliers try to cheat with energy performance indications for air conditioners, and it would like to have the ability to have those tested. Initially, there was also cheating with refrigerators, however, that stopped when the shop started checking themselves.

Shop visit, HiSense, 11-19 August 2015

HiSense made it its mission to promote energy efficiency. It started promoting efficient refrigerators in 6 of its shops in late 2014, and is adding more shops now. It so far exchanged 4,000 old refrigerators for new ones, with the project's

rebate scheme. It offers only refrigerators of 3 stars and above. Initially, HiSense lost 6 or 7 old fridges turned in because staff would take and resell these; this stopped when management put its foot down.

HiSense staff receives training on refrigerator energy efficiency from the Energy Commission, and it uses the energy label in its advertising. This brings in 95% of HiSense's clients. Clients see their energy bill drop after they exchange an old refrigerator, which creates good word-of-mouth. Filling in the paperwork for rebates is labour-intensive, however, labour is cheap making this not so relevant. The price of imported used refrigerators being sold has gone up, a sign that smuggling is becoming more difficult.

6.4. *List of documents reviewed*

- Project Document
- Request For Ceo Endorsement/ Approval
- Request For Project Preparation Grant (Ppg)
- Project Identification Form (Pif)
- Report On Local Project Appraisal Committee (Lpac) Meeting
- Inception Report
- Presentations At Inception Meeting
- Minutes Of Steering Committee Meetings
- Minutes Of 2014 Project Retreat
- Annual Budgets For 2012, 2013, 2014
- Workplan For 2012, 2013, 2014
- Compiled Quarterly Reports For 2011/2012/2013/2014
- Mid-Term Evaluation Report
- Gef Project Implementation Reports (Pir) 2011-2012, 2012-2013, 2013-2014
- Gef Tracking Tool
- Management Response To The Mid-Term Evaluation Report
- Audit Reports For 2012 And 2013 (Pwc)
- Li 1958 – Refrigerating Appliances Standards Regulation
- Action Plan On Carbon Financing For The Project – Study Report
- Quick Desk Review As Part Of The Study Report On Carbon Financing
- Various Compliance Monitoring Mission Reports
- 2013 Monitoring Report On Dismantling Facility
- Analysis Of Imported Refrigerating Appliances Since 2005
- Impact Evaluation Methodology And Strategy
- Various Training Reports
- Feasibility Study On Local Manufacturing Of Refrigerating Appliances In Ghana
- Consumer Awareness Survey
- Report On Baseline Survey On Refrigerators In Selected Hotels In Accra And Tema

6.5. *Questionnaire used*

General (All)

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?



3. Suggestions for follow-up work to sustain project outcome?

Project management questions (NPD, Project manager, UNDP)

4. Can you give an overview and time line of the project?
5. What were key issues / difficulties / milestones during project implementation?
6. Were there any difficulties with refrigerator rebates? If so, how were these resolved?
7. How are enforcement of minimum energy performance requirements, energy label and import ban on used refrigerators arranged? Is this working well?
8. Is the test laboratory working well? Is it used for testing compliance with MEPS and labels?
9. How was the interaction with government institutions and project steering committee?
10. How was the interaction with key non-governmental stakeholders and the general public?
11. Was there any collaboration with other UN projects? Government of Ghana projects? Other projects?
12. How was project progress monitored? How were market impacts monitored?
13. Has there been an evaluation of the refrigerator market after the project?
14. Has co-financing / spending by project partners been tracked? Where is this reported?

Stakeholder questions (All other parties)

15. What were key issues / difficulties / milestones during project implementation?
16. How did the project benefit your organisation? How did it benefit the country?
17. What are, in your view, the most important long-term results of the project?
18. Would you recommend any follow-up activities, by UNDP, by the Government or by another party?

Interview closing (All)

19. Do you have further recommendations for UNDP, the Energy Commission or the Government of Ghana regarding energy efficiency for refrigerators and other appliances?
20. Is there something else you would like to discuss?



6.6. Evaluation Consultant Agreement Form

Evaluation Consultant Code of Conduct and Agreement Form

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and /or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: Frank Klinckenberg

Name of Consultancy Organization (where relevant): Klinckenberg Consultants BV

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at Meerssen, The Netherlands on 3rd August 2015



6.7. *Terms of Reference*

Included on the next pages.



TERMINAL EVALUATION TERMS OF REFERENCE

INTRODUCTION

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the *Promoting of Appliance of Energy Efficiency and Transformation of the Refrigerating Appliances Market in Ghana* project (PIMS 4003).

The essentials of the project to be evaluated are as follows:

PROJECT SUMMARY TABLE

Project Title:	Promoting of Appliance of Energy Efficiency and Transformation of the Refrigerating Appliances Market			
GEF Project ID:	PIMS 4003		<i>at endorsement</i> (Million US\$)	<i>at completion</i> (Million US\$)
UNDP Project ID:	00074729	GEF financing:	1,722,727	1,722,727
Country:	Ghana	IA/EA own:	200,000 (UNDP)	430,000
Region:	Africa	Government:	3,000,000	3,000,000
Focal Area:	CCM	Other:	1,198,388 (MLF)	1,198,388
FA Objectives, (OP/SP):	CC-SP1	Total co-financing:		
Executing Agency:	Energy Commission	Total Project Cost:		
Other Partners involved:		ProDoc Signature (date project began):		July 2011
		(Operational) Closing Date:	Proposed: 30 June 2014	Actual: 31 December 2014

OBJECTIVE AND SCOPE

The project was designed to promote energy efficiency standards for refrigeration appliances in Ghana, and demonstrate replicable and scalable equipment turn-in and replacement program that removes inefficient and environmentally damaging appliances from the market and replaces them with more efficient and environmentally friendly models. By removing the barriers that inhibit the adoption of efficient refrigeration appliances, the project aimed to allow Ghanaian households and businesses to reduce their energy expenditures while improving quality of life. Potential annual energy savings range from 30 percent to 50 percent depending on the success level of market transformation incentives and programs.

The project's global objective was to reduce Ghana's energy-related CO₂ and ozone depleting substance (ODS) emissions by mitigating the demand for energy in the country's refrigeration and air conditioning sector and by encouraging recovery, recycling and/or destruction of environmentally damaging refrigerants. This has been accomplished through the implementation of energy efficiency measures and standards for refrigeration appliances

and also through the creation of a turn-in and replacement program for inefficient appliances and the ODS that they contain.

This project has been implemented with budget support from the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and the Government of Ghana, UNDP being the GEF Implementing Agency and the lead executing agency is the Energy Commission.

The project has been executed through eight principal components:

- i. Strengthening of regulatory and institutional framework
- ii. Design of certification, labeling and enforcement systems
- iii. Training and public outreach
- iv. Establishment of refrigerating appliance test facility
- v. Used appliance collection and disposal facilities
- vi. Efficiency program evaluation and monitoring capacity development
- vii. Conduct of refrigeration appliance rebate and exchange program
- viii. Financial design of follow-up national market transformation programs

The project has the following outcomes:

- i. Structures and mechanisms for implementation of appliance energy efficiency standards and labels (S&L) strengthened
- ii. National testing, certification, labeling and enforcement mechanisms adopted
- iii. Increased consumer's and retailer's awareness and improved marketing of appliance energy efficiency standards and labels
- iv. Establishment of refrigerating appliance test facilities
- v. Establishment of used appliance and ODS collection and disposal facilities
- vi. Development of efficiency program evaluation and monitoring capacity
- vii. Conduct of refrigeration appliance rebate and exchange program throughout Ghana that distribute at least 50,000 efficient appliances¹
- viii. Development of various feasible finance models for national scale follow-up of pilot rebate and exchange program

The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

EVALUATION APPROACH AND METHOD

An overall approach and method² for conducting project terminal evaluations of UNDP supported GEF financed projects has been developed over time. The evaluator is expected to frame the evaluation effort using the criteria of

¹ The project Steering Committee decided to reduce this amount to 15,000 refrigerators to take into consideration the available resources for the rebate scheme. Due to inflation and currency depreciation, the amount of the rebate had to be increased substantially to make the scheme attractive. As the total amount committed by the Government did not change, the number of refrigerators had therefore to be decreased to 15,000.

relevance, effectiveness, efficiency, sustainability, and impact, as defined and explained in the [UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects](#). A set of questions covering each of these criteria have been drafted and are included with this TOR (*fill in Annex C*). The evaluator is expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders. The evaluator is expected to conduct a field mission to Accra (Ghana) including some project sites in the Accra area, such as a refrigerator dismantling facility, a refrigerator test facility, and some shops participating in the refrigerator turn-in and rebate scheme. Interviews will be held with the following organizations at a minimum: Energy Commission (in particular: Executive Secretary, Head of Energy Efficiency Division, Head of Inspectorate Division), Ministry of Energy and Petroleum, Ministry of Finance, Ghana Standards Authority, Ministry of Trade and Industry, Ministry of Environment, Science, Technology and Innovation, Energy Foundation, Environmental Protection Agency (National Ozone Unit), Ghana Revenue Authority (Customs Division), Refrigeration and Air Conditioning Engineers Association of Ghana. The evaluator will also meet with City Waste Management Company Limited (responsible for refrigerators dismantling) and some shops participating in the rebate scheme.

The evaluator will review all relevant sources of information, such as the project document, project reports – including Annual APR/PIR, project budget revisions, midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment. A list of documents that the project team will provide to the evaluator for review is included in [Annex B](#) of this Terms of Reference.

EVALUATION CRITERIA & RATINGS

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework (see [Annex A](#)), which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: **relevance, effectiveness, efficiency, sustainability and impact**. Ratings must be provided on the following performance criteria. The completed table must be included in the evaluation executive summary. The obligatory rating scales are included in [Annex D](#).

Evaluation Ratings:			
1. Monitoring and Evaluation	<i>rating</i>	2. IA& EA Execution	<i>rating</i>
M&E design at entry		Quality of UNDP Implementation	
M&E Plan Implementation		Quality of Execution - Executing Agency	
Overall quality of M&E		Overall quality of Implementation / Execution	
3. Assessment of Outcomes	<i>rating</i>	4. Sustainability	<i>rating</i>
Relevance		Financial resources:	
Effectiveness		Socio-political:	
Efficiency		Institutional framework and governance:	

² For additional information on methods, see the [Handbook on Planning, Monitoring and Evaluating for Development Results](#), Chapter 7, pg. 163

Overall Project Outcome Rating		Environmental :	
		Overall likelihood of sustainability:	

PROJECT FINANCE / COFINANCE

The Evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the terminal evaluation report.

Co-financing (type/source)	UNDP own financing (mill. US\$)		Government (mill. US\$)		Partner Agency (mill. US\$)		Total (mill. US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Actual	Actual
Grants								
Loans/Concessions								
• In-kind support								
• Other								
Totals								

MAINSTREAMING

UNDP supported GEF financed projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

IMPACT

The evaluators will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status (energy efficiency of refrigerating appliances), b) verifiable reductions in stress on ecological systems (negative environmental impacts of end-of life equipment), and/or c) demonstrated progress towards these impact achievements.³

CONCLUSIONS, RECOMMENDATIONS & LESSONS

The evaluation report must include a chapter providing a set of **conclusions, recommendations** and **lessons**.

IMPLEMENTATION ARRANGEMENTS

³ A useful tool for gauging progress to impact is the Review of Outcomes to Impacts (ROtI) method developed by the GEF Evaluation Office: [ROtI Handbook 2009](#)

The principal responsibility for managing this evaluation resides with the UNDP CO in Ghana. The Project Team will be responsible for liaising with the Evaluator's team to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

EVALUATION TIMEFRAME

The total duration of the evaluation will be 25 days according to the following plan:

Activity	Timing	Completion Date
Preparation	4 days	1 October 2014
Evaluation Mission	10 days	15 October 2014
Draft Evaluation Report	10 days	5 November 2014
Final Report	1 day	30 November 2014

EVALUATION DELIVERABLES

The evaluation team is expected to deliver the following:

Deliverable	Content	Timing	Responsibilities
Inception Report	Evaluator provides clarifications on timing and method	No later than 2 weeks before the evaluation mission.	Evaluator submits to UNDP CO
Presentation	Initial Findings	End of evaluation mission	To project management, UNDP CO
Draft Final Report	Full report, (per annexed template) with annexes	Within 3 weeks of the evaluation mission	Sent to CO, reviewed by RTA, PCU, GEF OFPs
Final Report*	Revised report	Within 1 week of receiving UNDP comments on draft	Sent to CO for uploading to UNDP ERC.

*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report.

TEAM COMPOSITION

The evaluation team will be composed of 1 international evaluator. The consultant shall have prior experience in project evaluation. Experience with GEF financed projects is an advantage. The evaluator selected should not have participated in the project preparation and/or implementation and should not have conflict of interest with project related activities.

The evaluator must present the following qualifications:

- At least a first degree in science or engineering with minimum six years of relevant energy related M&E professional experience or related field
- Demonstrated technical knowledge in energy efficiency, in particular of household appliances
- Highly knowledgeable of GEF and UNDP-GEF monitoring and evaluation policies procedures an advantage Previous experience with results-based monitoring and evaluation methodologies;

- Must have undertaken at least 3 Mid-Term and/or Final Evaluations, including one in the field of Energy Efficiency, preferably for a similar UNDP/GEF project;
- Demonstrated ability to assess complex situations, succinctly distils critical issues, and draw forward-looking conclusions and recommendations;
- Familiarity with Ghana or any Developing Countries is an advantage;
- Excellent in human relations, coordination, planning and team work.
- Have exemplary written and oral communication skills in English, be fully IT literate

EVALUATOR ETHICS

Evaluation consultants will be held to the highest ethical standards and are required to sign a Code of Conduct (Annex E) upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the [UNEG 'Ethical Guidelines for Evaluations'](#)

PAYMENT MODALITIES AND SPECIFICATIONS

%	Milestone
20%	At contract signing
40%	Following submission and approval of the 1st draft terminal evaluation report
40%	Following submission and approval (UNDP-CO and UNDP RTA) of the final terminal evaluation report

APPLICATION PROCESS

As indicated in the Procurement Notice.

UNDP applies a fair and transparent selection process that will take into account the competencies/skills of the applicants as well as their financial proposals. Qualified women and members of social minorities are encouraged to apply.

ANNEX A: PROJECT LOGICAL FRAMEWORK

Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification	Risks and Assumptions
GOAL: To reduce Ghana's energy-related CO ₂ and ozone depleting substance (ODS) emissions	Cumulative amount of GHG reduced in kilotons of CO ₂	None	CO ₂ reduction- 251.6 kilotons comprising: - 129.6 kilotons CO ₂ ⁴ abated from energy savings - 122.0 kilotons CO ₂ ⁵ abated from CFCs (ODS) removal	Project implementation reports GHG inventories and reports to UNFCCC	The policy/ institutional/ regulatory framework in Ghana is fully supportive of the project objectives
PROJECT OBJECTIVE: To improve the energy efficiency of refrigeration appliances in Ghana through the introduction of energy efficiency standards, and demonstration of equipment turn-in and replacement program	Reduced consumption of electricity by households, institutions and commercial firms for refrigeration Tons of CO ₂ emissions reduction	Large number of refrigeration appliances with poor energy efficiency and ozone depleting substances in Ghana	<ul style="list-style-type: none"> Purchase of 50,000 energy efficient refrigeration appliances by year 3 of project implementation⁶ Energy savings – 216,000 MWh⁷ CO₂ reduction- 251.6 kilotons 	Refrigeration appliances imports / retailers survey Project implementation reports	<p>The policy/ institutional/ regulatory framework in Ghana is fully supportive of the project objectives</p> <p>Strong involvement for project from retailers and consumers of refrigeration appliances</p> <p>Project is implemented as per plan</p>
OUTCOME 1: Structures and mechanisms for appliance energy efficiency standards and labels (S&L) strengthened	Policy/ institutional/ regulatory framework on energy efficient refrigeration appliances	Poor policy/ institutional/ regulatory framework	Policy/ institutional/ regulatory framework on energy efficient refrigeration appliances is fully operational	Survey of major stakeholders	Major stakeholders are willing to support the project objectives

⁴ 38.9 kilotons based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

⁵ 36.6 kilotons based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

⁶ 15,000 based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

⁷ 64,000 MWh based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification	Risks and Assumptions
Output 1.1: S&L implementation regulations reviewed through stakeholder consultations	Stakeholders engaged in consultations	None	Majority of stakeholders fully review S&L implementation regulations	Stakeholder consultation reports	Stakeholders actively participate in the review of S&L implementation regulations
Output 1.2: Consulting and advising provided to enforcement authority staff and government ministries, departments and agencies (MDAs), involved in S&L program	<ul style="list-style-type: none"> Enforcement authority staff and provided with consultancy and advisory services 	None	Enforcement authority staff and MDAs involved in the S&L program build adequate capacity to implement the program	Performance Reports on enforcement authority staff and MDAs involved in the S&L	Enforcement authority staff and MDAs involved in the S&L are willing to support the project objectives
Output 1.3: Monitoring and data collection studies performed for end-use sales and appliance energy use	<ul style="list-style-type: none"> Launching of monitoring and data collection studies 	None	Detailed database on end-use sales and energy use of refrigeration appliances	Report on end-use sales and energy use of refrigeration appliances published	Consumers and retailers of refrigeration appliances, and MDAs involved in the S&L are willing to cooperate in data collection
OUTCOME 2: National testing, certification, labeling and enforcement mechanisms and infrastructure adopted	<ul style="list-style-type: none"> Framework for national testing, certification, labeling and enforcement mechanisms and infrastructure 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Framework for national testing, certification, labeling and enforcement mechanisms and infrastructure is fully operational 	Survey of retailers and consumers of refrigeration appliances	Retailers and consumers of refrigeration appliances support the project objectives
Output 2.1: National testing and certification procedures defined	<ul style="list-style-type: none"> Framework for testing and certification procedures on refrigeration appliances 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> National testing and certification procedures are published 	<ul style="list-style-type: none"> National testing and certification procedures documents 	<ul style="list-style-type: none"> Key stakeholders involved in testing and certification procedures cooperate in project
Output 2.2: Verification and enforcement procedures developed and state inspectors trained	<ul style="list-style-type: none"> Number of state inspectors trained on verification and enforcement procedures 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> At least 150 state inspectors trained nationwide on verification and enforcement procedures by Year 3 of project 	<ul style="list-style-type: none"> Project implementation reports 	<ul style="list-style-type: none"> State inspectors cooperate to be trained on verification and enforcement procedures
OUTCOME 3: Increased consumer's and retailer's awareness and improved marketing of	Consumers and retailers who become more aware of appliance energy efficiency standards and	None	Majority of consumers and retailers become more aware of appliance energy	<ul style="list-style-type: none"> Consumers and retailers survey Project 	<ul style="list-style-type: none"> Retailers and consumers of refrigeration appliances support the project objectives

appliance energy efficiency standards and labels	labels and retailers who improve their marketing		efficiency standards and labels and retailers improve their marketing	implementation reports	
Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification	Risks and Assumptions
Output 3.1. Enhanced awareness and knowledge of retailers' management and retail staff trained in appliance energy efficiency issues and sales rationales	Number of awareness sessions offered to retailers' management Number of training sessions offered to retail staff Attendance rate	None	3 awareness sessions / year 5 training sessions / year 75% attendance rate	<ul style="list-style-type: none"> Program implementation reports 	<ul style="list-style-type: none"> Retail companies of refrigeration appliances participate in awareness and training sessions
Output 3.2. Enhanced consumers' awareness of appliance energy efficiency characteristics, standards and labels, and of costs and benefits of more efficient products	Number of dissemination activities offered to consumers Number of consumers covered by dissemination activities	None.	500,000 households become aware of characteristics of more efficient refrigeration appliances in Year 3	<ul style="list-style-type: none"> Consumer surveys Program implementation reports 	Effective awareness activities are offered to consumers of refrigeration appliances
OUTCOME 4: Establishment of refrigerating appliance test facility	Appliance test facility	None	Commissioned test facility	Operational test facility	Pre-construction processes proceed as per plan
Output 4.1. Refrigeration appliance test facility designed and budgeted	Design drawings and budget on refrigeration appliance test facility	None	Design drawings and budget on refrigeration appliance test facility completed	<ul style="list-style-type: none"> Technical and financial proposal from a firm for the design and cost estimates of refrigeration appliance test facility 	<ul style="list-style-type: none"> Bid documents for design and cost estimates of refrigeration appliance test facility are appropriately prepared in good time
Output 4.2. Refrigeration appliance test facility built and commissioned	Refrigeration appliance test facility	None	Commissioned refrigeration appliance test facility	<ul style="list-style-type: none"> Fully operational refrigeration appliance test facility 	<ul style="list-style-type: none"> Building and commissioning of refrigeration appliance test facility are undertaken within time and budget limits
OUTCOME 5: Establishment of used appliance and ODS collection and disposal facilities	Collection and disposal facilities	None	Commissioned collection and disposal facilities	Operational collection and disposal facilities	Pre-construction processes proceed as per plan
Output 5.1. Ghana refrigeration appliance industry understands	Number of capacity building sessions offered to refrigeration technicians	None.	500 refrigeration technicians undergo capacity building by year 3	<ul style="list-style-type: none"> Consumer surveys Project implementation reports 	<ul style="list-style-type: none"> Refrigeration technicians are interested in building capacity on the collection and

environmentally friendly technologies and procedures for the collection and disposal of appliances and ODSs	Attendance rate		of program implementation	disposal of appliances and ODSs
Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification
Output 5.2. Bid documents formulated for Used Appliances Collection and Disposal Facilities (UACDFs)	Bid documents for ODS and used refrigerator collection and disposal	None.	Completed bid documents for ODS and used refrigerator collection and disposal	<ul style="list-style-type: none"> Completed bid documents
Output 5.3. Contract signed for UACDFs	Contract document	None	Contract documents signed with firm with winning bid	<ul style="list-style-type: none"> Signed contract document
Output 5.4. ODS Disposal Centre designed and implemented	ODS Disposal Centre	None	Commissioned ODS Destruction Centre	<ul style="list-style-type: none"> Fully operational ODS Disposal Centre
OUTCOME 6: Development of efficiency program evaluation and monitoring capacity	<ul style="list-style-type: none"> Skilled Ghanaian professionals in efficiency program evaluation and monitoring 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Adequate no. of skilled Ghanaian professionals 	<ul style="list-style-type: none"> Full commitment of Ghanaian professionals
Output 6.1. Professionals are trained in energy efficiency program monitoring and evaluation study design, methods, technologies and procedures	Number of professionals trained in energy efficiency program monitoring and evaluation	None	30 professionals trained by year 3 of program implementation	<ul style="list-style-type: none"> Project implementation reports
Output 6.2. Promising monitoring technologies and metering equipment are tested and well-known in Ghana	Monitoring technologies and metering equipment	None.	Good awareness and availability of proven monitoring technologies and metering equipment	<ul style="list-style-type: none"> Project implementation reports
Output 6.3. Pilot rebate and	<ul style="list-style-type: none"> Number of local professionals 	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> Experts adequately review monitoring technologies and metering equipment and make recommendations
				<ul style="list-style-type: none"> Selected contractors have

turn-in program evaluation and monitoring services are bid and contracted to qualified local professionals	contracted for program evaluation and monitoring services			evaluation and monitoring services reports	appropriate skills in evaluation and monitoring services
Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification	Risks and Assumptions
OUTCOME 7: Conduct of refrigeration appliance rebate and exchange program throughout Ghana that distribute at least 50,000 efficient appliances ⁸	Framework for refrigeration appliance rebate and exchange program	None	Large no. of households exchange for efficient refrigerators	Refrigerator consumers and retailers survey	Refrigerator consumers and retailers support project objectives
Output 7.1. Carbon finance options for Pilot Rebate and Exchange Program are accurately estimated and well known	Number of evaluated carbon finance options for Pilot Rebate and Exchange Program	None	Sustainable carbon finance options for Pilot Rebate and Exchange Program are well-documented	<ul style="list-style-type: none"> Project implementation reports Business Plan on sustainable carbon finance options 	Experts adequately review carbon finance options for Pilot Rebate and Exchange Program and make recommendations
Output 7.2. Designs for loan guarantee and capital financing programs that can facilitate implementation of Pilot Rebate and Exchange Program are known and available	Number of loan guarantee and capital financing schemes that facilitate Pilot Rebate and Exchange Program	None	Sustainable loan guarantee and capital financing schemes are well-documented and adequately disseminated	<ul style="list-style-type: none"> Project implementation reports Business Plan on sustainable loan guarantee and capital financing schemes 	Experts adequately review loan guarantee and capital financing schemes and make recommendations
Output 7.3. The refrigeration appliance rebate and turn in program is documented and available	Comprehensive document on refrigeration appliance rebate and turn in program	None	Document on refrigeration appliance rebate and turn in program is well-documented and adequately disseminated	<ul style="list-style-type: none"> Project implementation reports 	Progress of the S&L program is well-monitored and documented
Output 7.4. The organizational and logistical feasibility of the appliance rebate and turn-in program is	Operational appliance rebate and turn-in program	None	The appliance rebate and turn-in program is feasible in organizational and logistical terms	<ul style="list-style-type: none"> Project implementation reports 	Progress of the S&L program is well-monitored and documented

⁸ 15,000 based on the revision to 15,000 by the Steering Committee (if including only refrigerators purchased through the rebate scheme)

demonstrated						
Strategy	Indicators	Baseline (Year 0)	Target	Sources of Verification	Risks and Assumptions	
OUTCOME 8: Development of various feasible finance models for national scale follow-up of pilot rebate and exchange program	Finance models for national scale follow-up	None	Finance models for national scale follow-up ready for implementation	Documents on finance models for national scale follow-up	Finance models are feasible	
Output 8.1. Business plans are available for several program follow-up scenarios	Business plan	None	Comprehensive business plans prepared by the end of third year of program	<ul style="list-style-type: none"> Business plan documents Project implementation reports 	<ul style="list-style-type: none"> Adequate data for business plans becomes available from program implementation 	

ANNEX B: LIST OF DOCUMENTS TO BE REVIEWED BY THE EVALUATORS

- PROJECT DOCUMENT
- REQUEST FOR CEO ENDORSEMENT/APPROVAL
- REQUEST FOR PROJECT PREPARATION GRANT (PPG)
- PROJECT IDENTIFICATION FORM (PIF)
- REPORT ON LOCAL PROJECT APPRAISAL COMMITTEE (LPAC) MEETING
- INCEPTION REPORT
- PRESENTATIONS AT INCEPTION MEETING
- MINUTES OF STEERING COMMITTEE MEETINGS
- MINUTES OF 2014 PROJECT RETREAT
- ANNUAL BUDGETS FOR 2012, 2013, 2014
- WORKPLAN FOR 2012, 2013, 2014
- COMPILED QUARTERLY REPORTS FOR 2011/2012/2013/2014
- MID-TERM EVALUATION REPORT
- GEF PROJECT IMPLEMENTATION REPORTS (PIR) 2011-2012, 2012-2013, 2013-2014
- GEF TRACKING TOOL
- MANAGEMENT RESPONSE TO THE MID-TERM EVALUATION REPORT
- AUDIT REPORTS FOR 2012 AND 2013 (PWC)
- LI 1958 – REFRIGERATING APPLIANCES STANDARDS REGULATION
- ACTION PLAN ON CARBON FINANCING FOR THE PROJECT – STUDY REPORT
- QUICK DESK REVIEW AS PART OF THE STUDY REPORT ON CARBON FINANCING
- VARIOUS COMPLIANCE MONITORING MISSION REPORTS
- 2013 MONITORING REPORT ON DISMANTLING FACILITY
- ANALYSIS OF IMPORTED REFRIGERATING APPLIANCES SINCE 2005
- IMPACT EVALUATION METHODOLOGY AND STRATEGY
- VARIOUS TRAINING REPORTS
- FEASIBILITY STUDY ON LOCAL MANUFACTURING OF REFRIGERATING APPLIANCES IN GHANA
- CONSUMER AWARENESS SURVEY
- REPORT ON BASELINE SURVEY ON REFRIGERATORS IN SELECTED HOTELS IN ACCRA AND TEMA

ANNEX C: EVALUATION QUESTIONS

This is a generic list, to be further detailed with more specific questions by CO and UNDP GEF Technical Adviser based on the particulars of the project.

Evaluative Criteria Questions	Indicators	Sources	Methodology
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the national level?			
•	•	•	•
•	•	•	•
•	•	•	•
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
•	•	•	•
•	•	•	•
•	•	•	•
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?			
•	•	•	•
•	•	•	•
•	•	•	•
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?			
•	•	•	•
•	•	•	•
•	•	•	•
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?			
•	•	•	•
•	•	•	•

ANNEX D: RATING SCALES

<p><i>Ratings for Outcomes, Effectiveness, Efficiency, M&E, I&E Execution</i></p> <p>6: Highly Satisfactory (HS): no shortcomings 5: Satisfactory (S): minor shortcomings 4: Moderately Satisfactory (MS) 3: Moderately Unsatisfactory (MU): significant shortcomings 2: Unsatisfactory (U): major problems 1: Highly Unsatisfactory (HU): severe problems</p>	<p><i>Sustainability ratings:</i></p> <p>4. Likely (L): negligible risks to sustainability 3. Moderately Likely (ML): moderate risks 2. Moderately Unlikely (MU): significant risks 1. Unlikely (U): severe risks</p>	<p><i>Relevance ratings</i></p> <p>2. Relevant (R) 1.. Not relevant (NR)</p> <p><i>Impact Ratings:</i></p> <p>3. Significant (S) 2. Minimal (M) 1. Negligible (N)</p>
<p><i>Additional ratings where relevant:</i> Not Applicable (N/A) Unable to Assess (U/A)</p>		

ANNEX E: EVALUATION CONSULTANT CODE OF CONDUCT AND AGREEMENT FORM

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form⁹

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: _____

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *place* on *date*

Signature: _____

⁹ www.unevaluation.org/unegcodeofconduct

ANNEX F: EVALUATION REPORT OUTLINE¹⁰

- i. Opening page:
 - Title of UNDP supported GEF financed project
 - UNDP and GEF project ID#s.
 - Evaluation time frame and date of evaluation report
 - Region and countries included in the project
 - GEF Operational Program/Strategic Program
 - Implementing Partner and other project partners
 - Evaluation team members
 - Acknowledgements
- ii. Executive Summary
 - Project Summary Table
 - Project Description (brief)
 - Evaluation Rating Table
 - Summary of conclusions, recommendations and lessons
- iii. Acronyms and Abbreviations
(See: UNDP Editorial Manual¹¹)
- 1. Introduction
 - Purpose of the evaluation
 - Scope & Methodology
 - Structure of the evaluation report
- 2. Project description and development context
 - Project start and duration
 - Problems that the project sought to address
 - Immediate and development objectives of the project
 - Baseline Indicators established
 - Main stakeholders
 - Expected Results
- 3. Findings
(In addition to a descriptive assessment, all criteria marked with (*) must be rated¹²)
- 3.1 Project Design / Formulation
 - Analysis of LFA/Results Framework (Project logic /strategy; Indicators)
 - Assumptions and Risks
 - Lessons from other relevant projects (e.g., same focal area) incorporated into project design
 - Planned stakeholder participation
 - Replication approach
 - UNDP comparative advantage
 - Linkages between project and other interventions within the sector
 - Management arrangements
- 3.2 Project Implementation
 - Adaptive management (changes to the project design and project outputs during implementation)
 - Partnership arrangements (with relevant stakeholders involved in the country/region)
 - Feedback from M&E activities used for adaptive management

¹⁰The Report length should not exceed 40 pages in total (not including annexes).

¹¹ UNDP Style Manual, Office of Communications, Partnerships Bureau, updated November 2008

¹² Using a six-point rating scale: 6: Highly Satisfactory, 5: Satisfactory, 4: Marginally Satisfactory, 3: Marginally Unsatisfactory, 2: Unsatisfactory and 1: Highly Unsatisfactory, see section 3.5, page 37 for ratings explanations.

- Project Finance:
- Monitoring and evaluation: design at entry and implementation (*)
- UNDP and Implementing Partner implementation / execution (*) coordination, and operational issues

3.3 Project Results

- Overall results (attainment of objectives) (*)
- Relevance(*)
- Effectiveness & Efficiency (*)
- Country ownership
- Mainstreaming
- Sustainability (*)
- Impact

4. Conclusions, Recommendations & Lessons

- Corrective actions for the design, implementation, monitoring and evaluation of the project
- Actions to follow up or reinforce initial benefits from the project
- Proposals for future directions underlining main objectives
- Best and worst practices in addressing issues relating to relevance, performance and success

5. Annexes

- ToR
- Itinerary
- List of persons interviewed
- Summary of field visits
- List of documents reviewed
- Evaluation Question Matrix
- Questionnaire used and summary of results
- Evaluation Consultant Agreement Form

ANNEX G: EVALUATION REPORT CLEARANCE FORM

(to be completed by CO and UNDP GEF Technical Adviser based in the region and included in the final document)

Evaluation Report Reviewed and Cleared by

UNDP Country Office

Name: _____

Signature: _____ Date: _____

UNDP GEF RTA

Name: _____

Signature: _____ Date: _____