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Mid-term Review

of the UNDP-supported GEF-financed project

“Green Urban Lighting – Armenia”

Final Report

July 08, 2016

prepared by International MTR Consultant

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Evaluation Team

This Mid-term Review of the UNDP-supported GEF-financed project Green Urban Lighting (PIMS 4669) was carried out between 1 May, 2016 and 8 July, 2016.

The evaluation has been conducted for the Armenian office of the United Nations Development Programme by the international consultant, Mr Andreas Karner (andreas.karner@conplusultra.com).

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Table of Contents

1	Executive Summary	6
1.1	PROJECT INFORMATION SUMMARY	6
1.2	BRIEF DESCRIPTION OF THE PROJECT	6
1.3	SUMMARY OF PROJECT PROGRESS	7
1.4	MTR RATINGS & ACHIEVEMENT	9
1.5	CONCLUSIONS	10
1.6	SUMMARY OF RECOMMENDATIONS.....	10
2	Introduction	13
2.1	CONTEXT AND PURPOSE OF THE EVALUATION	13
2.2	EVALUATION METHODOLOGY	13
2.3	STRUCTURE OF THE MTR REPORT	14
3	Project Description and Background Context	14
3.1	PROBLEMS THAT THE PROJECT SOUGHT TO ADDRESS.....	14
3.2	IMMEDIATE AND DEVELOPMENT OBJECTIVES OF THE PROJECT	14
3.3	PROJECT DESCRIPTION AND STRATEGY	15
3.4	PROJECT IMPLEMENTATION ARRANGEMENTS	17
3.5	PROJECT TIMING AND MILESTONES	18
3.6	KEY PARTNERS AND STAKEHOLDERS	18
4	Findings	19
4.1	PROJECT STRATEGY	19
4.1.1	<i>Project Design.....</i>	<i>19</i>
4.1.2	<i>Results Framework (Logframe).....</i>	<i>22</i>
4.2	PROGRESS TOWARDS RESULTS.....	23
4.2.1	<i>Progress Towards Outcomes Analysis</i>	<i>23</i>
4.2.2	<i>Remaining Barriers to Achieving Project Objective</i>	<i>30</i>
4.3	PROJECT IMPLEMENTATION AND ADAPTIVE MANAGEMENT.....	30
4.3.1	<i>Management Arrangements</i>	<i>31</i>
4.3.2	<i>Work Planning</i>	<i>32</i>
4.3.3	<i>Finance and Co-financing</i>	<i>33</i>
4.3.4	<i>Project Level Monitoring & Evaluation Systems</i>	<i>35</i>
4.3.5	<i>Reporting</i>	<i>35</i>
4.3.6	<i>Stakeholder Engagement</i>	<i>36</i>
4.3.7	<i>Communications.....</i>	<i>37</i>
4.4	IMPACT AND SUSTAINABILITY.....	39

5	Conclusions and Recommendations.....	44
5.1	CONCLUSIONS.....	44
5.2	RECOMMENDATIONS	46
6	Annexes.....	48
6.1	ANNEX 1: MID-TERM REVIEW – TERMS OF REFERENCE	48
6.2	ANNEX 2: MTR EVALUATIVE MATRIX	55
6.3	ANNEX 3: DOCUMENTS REVIEWED.....	56
6.4	ANNEX 4: MISSION ITINERARY AND MEETINGS HELD.....	57
6.5	ANNEX 5: AUDIT TRAIL.....	60
6.6	ANNEX 6: CODE OF CONDUCT FOR EVALUATORS/MIDTERM REVIEW CONSULTANTS	63

List of Tables

Table 1: Key Planned Outputs and Barriers Addressed by the Proposed UNDP/GEF Project (at CEO Endorsement stage).....	15
Table 2: Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)	24
Table 3: Project Budget and Expenditures (in USD)	34
Table 4: Co-financing of Project Partners (in USD).....	34
Table 5: Risk Analysis of the GUL Project – updated at MTR stage.....	41

List of Figures

Figure 1: Assessment of the project’s logframe in regard to “SMART” criteria	23
Figure 2: Project Implementation Structure	32

Acronyms and Abbreviations

AUA	American University of Armenia
AWP	Annual Work Plan
CEO	Chief Executive Officer
CFL	Compact Fluorescent Lighting
CIS	Commonwealth of Independent States
EE	Energy Efficiency
EU	European Union
FSP	Full-Sized Project
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gases
GoA	Government of Armenia
IE	International Expert
IW	Inception Workshop
LFL	Linear Fluorescent Lighting
LPAC	Local Project Advisory Committee
ME	Ministry of Economy
MENR	Ministry of Energy and Natural Resources of RA
MNP	Ministry of Nature Protection of RA
MTE	Ministry of Territorial Administration of RA
MUD	Ministry of Urban Development of RA
NIS	National Institute of Standards CJSC
NGO	Non-governmental Organization
PB	Project Board
PPG	Project Preparation Grant
ProDoc	Project Document
R2E2 Fund	Armenia Renewable Resources and Energy Efficiency Fund
RE	Renewable Energy
RTA	Regional Technical Advisor
RoA	Republic of Armenia
NPUA	National Polytechnic University of Armenia
SRIE	Scientific Research Institute of Energy
TA	Technical Assistance
TAC	Technical Advisory Committee
tCO ₂ e	Tons of CO ₂ equivalent
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNDP CO	United Nations Development Programme Country Office
UNFCCC	UN Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	the U.S. Dollar

1 Executive Summary

1.1 Project Information Summary

Project Title			
UNDP Project ID (PIMS #):	4669	PIF Approval Date:	04.01.2012
GEF Project ID (PMIS #):	4742	CEO Endorsement Date:	19.08.2013
ATLAS Business Unit, Award # Proj. ID:	Award ID: 00074869, Project ID: 00087057	Project Document (ProDoc) Signature Date (date project began):	08.11.2013
Country:	Armenia	Date project manager hired:	November 2013
Region:	Europe & Central Asia	Inception Workshop date:	15.01.2014
Focal Area:	Climate Change	Midterm Review completion date:	30.06.2016
GEF Focal Area Strategic Objective:	CCM-2	Planned closing date:	31.10.2017
Trust Fund [indicate GEF TF, LDCF, SCCF, NPIF]:	GEF TF	If revised, proposed op. closing date:	
Executing Agency/Implementing Partner:	Ministry of Nature Protection of the Republic of Armenia, Municipalities of Yerevan and other main cities		
Other execution partners:			
Project Financing	at CEO endorsement (USD)	at Midterm Review (USD) *)	
[1] GEF financing:	1,600,000	739,852	
[2] UNDP contribution:	1,120,000	526,736	
[3] Government:	250,000	180,000	
[4] Other partners:	7,150,000	2,002,803	
[5] Total co-financing [2 + 3+ 4]:	8,520,000	2,709,539	
PROJECT TOTAL COSTS [1 + 5]	10,130,000	3,449,391	

*) status: 25 May 2016

1.2 Brief description of the project

The objective of the UNDP-supported GEF-financed **Project: Green Urban Lighting in Armenia** (in the following short referred to “the Project” or “GUL Armenia”) is to save energy and to reduce emissions of greenhouse gases by increasing energy efficiency of municipal lighting in the cities of Armenia via implementation of municipal investment programs and national policies. The proposed project is in compliance with the national priorities to strengthen the economic and energy independence of the Republic of Armenia by promoting resources efficient and climate resilient growth.

In pursuit of the objective, the project will deliver the following outcomes:

- **Outcome 1:** Municipal energy audits and technical capacity-building;
- **Outcome 2:** Demonstration projects;
- **Outcome 3:** Replication via municipal lighting programs and associated financial instruments;

- **Outcome 4:** National policies, codes, and standards on lighting;

Collectively, these components seek to put in place cornerstone policy instruments at both the municipal and national level, supported by technical, policy-related, educational, and financial measures to raise capacity, reduce investor risk, and help assure successful implementation

The Project was commenced in November 2013, and the Inception Workshop was held on January 15, 2014. The Project duration is until October 2017.

1.3 Summary of Project Progress

The GUL Project has been operational for about 30 months (out of planned 48 months) since it has been kicked-off, with about 46% of its technical assistance budget expended. While there appears to be broad acceptance of most of the proposed activities and interventions of the Project, the progress of the Project to date can be characterized as follows:

- **Municipal energy audits conducted, technical capacity-building and awareness raising activities launched.**
 - The main provisions for audit of lighting systems were developed according to the current standards, tested during the pilot site monitoring, gaps revealed, recommendations drafted. The audit methodology was tested and audits conducted and reported for Yerevan city, Alaverdi, Spitak, Goris, Ararat, Abovyan, Sevan, Kapan, Kajaran, Gavar and Stepanavan municipalities.
 - In the frames of the International Day of Energy Efficiency and in cooperation with the Union of Architects of Armenia and UNDP-supported GEF-financed Project on Improving Energy Efficiency in Buildings, a seminar for architects and designers organized. Training conducted by the technology supply company for the respective staff of the Yerevan Municipality on proper installation and operation of light-emitting diode luminaries (about 20 staff trained).
 - Seminar held on "Technical regulation of lighting devices application in the frames of Customs Union and issues of establishment of national testing laboratory" by specialists of the "Center of light-emitting diode and optoelectronic technologies of National Academy of Sciences of Belarus" and a workshop on "Modern lighting devices, optometric norms and standards, equipment for measurement" was held in cooperation with Russian Lighting Research Institute named after S.I. Vavilov.
 - Educational module for college students on light and issues and energy efficient technologies and solutions in the sector were developed and presentations delivered for about 180 college students in 5 institutions.
 - Seminar on modern lighting, lighting norms and standards, measuring equipment was held for about 50 representatives of state authorities of the RA, municipalities, design institutions, private sector, educational institutions and academia. A guide for on modern LED technologies, their application, pros and cons, modern energy efficient solutions was prepared and distributed.
 - Lighting source-testing laboratory is established in cooperation with Yerevan Illumination Company and equipped with basic instruments.
 - Public outreach activities:
 - Reference book on acting organizations and rendered services in the lighting sector of Armenia published
 - LED Road Lighting Design Manual was translated into Armenian and published
 - Guide on Energy Efficient Lighting for Students presented
 - Presentation of a country-specific guide on EE modernization of tunnels
 - Development of documentary on Green Urban Lighting Project
 - Project factsheets produced and published via website
 - GUL project Facebook page developed
 - GUL project sub-page provided on CCIC website

- **Pilot projects are yielding energy savings and raising awareness of investors and decision-makers about EE lighting.**
 - The baseline energy consumption was assessed and measurements conducted in preparation for the design of pilot projects in Yerevan city, Alaverdi, Spitak, Goris, Ararat, Abovyan and Sevan towns. The measurements conducted for the installed fixtures for pilot projects.
 - For two pilot streets, based on measurements and monitoring, payback period for energy efficiency investments estimated and used for revolving fund establishment process as indicative figures.
- For the first two pilot projects (9 km and 1.8 km) with 100% light-emitting diode replacement procurement process and installation finalized in Yerevan: street lighting (482 units) and Zoological garden park type - all with 100% light-emitting diode replacement. Energy efficient lighting pilots are finalised in following small municipalities: Alaverdi (70 units); Spitak (50), Abovyan (83) , Sevan (62) towns. Street lighting pilot projects are all with 100% LED replacement, with efficiency requirement sustained at 100 lumen per Watt.

Municipal lighting programmes started to be developed and to lead to widespread deployment of EE lighting.

- Municipal programs for lighting upgrades were started to be developed in Alaverdi and Spitak towns. The lighting system upgrade in Alaverdi was already prepared for implementation, shared with the Municipality and the selected measures assumed as the basis for pilot projects' implementation.
- Lighting system upgrades were further envisaged and pilot urban areas/settlements agreed upon with the municipalities of Goris, Abovyan and Sevan.
- Municipal revolving funds were introduced as a new financing instrument, with funds being established in Yerevan city, and towns of Alaverdi, Abovyan, Spitak, Goris and Sevan being approved by municipal councils. Meanwhile, savings of about AMD 25 million (approx. USD 52,000) were achieved on municipal accounts (status April 2016), with majority of savings reached in Yerevan city.
- **New national policies, codes and standards related to EE lighting are under development.**
 - The decision of Armenian Government "On implementation of energy saving and energy efficiency improvement measures in objects being constructed (reconstructed, renovated) under the state funding" was developed and submitted to the Government of Armenia. It was approved and published on 25 December 2014.
 - Amendments to Armenian Law "On Renewable Energy and Energy Saving" were adopted by the National Assembly of Armenia in May 2016, and signed by the President of RA on 3 June 2016. The additions and amendments adopted envisage promotion of large-scale introduction of design, construction and operation practices of energy efficient buildings and lighting systems in the Republic of Armenia in line with the concept of energy security of the country and environmental policy for climate change mitigation.
 - The localization of SNiP 52.13330.2011 "Natural and artificial lighting" is underway.

1.4 MTR Ratings & Achievement

Measure	MTR Rating	Achievement Description
Project Strategy	Rating: Highly Satisfactory	Project design and activities are regarded very relevant to the GEF and countries development objectives and contribute to the sustainability in respect to relevant topics being addressed through the project.
Progress Towards Results	Objective Achievement Rating: Satisfactory	Several demonstration projects will result of GHG emission reduction target to be achieved at the end of the project. However, indirect savings are not expected to be achieved without effective phase out of incandescent lighting.
	Outcome 1 Achievement Rating: Satisfactory	Methodology for municipal lighting energy audits has been developed and tested with several municipalities. Progress is made on other activities, with targets expected to be achieved at the end of the project.
	Outcome 2 Achievement Rating: Highly Satisfactory	Demonstration projects have been successfully launched and implemented with project's support. Number of pilots is higher than expected at the beginning, the target for energy savings from street lighting is achieved, and for indoor lighting pilots expected to be achieved by the end of the project.
	Outcome 3 Achievement Rating: Satisfactory	Municipal EE lighting programs have been started to develop, yet with results to be expected throughout the remaining project implementation period. Financing instrument of a revolving fund has been successfully implemented in several municipalities, with financial savings already resulting and being reinvested in new EE lighting projects.
	Outcome 4 Achievement Rating: Moderately Satisfactory	While there was progress made in the analysis of the acting local and international legislation, norms and standards to identify gaps and propose solutions, it is yet not foreseeable if legislation and technical regulations to support EE lighting will be implemented/approved by the end of the project.
Project Implementation & Adaptive Management	Satisfactory	The project shows overall substantial progress made regarding all outcomes and maintains a good cooperation basis and exchange with all project partners and external stakeholders. There are only few adaptive measures concerning project level monitoring and communications required.
Sustainability	Moderately Likely	Taking into consideration some prevailing risks and the mitigation strategies to be considered by the project, the sustainability prospects are rated Moderately Likely.

1.5 Conclusions

- **The project has made satisfactory progress on outcomes 1-3 so far. Under outcome 4, the Project has still to cope with the risk of non-achievement of legal/regulatory targets, while having progressed on the gap analysis and preparatory activities for legal decision making, the progress is therefore rated moderately satisfactory.**
- Overall, progress is in line with expectations as log frame indicators are achieved in compliance with the Work Plan. Special attention was paid to the municipal lighting audits and technical-capacity building activities (Outcome 1) as well demonstration projects (Outcome 2), where a higher number of projects than initially foreseen are expected to lead to the achievement of direct energy savings as planned. Current status is that the project will implement 12 demonstration projects on street-lighting (initially 5 planned) and two indoor-lighting pilot activities. As a direct result of the project implementation and support received for the realisation of demonstration projects, about USD 8.2 million co-financing was committed during project development, from which USD 2.7 million were already utilised and some USD 0.91 million (11%) leveraged through additional partners and co-financing means.
- Although the project is not 100% on track regarding implementation of EE legislation and standards, the relevance of the EE topic is high for the Armenian government. Project stakeholders and cooperation partners are fully committed to proceed with the activities according plan. Stronger co-ordination between project management and political decision-makers (e.g. through the IAWG or Project Board) is required in the second period to get the necessary political commitments and strategies (e.g. phase-out plan for incandescent lighting, developing new criteria for incorporating lighting applications into public procurement procedures) off the ground.
- The ability of the project to create long term impact has been partly achieved so far. Most of activities are ongoing and so are their results and achievements to be viewed in a longer perspective.
- As for the planned remaining activities, continuous review of work plan against available resources and likelihood of timely implementation needs to be properly taken care of and results evaluated & monitored against their outcomes and impacts.
- The completion date of the Project is foreseen for October 2017. No major project delays are to be expected from today's point of view.

1.6 Summary of Recommendations

Rec #	Recommendation	Entity Responsible
A	Municipal energy audits, technical capacity-building and awareness raising (Outcome 1)	
A.1	Procurement advice and specific guidelines on formulation of technical specifications and selection criteria based on 'most-advantageous-tender' concepts shall be developed and introduced to municipal procurement staff, including safeguarding elements, illumination quality level, product guarantees and environmental aspects. In this respect, specific procurement guidelines for the replacement of old CFLs and LFLs and other types of luminaires and lighting fixtures (as deemed necessary) shall be considered.	UNDP
A.2	Project team shall further consider introducing lifecycle costing approaches in public tenders organized in the frame of the demonstration projects. Procurement and technical staff dealing with public tenders shall be trained on this concept.	UNDP
A.3	Establishment of a testing laboratory for lighting equipment and educational laboratory in a university is already underway. However, it shall be assessed whether any complementary outreach is required e.g. for universities to	UNDP, NPUA, SRIE

Rec #	Recommendation	Entity Responsible
	encourage the effective use of the laboratory for research and educational purposes by a variety of stakeholders.	
A.4	Lighting campaigns and awareness programs shall be widened up and addressing the potential for EE in lighting for different end-user groups (users of public and residential buildings). Project shall further start measuring impact of campaigns allowing to measure the contribution of EE lighting retrofits towards the change of energy demand in the country, and towards the project finalisation introduce specific monitoring indicators into its M&E strategy.	UNDP
B	Demonstration projects (Outcome 2)	
B.1	Given the large replication potential for energy efficiency in indoor lighting (public and private residential buildings), remaining project duration shall be used to select a few representative public buildings of different type for more detailed energy audits not addressing only lighting, but their energy consumption in general (so as to contribute to the formulation of broader municipal EE programs later on).	UNDP, Municipalities
C	Replication via municipal programs and associated financial instruments (Outcome 3)	
C.1	Methodological guidance/manual prepared for audits of public lighting systems shall be relatively straight forward by building on the audits already conducted in the frame of the GUL project as well as on the information that can be drawn from the comprehensive EBRD studies done for the preparation of EBRD Street Lighting Project.	UNDP
C.2	Municipal programs for EE public lighting will need to be enhanced in terms of broader coverage (e.g. overall lighting infrastructure retrofit strategy) and especially for the municipalities involved addressing the plans for retrofitting other remaining streets not included among the covered by UNDP-GEF or other IFIs (e.g. EBRD) support. Lighting programs shall also consider indoor EE lighting retrofit needs in public buildings.	UNDP, Municipalities
C.3	With the help of dedicated financing experts, specific guidelines and templates for municipalities to develop model contracts for different kind financing modalities (direct procurement, EPCs, ESCOs etc.) shall be prepared. Additional supporting instruments, such as analytical tools to conduct lighting system audits, or technical, economic and financial feasibility assessments could be made available from other similar projects.	UNDP
D	National policies, codes, and standards on lighting (Outcome 4)	
D.1	The development of a national phase-out policy for incandescent and other inefficient lighting fixtures will be a key milestone to make a shift towards EE lighting on the Armenian market happen. Project shall therefore keep track and support the government in developing the strategy.	MENR, MNP, NIS, UNDP
D.2	Project shall take into account the required quality control and affordability constraints when EE lighting technologies are introduced to the market, and support the elaboration of measures and policies, such as adequate quality control and social support schemes, by building on the experiences and lessons learned from other countries.	MENR, ME, UNDP
D.3	Regarding adoption of new rules for procurement of energy efficient lighting, experiences from similar work done in other countries shall be incorporated into the Armenian case.	UNDP

Rec #	Recommendation	Entity Responsible
E	Project Implementation & Adaptive Management	
E.1	In terms of more effective and visible awareness and campaigning, a dedicated website (separate web domain) shall be introduced in Armenia. This website – eventually combined with social media functionality – shall provide the major information hub on energy efficient lighting in Armenia.	UNDP, MNP
E.2	Experiences and lessons learnt from Armenian GUL project shall be referred to in the UNEP's en.light programme website (http://www.enlighten-initiative.org/), thus becoming part of the international cooperation network and exchange platform. Further exchange with other countries implementing similar activities (e.g Russia, Kazakhstan, Belarus) shall be maintained.	UNDP
E.3	It is recommended that the project team compile “lessons learnt” from the project to contribute to the project's knowledge management, learning and information dissemination strategy. An analytical, thorough and, as required, also critical report summarizing experience and findings of this project would highly benefit the country activities and UNDP in general. As a part of that, an analysis of the pilot project tender results and their evolution over the time in line with the capacity built shall be considered in such review.	UNDP
E.4	The Project shall maintain the high level of dissemination and public awareness creation activities throughout the remaining project period. Public outreach expert, preferably with international background and relevant expertise shall be nominated to implement dedicated awareness activities.	UNDP
E.5	A no-cost time extension (max. 1 year) may be foreseen in order to keep control of the monitoring of disbursements/replenishments of the municipal revolving funds and impacts of improved legislation on urban and indoor lighting systems.	UNDP
F	Sustainability	
F.1	Monitoring of GHG emission reductions and correlating energy savings is to be refined and beneficiaries supported in building own M&E capacities. While direct emission reductions are likely to be achieved, indirect targets require additional action for their achievement; complementary efforts to be made during the second half of the project to address areas with large replication potential are indoor lighting in public and private residential buildings.	UNDP
F.2	The targeted GHG reduction impact of the project was reassessed and slightly amended at the project inception phase, but, except from the GEF CC tracking tool, neither the project document nor the inception report were calculating the direct project impact over the entire lifetime of the investment, which would make the assessment consistent with the recommended GEF methodology and other GEF funded climate change mitigation projects. Calculation methodology shall be thus reviewed and updated as follow-up to the MTR and any changes also adopted within the <i>GEF CC Mitigation Tracking Tool</i> .	UNDP

2 Introduction

2.1 Context and purpose of the evaluation

This Mid-Term Review (MTR) has been conducted on a request of UNDP CO in Armenia; it is a key element of standard project monitoring and evaluation procedure.

UNDP acts as the GEF Agency for this project. The project is implemented by the Ministry of Nature Protection (MNP) following UNDP's National Implementation Modality (NIM). The Municipality of Yerevan and other major municipalities in Armenia act as the main beneficiaries and implementing partners.

Mr Andreas Karner, energy consultant from Austria, has been contracted to carry out the Evaluation. He was supported by local expert group and administrative team of the project.

The MTR assessed progress towards the achievement of the project objectives and outcomes as specified in the Project Document, and reviewed early signs of project success or failure with the goal of identifying the necessary changes to be made in order to set the project on-track to achieve its intended results. The MTR also evaluated the project's strategy and its risks and progress towards sustainability.

The MTR report provides a review of:

- the overall **project strategy** in terms of appropriateness of project design, its objectives, planned outputs, activities and inputs compared to other cost-effective alternatives,
- the **implementation** of the Project in terms of quality and timeliness of inputs and efficiency and effectiveness of activities carried out as well as overall management and stakeholder involvement
- the **project outputs, outcomes and impact** and how the objectives of the Project contribute to the realisation.

2.2 Evaluation Methodology

The Monitoring and Evaluation (M&E) policy at the project level in UNDP-GEF has generally four objectives:

- to monitor and evaluate results and impacts;
- to provide a basis for decision making on necessary amendments and improvements;
- to promote accountability for resource use; and
- to document, provide feedback on, and disseminate lessons learned.

The methodology used for the project mid-term review is based on the **UNDP-GEF Monitoring & Evaluation Policies** and includes following key parts:

- I. Project documents review prior to the evaluation mission
- II. Evaluation mission and on-site visit conducted in May 2016, interviews with project management, UNDP CO, project partners and stakeholders, as well as with independent experts. Discussion with project management on key issues to be addressed and implemented until the end of the project period, and presentation of the preliminary findings and recommendations to Project Stakeholders and UNDP CO.
- III. Drafting the MTR report and ad-hoc clarification of collected information/collection of additional information
- IV. Circulation of the draft MTR report for comments
- V. Finalizing the report, incorporation of comments

Achievements of project objectives have been rated in terms of the criteria above at a six level scale as follows:

- Highly satisfactory (HS) - the project has no shortcomings
- Satisfactory (S) - minor shortcomings
- Moderately satisfactory (MS) - moderate shortcomings
- Moderately unsatisfactory (MU) - significant shortcomings
- Unsatisfactory (U) - major shortcomings
- Highly unsatisfactory (HU) - severe shortcomings.

2.3 Structure of the MTR report

This mid-term review follows the structure and content as specified in its Terms of Reference (see 6.1 Annex 1) and according to UNDP “Guidance for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects” (2014).

3 Project Description and Background Context

3.1 Problems that the project sought to address

Lighting is the second largest source of municipal GHG emissions in Armenia (after heating), accounting for about one-third of municipalities’ GHG emissions and up to 50 percent of their electricity bill. Urban lighting costs of Armenian municipalities account for more than USD 5 million per annum (power costs and maintenance). Municipal lighting in the capital city of Yerevan accounts for the largest consumption in the country: about 80 per cent of all urban lighting energy use nationwide, or about 56,000 MWh/year. At the same time, there is considerable technical potential for cost-effective efficiency improvements in public lighting in Yerevan and other Armenian cities. Street lighting power use in Yerevan is 1.3-1.5 times higher than the average street lighting power consumption in European cities and towns. The vast majority of bulbs used in street lighting in Yerevan are high pressure sodium bulbs (HPS), mercury bulbs and compact fluorescent lighting (CFL).

The key problem associated with these lights is low technical quality and thus inconsistency of technical parameters (wattage, luminosity, operational lifetime, etc.) named on appliances with real capacities. As a result, operation and maintenance costs of municipalities grow because of high replacement costs as well as the necessity to install bulbs of high capacity in order to ensure the requested level of street illumination.

This, in its turn, leads to unjustified high energy consumption and associated GHG emissions in the street lighting sector. On the other hand, high energy consumption of the above mentioned “inefficient” street lighting technologies results in high energy costs that (along with high O&M costs) are usually quite burdensome for municipalities. This causes the majority of municipalities to reduce duration of street lighting or even stop illumination of some secondary streets and facilities in order to reduce street lighting costs and to keep the costs within the limits of available municipal budgets.

The project therefore sought to address the main barriers associated with urban (outdoor) lighting systems, namely lack of information and awareness, lack of available technical quality and financial capabilities of the municipalities and lack of access to capital, and absence or insufficiency of policies and regulations related to outdoor and indoor lighting systems. The aspect of awareness raising and improvement of indoor lighting systems (public buildings, residential) has been included as another focus direction in the project objectives, since energy demand of indoor lighting is significant and thus the replication potential high to reduce energy demand and corresponding (indirect) GHG emissions within buildings.

Together with newly introduced financing mechanisms, e.g. municipal revolving funds and ESCOs, the project was designed to develop and implement a comprehensive program for upgrading public lighting and draw upon lessons learned from large municipalities like to support the implementation of analogous programs in other municipalities around Armenia.

3.2 Immediate and Development Objectives of the Project

The UNDP-supported GEF-financed project is supposed to build upon current and planned activities at the municipal and national level with regard to lighting in Armenia, using GEF funds to address the above-described barriers and create incremental global environmental benefits.

In this respect, the overarching goal of the GEF-supported activity of the project is to save energy and to reduce emissions of greenhouse gases by increasing energy efficiency of lighting in cities of Armenia via the implementation of municipal investment programs and national policies. The achievement of the main goal is organized around four interrelated components.

- **Component 1:** Knowledge and capacities for green urban lighting

- **Component 2:** Pilot green urban lighting projects
- **Component 3:** Financial and institutional mechanisms for scaling up municipal EE lighting programs
- **Component 4:** National policies, codes, and standards on EE lighting

These components retain all of the elements and intended outcomes elaborated at the project development stage, but these elements have been streamlined and reorganized for greater clarity and ease of orderly implementation. The project therefore includes some major activity focusing also on residential lighting.

Collectively, these components seek to put in place cornerstone policy instruments at both, the municipal and national level, supported by technical, policy-related, educational, and financial measures to raise capacity, reduce investor risk, and help assure successful implementation. In the project design, an indirect project impact was foreseen to primarily result from the adoption and implementation of a national lighting policy to improve the energy efficiency of indoor lighting, including a gradual phase out of less inefficient lighting fixtures in line with the adopted policies in the EU and some Eurasian Economic Union countries such as Russia and Kazakhstan. The four components therefore involve various planned outputs and activities, all designed to remove the barriers enumerated above. Table 1 shows how the project outputs in the design of the project were to address the major barriers.

Table 1: Key Planned Outputs and Barriers Addressed by the Proposed UNDP/GEF Project (at CEO Endorsement stage)

Output	Barriers addressed			
	Information gaps	Low capacity	Absence of financing	Policy gaps
Energy audits of public lighting systems (Output 1.1)	X	X		
Study tour, co-financed outside of GEF financing (Output 1.2)	X	X		
Technical training and outreach (Output 1.3)	X	X		
Pilot projects (Component 2)	X	X	X	
Facilitation of financing for green lighting programs (Output 3.1)			X	X
Development and assistance in implementation of comprehensive municipal programs for green lighting (Output 3.2 and Output 3.3)	X	X		X
Support for development of a phase-out of incandescent lighting (Output 4.1)	X	X		X
New and/or expanded technical standards and codes for lighting equipment (Output 4.2)	X			X
Improvements to state procurement process (Output 4.3)		X	X	X

3.3 Project Description and Strategy

As an overall objective, the project was designed to remove barriers to energy-efficient lighting in Armenia, by means of technical assessment, facilitation of financing, and development and implementation of municipal programs and national policy.

The global environmental benefits targeted at the end of the project lifetime were defined as follows:

- Direct energy savings of 1.2 GWh per year from demonstration projects (474 tonnes of CO_{2eq} emission reductions achieved at end of project)
- Direct energy savings of 20 GWh per year from replication of demonstration projects via municipal programs (8,000 tonnes of CO_{2eq} emission reductions achieved at end of project).
- Indirect energy savings of 125 GWh per year from implementation of national lighting policy (50,000 tonnes of CO_{2eq} emission reductions achieved at the end of the project)

The targeted GHG reduction impact of the project was reassessed and slightly amended at the project inception phase, but neither the project document nor the inception report was calculating the direct project impact over the entire lifetime of the investment, which would make the assessment consistent with the recommended GEF methodology and other GEF funded climate change mitigation projects.

The Project Document specified expected project results – project outputs for each project component that relates to the immediate objectives.

Immediate objective – outcome 1:

Municipal energy audits, technical capacity-building and awareness raising measures implemented.

- **Output 1.1 Audits of public lighting systems.** The project will organize the design and execution of at least ten technical audits of public lighting, with the goal of defining the technical basis for municipal plans and financial proposals for specific sets of upgrades to be carried out.
- **Output 1.2 Study tour** to GEF Public Lighting project in Central Europe (100% co-financed by Slovak and Czech ODA Trust Funds, managed by UNDP). The project will organize a study tour to Europe for key personnel of YIC, the municipality of Yerevan, and other responsible agencies. Participants will be exposed to best practices in urban lighting design, organization, and financing. All costs of the tour will be covered outside of GEF funds.
- **Output 1.3 Technical training and capacity building** on energy-efficient lighting for specialists from municipal agencies, lighting companies, and building design institutes. The project will organize and deliver at least two half-day seminars or the equivalent for technical specialists on lighting in Armenia, covering technology and best practices in lighting design, installation, and monitoring and maintenance.
- **Output 1.4 Increased awareness and support among the general public** for green urban lighting programs. The project will organize media coverage and other public outreach on energy-efficient lighting, to build support for the urban programs and also to promote EE lighting in the residential sector.

Immediate objective – outcome 2:

Pilot projects yield cost-effective energy savings, raising the confidence of investors and decision-makers about EE lighting.

- **Output 2.1 Design, completion, and documentation of demonstration projects on street lighting**
- **Output 2.2 Design, completion, and documentation of demonstration project in municipal public buildings**
- **Output 2.3 Design, completion, and documentation of demonstration project on lighting of outdoor spaces**

For all demonstrations, the UNDP/GEF project will organize the solicitation of proposals from municipal governments and select projects based on their technical viability, replicability, and availability of secure co-financing. The UNDP/GEF project will also provide technical guidance on project design and will oversee quality control, monitoring, data collection, and compilation and dissemination of results.

Collectively, the demonstration projects are expected to cover various baseline and replacement technologies. Light-emitting diodes (LEDs) are expected to be an important focus of both indoor and outdoor lighting demonstrations. On the basis of the technical, procedural, and financial insight gained from the demonstration projects, replication will be organized via municipal programs and associated financing support (within component 3).

Immediate objective – outcome 3:

Municipal lighting programs lead to widespread deployment of EE lighting and associated energy savings.

- **Output 3.1 Support for private, international, and innovative municipal financing for EE urban lighting programs.** The project will provide technical support and facilitation for the submittal of financial proposals from municipalities to various potential sources.
- **Output 3.2 Implementation and monitoring of the city-wide program** on public lighting in Yerevan. Based on technical results of Components 1 and 2, as well as the results of financing efforts connected with Output 3.1, the project will assist the municipality of Yerevan and YIC in developing and implementing a program for comprehensive city-wide upgrades of public lighting. This output will also

include ongoing maintenance, monitoring, and evaluation of the upgrades, including preparation of reports on energy savings, avoided emissions, and financial returns.

- **Output 3.3 Facilitation of analogous programs** in other cities in Armenia. Drawing upon lessons learned from Yerevan but also recognizing the particularities of each region, the project will support the implementation of analogous programs in other municipalities around Armenia. As with Output 3.2, this output will also involve ongoing maintenance, monitoring, and evaluation.

Immediate objective – outcome 4:

New national policies mandate significantly greater energy efficiency and ensure product quality for lighting, particularly in residential buildings.

- **Output 4.1 Phase-out of incandescent lighting and/or other major national policies on EE lighting.** The project will carry out a comprehensive review providing technical and policy justification for a phase-out of inefficient incandescent lighting (IL) in Armenia. This review will include comparative analysis of energy consumption, life-cycle costs, and environmental effects of incandescent lighting and potential replacement technologies, including CFLs and LEDs, in Armenia. The review will also present international experience and best practice with laws, regulations, and enforcement mechanisms with regard to phase-out of incandescent lighting, as well as market-based or tax-related incentives for EE lighting.
- **Output 4.2 Development and adoption of new standards** for lighting quality, lighting design in buildings and construction, and lighting issues in public health. It is expected that the adoption of the IL phase-out or other major national policies will trigger the need for accompanying technical standards and/or construction codes for energy-efficient lighting. The UNDP/GEF project will support the development of all relevant standards, which will likely cover energy performance, mercury content, operating lifetime, and lighting quality, and will include not only performance criteria but also test procedures.
- **Output 4.3 Development and adoption of new rules for state agencies on procurement** of energy-efficient lighting. Based on best practices in other countries, including European nations as well as Russia and Kazakhstan (where procurement is one focus area of analogous UNDP/GEF projects), the project in Armenia will elaborate and deliver recommended processes and criteria, including performance and life-cycle costs, for public agencies to use in bulk procurement of lighting products.

3.4 Project Implementation Arrangements

The project is implemented by the **Ministry of Nature Protection (MNP)** following UNDP's National Implementation Modality (NIM). As the national authorized body for UNFCCC implementation in Armenia, MNP has coordinated the climate change program of UNDP-GEF since 1997 and is responsible for the overall management and supervision of the project to ensure synergy with other GHG mitigation policies and measures in country, such as the above-mentioned UNDP-supported GEF-financed projects. MNP has sufficient capacity and knowledge to guide and oversee the conceptual part of the project implementation including professional guidance for achieving the climate change mitigation objectives and overseeing the environmental impacts with regard to mercury-containing lighting equipment (e.g. CFLs), as well as overall support via the project's Technical Advisory Committee and Project Board.

MNP has been the implementing agency for the full-sized UNDP-supported GEF-financed projects on energy efficiency of district heating and the building sector, and has a proven track record in successful implementation and cooperation with different ministries and stakeholders.

The **Municipality of Yerevan** acts as the main beneficiary and implementing partner. The energy-efficient lighting programmes and implementation modalities are developed in close cooperation with municipalities of other cities, such as Alaverdi, Abovyan, Spitak, Sevan, Goris, Ararat only to name a few.

The corresponding regulatory framework for promotion of energy efficient lighting systems will be developed in close cooperation with the **Ministry of Energy and Natural Resources, Ministry of Urban Development and Ministry of Territorial Administration and Development** of the Republic of Armenia.

The **National Institute of Standards** is responsible for development of technical standards for lighting products. The **Shincertificate LLC**, involved in the testing and certification of lighting products in accordance with technical standards and **National Polytechnic University of Armenia**, together with the **American University of Armenia**

and **Scientific Research Institute of Energy of Armenia**, involved in education, training and awareness raising activities.

UNDP acts as the GEF Executing Agency for this project. UNDP's Country Office in Armenia is responsible for ensuring transparency, appropriate conduct and financial responsibility throughout the project.

The day-to-day implementation of the project is ensured through the well-established UNDP Climate Change Program Unit coordinated by and located at the MNP.

A technical expert - Task Leader has been acquired to provide necessary management and technical backstopping to the Climate Change Program Coordinator.

The *Project Management Team* is assisting in recruitment of International and National Consultants, including candidate search/selection, preparation of TORs, and supervision; project coordination, including organization of regular meetings with the national implementing agency; financial management and accountability, issuance of payments, training staff on financial disbursements and reporting, and ensuring completeness and timeliness of financial reporting; technical reporting including preparation of progress reports; monitoring and evaluation; organization of training/workshop activities; and other tasks.

The four project components are executed by part-time staff teams of local and international experts, working closely together.

3.5 Project Timing and Milestones

The project development started in beginning of 2012 with the development of a PIF and a request for a Project Preparation Grant (PPG). The full-sized proposal was finally approved on 29 February 2012.

Following the GEF CEO endorsement issued on 19 August 2013, the Project Document was signed on 08.11.2013. Subsequently, a multi-year work plan (2014-2017) was developed.

The Project's inception seminar was held on 15 January 2014.

According to the approved Project Document, the stakeholder agencies nominated the Project Board and Technical Advisory Committee members, while the first TC meeting took place on 6 May 2014 and the first board meeting on 18 December 2014.

The Project was originally planned to last for four years and is to be closed in October 2017, the project duration is 48 months.

3.6 Key partners and stakeholders

Outside direction and oversight within the project implementation is provided by two separate but closely linked committees.

- **The Project Board** consists of the UNDP Environment Governance Portfolio National Director (First Deputy Minister of Nature Protection), and senior representatives of MNP and UNDP as well as selected experts from outside the project. The Project Board shall provide consensus management decisions and guidance to the Project Manager. The Project Board also has the final authority on matters requiring official review and approval, including annual work plans, budgets, and key hires.
- **The Technical Advisory Committee** comprises of representatives of various other interested public and private agencies. The Ministry of Energy and Natural Resources, Ministry of Territorial Administration and Development, Ministry of Economy, Ministry of Nature Protection, the R2E2 Fund, the Scientific Research Institute of Energy, National Institute for Standards of RA and the Yerevan State University of Architecture and Construction have nominated representatives to the Technical Advisory Committee. This group meets annually, with periodic consultation as needed throughout the year. The Project Board shall actively seek and take account of the input of the Technical Advisory Committee. Project Board meetings are timed, where possible, to take place immediately after the annual meetings of the Technical Advisory Committee.

Main project stakeholders (including ministries, municipalities, partner organisations and contractors) identified in the project design to be actively involved in project implementation include:

- Ministry of Nature Protection (MNP)
- Ministry of Energy and Natural Resources (MENR)
- Ministry of Territorial Administration and Development
- GEF Focal Point at MNP
- Municipality of Yerevan
- Municipality of Alaverdi
- Municipality of Sevan
- Municipality of Abovyan
- Municipality of Spitak
- Municipality of Ararat
- Municipality of Goris
- Municipality of Kapan
- Municipality of Kajaran
- Municipality of Stepanavan
- Yerevan Illumination Company CJSC
- National Institute of Standards CJSC
- National Polytechnic University of Armenia
- American University of Armenia (AUA)
- Economic Development and Research Center
- Shincertificate LLC
- Schreder and other international and local suppliers of lighting equipment
- Center for Light Emitting Diode and Optic-Electronic Technologies of the National Academy of Sciences of Belarus
- Russian Lighting Research Institute named after S.I. Vavilov
- Design for Lighting LTD, UK
- CivilNet (private foundation)
- G2iA (NGO)

4 Findings

4.1 Project Strategy

4.1.1 Project Design

Project Relevance

The **relevance** of the project is to be considered very high based on the importance of the EE topic for the Armenian government, and since it addresses a number of critical barriers that impede the realisation of energy efficiency improvements in the area of public and residential lighting:

- **Lack of information and awareness.** Municipal agencies responsible for public lighting lack expertise on technical design, implementation, and financial performance of EE lighting upgrades. This problem is especially notable in regional municipalities, which lack qualified personnel to oversee lighting systems. The general population does have some general awareness of potential benefits of EE lighting products (e.g. CFLs) through advertisement of such lamps in various media; however, the low quality of the majority of energy efficient products available on local market contributes to distrust toward such products.
- **Low technical capacity:** Municipal agencies lack experience with the design of energy-efficiency projects in lighting. The provision of integrated energy services in the lighting sector via ESCOs or similar vehicles

does not yet exist in Armenia due to limited technical and financial capacity. Private-sector activity is present but still immature with regard to the import, assembly, sale, and installation of EE lighting.

- **Lack of available financing for urban lighting:** Municipal governments spend millions of dollars annually on lighting (about \$4.5 million annually in Yerevan alone), but their budgets are stretched, without extra capital funds available for major new investments and improvements. In the absence of dedicated municipal budget funds, investment in EE upgrades depends on the availability of outside financing, for which new concepts are being developed within the project.
- **Absence or insufficiency of policy and regulations:** There are presently no restrictions on the wattage of household lamps in Armenia. Regulations on lighting design and installation in Republic of Armenia are integrated in building codes and health codes. The building code on natural and artificial lighting regulates the amount of light delivered into given indoor or outdoor spaces, with very limited requirements for energy efficiency. There exists a national law on product standards, including technical standards on lighting, but these existing lighting standards deal with health and safety, not energy efficiency. Furthermore, state procurement law requires purchase of equipment based on initial costs, without taking life-cycle costs into account, to the detriment of EE lighting, which costs less to operate and usually lasts longer than conventional lighting. There is also no state policy regarding promotion of energy-efficient lighting products.

Lessons from other relevant projects incorporated into project implementation

The project has worked closely since the project development phase with several other relevant projects and activities, namely with the

UNDP-supported GEF-financed full-sized project **“Improving Energy Efficiency of Municipal Heating and Hot Water Supply”**, which was concluded in 2014 and has provided valuable connections with outreach partners, including apartment-owner associations and the Municipality of Yerevan.

UNDP-supported GEF-financed full-sized project **“Improving Energy Efficiency in Buildings” (IEEB)**: offered collaborative assistance with regard to building codes and demonstration projects in public buildings. Some objectives of the IEEB project are in line with those with the GUL project; thus, combination of efforts (e.g. integration of minimum lighting efficiency standards into building codes) are mutually beneficial. While the IEEB project focuses on building envelope and introducing a new mandatory energy efficient building code that requires a strict energy performance target (including lighting), the GUL project will complement these efforts by working on the codes entitled “Artificial and Natural Lighting” and also “On Design of Outdoor Lighting of Cities, Villages, and Rural Population Centers.”

All three projects are overseen by UNDP Climate Change Programme Coordinator and Head of UNDP Energy and Environment Unit of UNDP in Armenia. Results and lessons learned from other finalized projects, such as the World Bank-GEF funded project “Energy Efficiency and Renewable Energy Sources” have been incorporated partly in the project design or are have been made available to the project team.

The project will also seek synergy and work closely with the **GEF-UNEP en.lighten Initiative**. While the GUL project has already benefited from guidance and assistance provided by en.lighten for sectoral GHG emission estimates and vice-versa, all knowledge products, case studies, and best practices from the Armenian project will be shared with global EE lighting community via *en.lighten* knowledge management platform.

The GUL project is also collaborating with a recent EBRD financing and technical assistance activity launched in the Municipality of Yerevan: 4 million USD have been on-lent from a government loan to Yerevan Illumination Company, accompanied by a 2 million USD grant from E5P. Project implementation and development support are provided through TA contract to refurbish public lighting infrastructure (including lighting poles, cabling and monitoring systems) on 28 streets in the city. Exchange on expert level regarding technical specifications and exchange of experiences on development of innovative financing tools (e.g. ESCO models) is taking place under the complementary project activities.

Extent to which project addresses country priorities and is country-driven.

The proposed project is in compliance with the national priorities to strengthen the economic and energy independence of the Republic of Armenia by promoting resources efficient and climate resilient growth. In particular, the project is consistent with the following national policies and strategic documents:

- **Energy Sector Development Strategy in the Context of Economic Development of Armenia (2005).** The strategy covers the period until 2025 and aims at addressing the following issues: contribute to sustainable economic development of Armenia and ensure energy security, including maximum utilization of renewable and non-traditional sources of energy; promotion of *energy saving*; and environmentally friendly energy supply.
- **National Program on Energy Saving and Renewable Energy (2010)** recognizes energy efficiency as a key means for ensuring energy security and availability. The program provides assessment of the energy saving potential in power supply, heat supply and gas supply systems in the industrial production, transportation, housing and public sectors, as well as assessment of the potential for renewable energy and measures for effective exploitation of the energy saving potential. The program specifically *emphasizes the existence of potential for energy saving via improvement of street lighting systems in Armenian cities and towns.*
- **Energy Security Concept of the RA (2013)** defines the main ways for ensuring energy security and compensation of the lack of domestic fossil fuel resources of industrial significance for providing affordable and reliable energy supply. The concept identifies development of nuclear energy, the promotion, development and investment in renewable energy and energy efficiency as critical to achieving energy security.
- **3rd National Communication to UNFCCC (2015)** identifies energy sector as the main source of GHG emissions and energy saving measures as the largest and most cost-effective opportunities for GHG emission reduction.

Sustainability and viability of the project.

Successful implementation of the pilot projects on improvement of energy efficiency of municipal street lighting will likely demonstrate (and partly have already) immediate cost-savings and emission reduction benefits that is expected to substantially changing decision-makers' mentality, both on local (municipalities) and national level, thanks to the awareness raising activities aimed at dissemination of these success stories and lessons learned.

In the future, municipal lighting is considered as the sector where drastic improvement of public services can be achieved through cost-effective investments into energy efficient technologies available on the local market.

The number of municipalities interested in piloting new lighting systems or willing to expand already implemented pilots is increasing; however, shortage of municipal funds, limited access to loans, unattractiveness of municipal sector for private capital because of lack of regulations and high risks as well as other factors are limiting capabilities of local governances to realize these plans. Therefore, the project team is tasked to develop a set of financial, institutional and legal proposals aimed at overcoming the mentioned barriers and facilitating investments in municipal energy efficient lighting.

In November 2015, Yerevan city municipality applied to the project with a letter proposing extension of pilot funds using the resources accumulated in a *revolving fund mechanism*. The project is envisaging to adapt this scheme of cooperation in a similar manner to other partner municipalities to support the implementation of replication activities. However, it is most likely that savings accumulated in the funds of small communities will not be sufficient to cover total costs of replications; hence, it is important to leverage additional financing in support of the municipal lighting programs. Project already initiated negotiations with donors and banks.

Apart from the financial sustainability, other elements are considered in the design of the project that will influence the long-term overall sustainability and viability of project results/impacts.

- National policies, codes and standards on EE lighting: According to the ProDoc the project is to focus on the development and implementation of broad policy instruments to promote energy-efficient lighting in Armenia. These planned instruments include a legislative mandate for phase-out of incandescent and other inefficient or environmentally adverse lighting; technical standards for lighting products; lighting provisions in codes on building energy performance and health; and procurement law and accompanying rules for public institutions. Such policies would not only support the municipal lighting programs, but

would have an expanded cross-sectoral impact, especially in the public and residential building sectors. These policy-related activities shall be fully consistent with the legal and political processes and priorities of Armenia.

- In addition, widespread presence of outdated, inefficient and poor quality lighting sources on the Armenian lighting market is considered as serious barrier for penetration of the EE lighting technologies. In order to address this issue, the project initiated establishment of a modern photometric lighting laboratory that will enable checking the technical parameters of light sources and confirm their conformity with the declared and/or required parameters. The list of most essential equipment for the laboratory was proposed by consultants from Belarus and consists of integrating sphere and spectroradiometer as well as necessary ancillary equipment on initial stage. Yerevan Illumination Company as beneficiary of this activity provided space at its premises. The installed equipment will allow checking and measuring technical parameters of light sources such as luminous flux, luminous efficacy, spectrum, colour temperature and colour rendering index and together with an established educational laboratory functions as an important capacity building instrument.
- Increased awareness of the project stakeholders and general public on cost saving and environmental benefits of modern energy efficient and energy saving lighting technologies is considered as one of the main objectives of the project aimed at changing consumer behaviour towards sustainable green urban lighting and thus contributing to long-term EE development goals.
- Development and approval of the city-wide program on public lighting: mainly in the largest city of Armenia, Yerevan, but also other municipalities. The project shall target the development of a “EE lighting programme”, including assessment of technical and financial capacities needed for full modernisation of the street lighting infrastructure (based on LED and other energy saving technologies, including smart control and optimization schemes), evaluate energy and cost saving potentials of the proposed measures and identify most feasible funding mechanisms including state subsidies, municipal investments, loans and grants from financial and donor organizations in a longer-term. As one subtask of the project under its third component, the facilitation of public lighting modernization programs in other communities in Armenia based on lessons learned from Yerevan is envisaged.

Overall, the project design and activities foreseen are therefore regarded very relevant to the GEF objectives and countries development objectives and contribute to the sustainability in respect to relevant topics being addressed through the project.

Project design is rated Highly Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.1.2 Results Framework (Logframe)

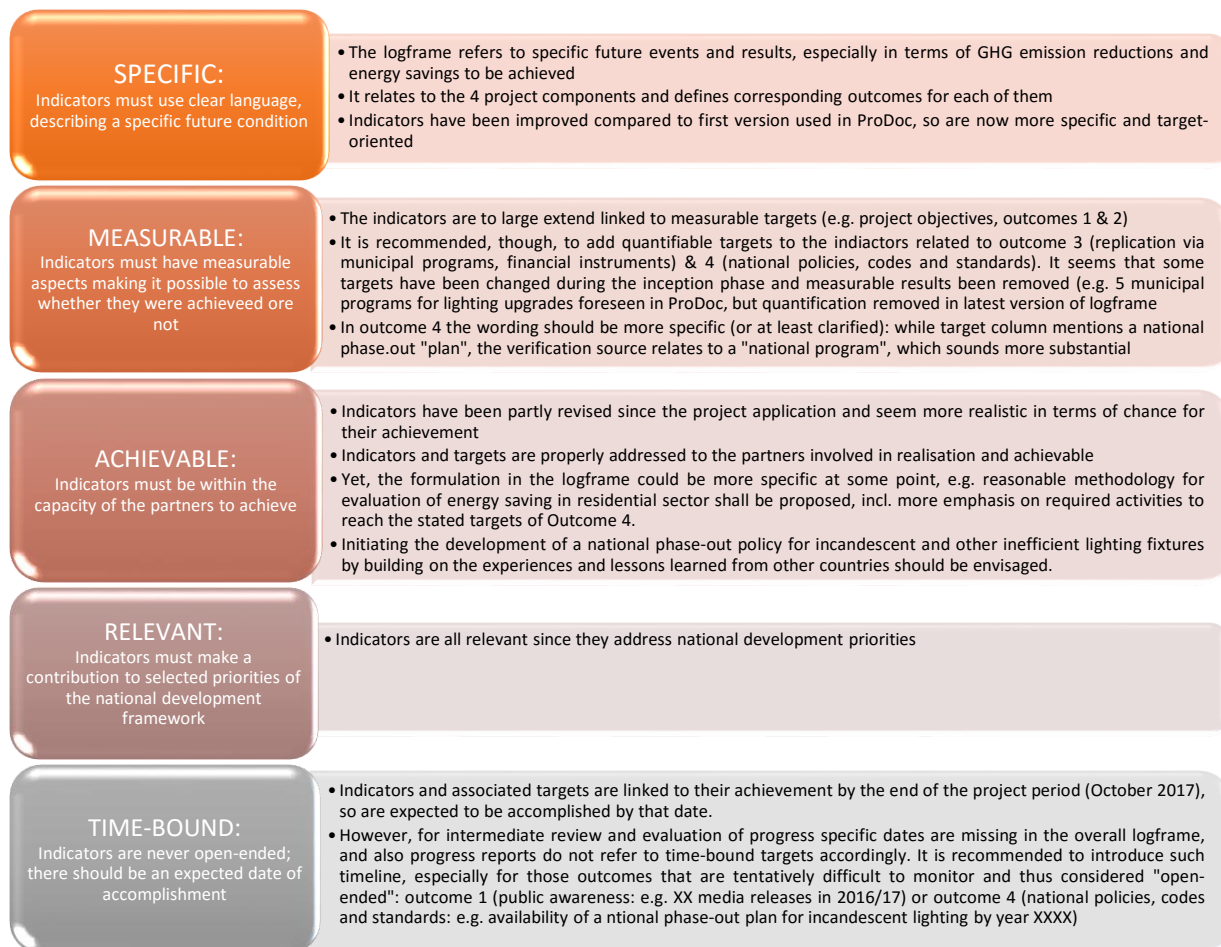
The GEF Project Results Framework (logframe) is a key basis for planning the detailed activities under the implementation framework that was defined in the Project Document. It is also used as a basis for reporting on the progress towards achievement of development objectives and implementation progress to GEF in the middle of the calendar year (end of GEF fiscal year) in a combined Annual Project Review (APR) and Project Implementation Report (PIR), together with the UNDP format for internal project management and reporting done on an annual basis (Standard Progress Reports).

The logframe shall in principle serve to monitor & evaluate the overall project achievements – based on defined targets and indicators to measure these targets. Indicative activities are related to each output and output target.

During the project inception the logical framework has been reviewed and changes have been introduced to some indicators, targets and sources of verification. It seems that targets achievement per the end of the project as formulated during inception workshop are more realistic, although (with few exceptions) no mid-term targets have been formulated and thus assessment is difficult at this stage.

The following table provides an overview on the MTR assessment of the project’s logframe and how “SMART” the mid-term achievements are compared to the defined end-of-project targets (Specific, Measurable, Achievable, Relevant, Time-bound).

Figure 1: Assessment of the project’s logframe in regard to “SMART” criteria



The logical framework of the Project is rated as Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.2 Progress Towards Results

4.2.1 Progress Towards Outcomes Analysis

The MTR expert has rated the project’s progress towards its objective and each outcome. The assessment of progress is based on data provided in the PIRs, supplemented by data provided in the GEF TTs, the findings of the MTR mission, and interviews with the project stakeholders.

Table 2 below summarizes the progress towards the **end-of-project targets** for the project objective and each outcome.

Table 2: Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator	Baseline	Level in 1 st PIR (self-reported)	End of Project Target	Midterm Level & Assessment	Achievement Rating	Justification for Rating
Project Objective: To remove barriers to energy-efficient lighting in Armenia, by means of technical assessment, facilitation of financing, and development and implementation of municipal programs and national policy	Quantity of energy saved and GHG emissions avoided	Street lighting: 40 GWh of electricity consumed for street lighting in 2011, accounting for about 16,000 tons of CO ₂ emissions.	Direct energy savings of 0.128 GWh Accomplishment level: 9.1% 56.6 tons of CO ₂ emissions)	Direct energy savings of 1.2 GWh per year from demonstration projects (474 tons of CO ₂ emissions)	Substantial progress on pilot activities will result of savings target to be achieved at the end of the project	S	Completion of 9 pilots plus new ones planned for remainder project will help to meet the set target by the end of 2017.
		Average fixture power consumption is 210W in 2011.	Indirect energy saving from replication of demonstration projects is expected to be achieved within the next reporting period (i.e. by mid- 2016).	Direct energy savings of 20 GWh per year from replication of demonstration projects via municipal programs (8000 tons of CO ₂ emissions).	Further replication activities are required to reach the target of indirect energy savings by end of project (e.g. through selection of pilots in public buildings)		It is expected that total calculated annual energy saving potential of EBRD project on EE modernization of 28 streets if Yerevan is 2.6 GWh (13% of the target value). 100% achievement of the target value is possible in case of realization of a city-wide program on complete modernization of street lighting system of Yerevan to be developed by the project in 2016. Estimated energy saving potential of such a program is 18.5 GWh.
		Residential lighting: 550 GWh consumed for residential lighting in 2011, accounting for about 220,000 tons of CO ₂ emissions.	Indirect energy saving from implementation of national lighting policy is expected to be achieved by the end of the project.	Indirect energy savings of 125 GWh per year from implementation of national lighting policy (50,000 tons of CO ₂ emissions)	The target is not possible to be achieved without effective phase out of incandescent lighting. Needs more efforts.		Residential sector survey carried out in 2016 allows estimating power consumption for lighting purposes in residential sector. However, this data only is not sufficient for assessment of indirect energy saving to be achieved through legislative ban of inefficient indoor lighting.

Project Strategy	Indicator	Baseline	Level in 1 st PIR (self-reported)	End of Project Target	Midterm Level & Assessment	Achievement Rating	Justification for Rating
Outcome 1: Municipal energy audits, technical capacity-building and awareness raising	Methodology for energy/lighting audit	Lack of methodology for assessing energy efficiency in lighting	The methodology was developed and tested during energy audits in Yerevan city (demo site), Alaverdi, Stepanavan, Spitak and Goris towns. More municipalities to be involved in the course of the project.	By the project mid-term methodology established	Methodology for assessing EE in lighting is on track and was tested with several municipalities.	S	Draft methodology for municipal lighting system audit is developed. The document need to be adjusted based on practical experience on audit gained by the project and shall propose step-by-step guidance for municipal specialist.
	Number of municipal lighting systems energy audits conducted	Municipalities are not aware of energy saving potential in lighting sector	5 municipal audits have been prepared	At least 10 comprehensive audits of public lighting (including pilots) completed in Yerevan and other cities	Targeted number of municipal lighting audits to be achieved by end of project.		At Mid-term stage, energy audits and recommendation reports have been prepared for 8 municipalities and 2 more are currently under development.
	Number of specialists and agency representatives trained	No specialized training or training materials on EE lighting is offered in Armenia	30 specialists were trained of YIC and respective municipalities on proper installation and operation and maintenance of LED luminaires.	At least 20 specialists from private sector and municipalities are trained on EE lighting and energy audit	No trainings on energy audit in lighting have been organized yet.		3 trainings and capacity building events and 1 study tour on EE lighting were organized from more than 20 specialists and stakeholders.
	Public media exposure	Limited broadcasting of information on EE lighting	Awareness raising materials prepared and disseminated, including sharing during relevant events.	Media releases on outcomes of each pilot. Awareness raising materials available for general public	Several publications and awareness materials were produced. But needs more focus on visibility and awareness related to benefits of EE in indoor lighting for the remainder of the project.		Leaflets of each of the implemented pilot project were developed, disseminated and posted on the website. Facebook page on GUL project objectives and results has been opened and updated regularly. A Reference Book and Guide on EE Lighting for Students were developed and disseminated. A video on the project is developed and broadcasted.

Project Strategy	Indicator	Baseline	Level in 1 st PIR (self-reported)	End of Project Target	Midterm Level & Assessment	Achievement Rating	Justification for Rating
Outcome 2 Demonstration projects: <i>Pilot projects yield cost-effective energy savings, raising the confidence of investors and decision-makers about EE lighting</i>	Efficiency and energy savings of installed EE lighting Share of LED in demo-projects	The majority of fixtures in municipal outdoor lighting sector incorporate inefficient 250W HPS lamps or 400W mercury-vapor lamps.	3 demonstration projects are completed	At least five demonstration projects on a number of efficient lighting technologies completed for indoor, outdoor and street lighting.	Number of foreseen pilot projects is achieved and produce foreseen energy and GHG savings.	HS	Nine pilot projects on street and park lighting have been implemented already and 3 more are under implementation. No pilot on indoor lighting has been implemented.
			No savings reported from pilot activities.	Direct energy savings of up to 0.95 GWh per year by completion of all pilots (subject to final selection of pilot size and technologies)	Expected target achieved by pilot projects.		Expected annual energy saving from implementation of 12 pilot projects in 0.983 GWh.
		100% LED replacement is achieved in all the three implemented demonstration projects.	100% LED for outdoor (park) and indoor lighting pilots	Target achieved.	100% LED included in park lighting pilot. Indoor lighting pilot based on LED technology will be implemented by July 2016.		
			40% LED included in street lighting pilots	LED technology is being used in all street lighting projects so far.	So far 100% LED included in street lighting pilots.		

Project Strategy	Indicator	Baseline	Level in 1 st PIR (self-reported)	End of Project Target	Midterm Level & Assessment	Achievement Rating	Justification for Rating
Outcome 3 Replication via municipal programs and associated financial instruments: <i>Municipal lighting programs lead to widespread deployment of EE lighting and associated energy savings</i>	Municipal programs for EE public lighting Financial commitments for energy-efficient municipal lighting	Municipal programs for EE public lighting are desired but not comprehensively designed, financed, nor implemented	No progress reported	Municipality of Yerevan develops and adopts program for upgrades of municipal lighting	No comprehensive MEEL program for Yerevan has been developed by the Project because of EBRD intervention. Reasonability of development of such a program shall be further discussed.	S	YM-EBRD joint project on EE upgrade of lighting systems of 28 streets. Project has been therefore not interfering with complementary project activities supported by other donors. Nevertheless, the remainder of the project will require a focus on municipal programs to be developed, with Yerevan as largest city in the lead.
			Municipal programs for Alaverdi, Spitak, Goris and Stepanavan towns are drafted. Alaverdi and Spitak drafts are shared with the owner municipalities for comments and further approval.	Similar programs are adopted in other cities of Armenia	While recommendations regarding street lighting modernization were provided to other municipalities, concise programs are not yet available.		Reports with recommendation on municipal street lighting system EE modernization were developed for and approved by in the meantime 8 municipalities.
			Revolving fund developed, discussed, approved and at work in Yerevan, and considered in other municipalities for implementation.	Establishment of financing mechanism for Yerevan (e.g. revolving fund)	The municipal revolving fund concept is set up and working successfully in several municipalities.		Municipal lighting modernization funds are established and operational in 5 municipalities and are under establishment with new partner municipalities.
			No progress reported	Support in preparation of funding proposals (including tenders for ESCOs) for cities of Armenia	No investment proposals for funding of EE lighting have been prepared yet.		Cooperation with IFIs and banks will have to be facilitated to develop at least one proposal on ESCO involvement.

Project Strategy	Indicator	Baseline	Level in 1 st PIR (self-reported)	End of Project Target	Midterm Level & Assessment	Achievement Rating	Justification for Rating
Outcome 4 National policies, codes, and standards on lighting: <i>New national policies mandate significantly greater energy efficiency and ensure product quality for lighting, particularly in residential buildings</i>	Existence of regulations that mandate improved energy efficiency of lighting products and installations	There is no regulation on energy performance of lighting products in Armenia	The energy labelling procedure was included in the amendments to the RA Law "On Renewable Energy and Energy Saving", currently pending adoption by the National Assembly of the RA. Decision "On implementation of energy saving and energy efficiency improvement measures in objects being constructed (reconstructed, renovated) under the state funding" was approved by the Government of the RA (decision #1504-N of December 25, 2014).	Proposed improvement to existing Law on Energy Efficiency addressing minimum energy performance requirements for lighting appliances	While there was progress made in the analysis of the acting local and international legislation, norms and standards to identify gaps and propose solutions, it is yet not foreseeable if the end of project target will be achieved throughout the remaining project period (ca. 1.5 years)	MS	Analysis of the acting local and international legislation, norms and standards is carried out to identify gaps and propose solutions. Progress has been made in analysing the legal/policy gaps but the development and implementation of broad policy instruments to promote energy-efficient lighting in Armenia yet remain work in progress and governmental decisions to large extent pending.
			International experience on phase-out of inefficient incandescent lamps was studied and a respective analytical note was elaborated, including an	A national phase-out plan of conventional incandescent lighting is adopted			The national plan for phasing-out incandescent lamps is one of the major impacts expected from the project. Is ongoing and expected to be achieved by end of the project.

Project Strategy	Indicator	Baseline	Level in 1 st PIR (self-reported)	End of Project Target	Midterm Level & Assessment	Achievement Rating	Justification for Rating
			address to legal and regulatory issues.				This subtask is expected to be completed by the local team of experts by the end of 2016. Another specific tasks of the project to be performed within the scope of the fourth outcome is envisaging the development of a proposal on setting the national regulations for environmentally safe collection, transportation, recycling and disposal of used mercury-containing lighting equipment.
			No progress reported	Other adopted policies and supporting standards	A local expert has been contracted to update national standard on natural and artificial illumination.	MS	One objective of this project is to facilitate adoption and enforcement of the updated norms by the Ministry of Urban Development of RA. Once become mandatory the new requirements will enable broader penetration of modern lighting technologies, thus, contribution to overall improvement of energy efficiency lighting for new public and residential buildings, educational institutions, streets, parks, etc.
			No progress reported	New criteria (including performance and life cycle costs) for incorporation in state procurement procedures for lighting applications are developed	Development and adoption of new rules for state agencies on procurement of energy-efficient lighting, based on best practices in other countries, is envisaged.		Baseline data for development of recommendation for incorporation in state procurement procedures for lighting applications is collected and analysed. As a first step a manual of energy efficient procurement of lighting systems/equipment is being developed. Second step is the analysis of the RA Law on procurement and secondary legal acts.

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved
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4.2.2 Remaining Barriers to Achieving Project Objective

Among the prevailing barriers that were considered in the project design to be mitigated by the GUL project, the following remain to be addressed throughout the outstanding project lifetime:

- **Lack of sufficient policy and regulations for EE lighting:** while progress has been achieved in initiating improvements in the legal policy framework of the Republic of Armenia, yet major results are not achieved. While it is being mentioned several times in the progress reports that the adoption of legal & regulatory improvements are a challenging task both – technically and politically – the impact of the project will be measured based on the achievements made.
- **Lack of information and awareness.** While progress has been made to involve several municipalities in pilot activities for improved street lighting, awareness and capacity is slowly improving on the public administration level. Yet, the biggest impact of this project is expected in the area of indoor lighting within public sector and residential buildings, since it has the chance to change the user behaviour of building users across the country and show the benefits of improved technology. The project has started to develop very useful awareness raising activities and materials, yet apart from street lighting other lighting users are not well addressed. Public awareness needs to be focussed on other lighting applications, and together with adequate quality control schemes for lighting products (luminaires and lamps) properly marketed.
- **Lack of available financing for urban lighting:** While the project has successfully introduced the model of a municipality-owned revolving fund, the provision of integrated energy services in the lighting sector via ESCOs or similar vehicles does not yet exist in Armenia, due to limited technical and financial capacity. Private-sector activity is present but still immature with regard to the import, assembly, sale, and installation of EE lighting. The project's task for the remaining project period is to develop a set of financial, institutional and legal proposals aimed at overcoming the mentioned barriers and facilitating investments in municipal energy efficient lighting.

4.3 Project Implementation and Adaptive Management

The MTR expert has reviewed the project implementation and adaptive management of the project, identified challenges and is going to propose in this report additional measures to support more efficient and effective implementation. The following aspects of project implementation and adaptive management have been assessed:

- management arrangements,
- work planning,
- finance and co-finance,
- project-level monitoring and evaluation systems,
- stakeholder engagement,
- reporting, and
- communications.

Achievements of project implementation and adaptive management have been rated in terms of the criteria above at a six level scale as follows:

- Highly satisfactory (HS) - the project has no shortcomings
- Satisfactory (S) - minor shortcomings
- Moderately satisfactory (MS) - moderate shortcomings
- Moderately unsatisfactory (MU) - significant shortcomings
- Unsatisfactory (U) - major shortcomings
- Highly unsatisfactory (HU) - severe shortcomings.

The results of the review and justification for the rating provided is described in the following paragraphs. The selected rating and a description/explanation of that rating is included in the *MTR Ratings & Achievements Summary* table (refer to summary, chapter 1.4).

4.3.1 Management Arrangements

The Project Management arrangements are as follows:

- The Project Implementation Agency is UNDP.
- The Ministry of Nature Protection is appointed to serve as Executing Agency.
- A Project Task Leader is responsible for daily management and actual implementation and monitoring of the project and is accountable to the Climate Change Program Coordinator. The project team has its project office in the premises of the Climate Change Information Center of Armenia hosted in the governmental building by Ministry of Nature Protection, i.e. outside of the UNDP country office in Armenia.
- The overall responsibility over the project is with a Project Board where ministries and governmental agencies are represented.
- UNDP Country Office Armenia is offering full support to project implementation, including administrative support as well as high level support by participation of the UNDP Deputy Resident Representative in the Project Board.
- The project is implemented by the ministry of MNP, in cooperation with MENR, MUD, MTAD and experts who are supported by international consultants.

A team of national and international specialist has been established to ensure proper implementation of the project activities and timely delivery of the expected outputs. The expert team is mobilized to implement project activities in line with the Project Logframe and Project Annual Work Plan. The most recent work plan for 2016 with allocation of expert tasks has been provided and reviewed by the MTR consultant. The Logframe and Project Performance Analysis summarizing achieved progress and pending tasks as of April 2016 has been introduced in Table 2.

National experts hired under the project comprised:

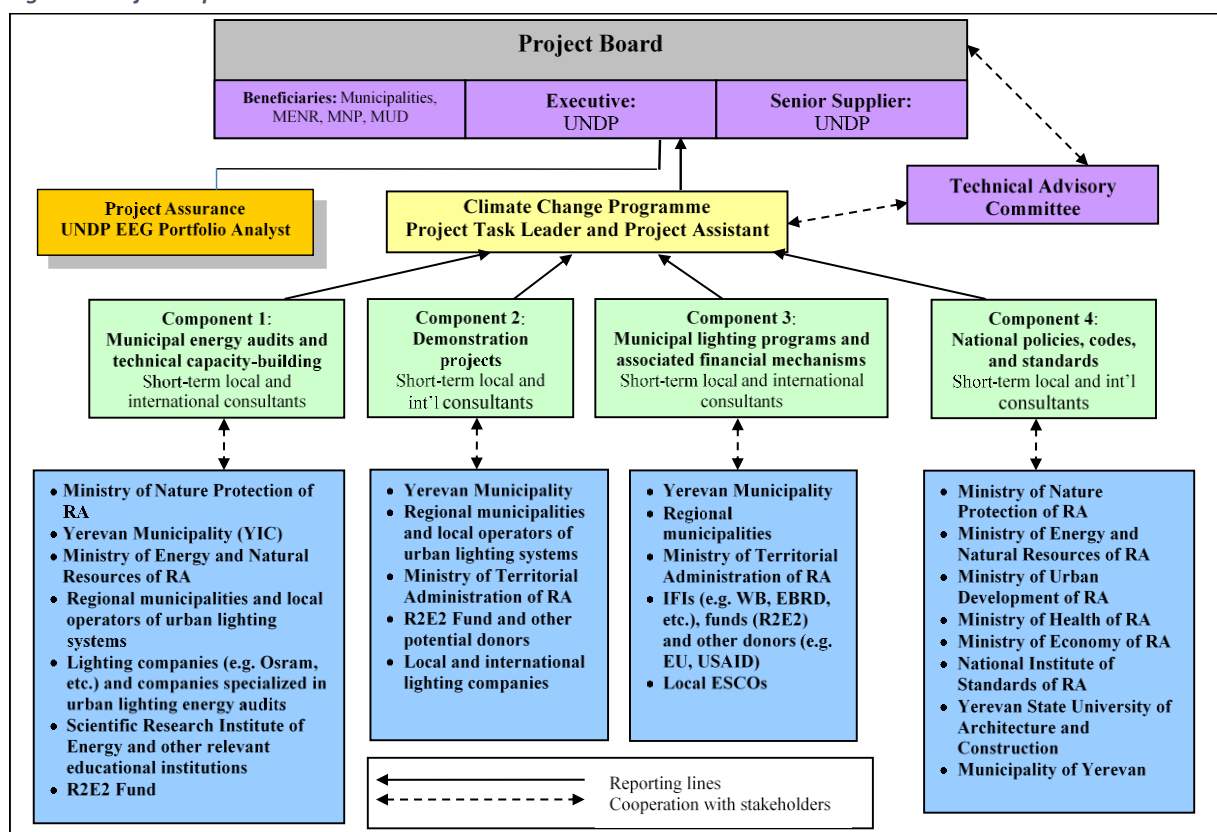
- Climate Change Program Coordinator
- Task Leader, Energy Efficiency Expert
- Expert on EE Market and Technologies
- Expert on Lighting System Audits (methodology and assessment)
- Expert on Lighting System Audits (technical and supervision)
- Expert on Municipal EE Lighting Projects
- Expert on Economic Assessment and Financial Mechanisms
- Expert on Building Codes and Standards
- Expert on Energy Auditing and EE potential evaluation
- Expert Team Assistant
- Local Experts on Legal and Regulatory Aspects, Building Codes
- Local Public Outreach Expert
- Local GHG Monitoring & Evaluation Expert

International experts hired under the project comprised:

- International Expert on Energy Efficient Lighting (for Inception Phase)
- International Expert on Roadway Tunnel Illumination Systems
- International Expert on Energy Efficient Lighting

The Project management structure proposed at the beginning of the project is summarised in the figure below.

Figure 2: Project Implementation Structure



The CC Program Co-ordinator and her acting Task Leader do cooperate very well together with the team of experts. One advantage of the given project management structure is the integration and close interaction with the MNP and other ministries involved, since the project office is in the premises of the government building, where the ministries are located as well. Furthermore, the Task Leader maintains a good communication basis and exchange with all project partners and external stakeholders, such as municipalities and ministries, as well as external co-operation partners (e.g. Universities, or Institutes from Russia and Belarus). The large number of demonstrations achieved during the project implementation does not only provide a strategic advantage (visibility and replicability of project results) but is also due to strong communication with external stakeholders and management & co-ordination under the Task Leader.

In terms of awareness and public outreach, a strategy has been developed, however, there is no specific expert nominated for this task. In order to increase the public perception of energy efficient lighting technologies, it is suggested to hire a public outreach expert, preferably and international expert.

In overall terms **management arrangements** are rated **Highly Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.3.2 Work Planning

The project was CEO endorsed in August 2013, whereas the actual project start (inception workshop) was January 2014.

All in all, compared to usual start-up difficulties in the first period of such projects, there was no major delay caused in the operationalisation phase, which is also grounded on the well-established PIU of the Climate Change Programme Co-ordination, which allowed the project to be immediately started.

The project management team has prepared annual work plans (AWP), based on which the activities and outputs are related to proposed project components and outcomes. The progress on the work programme is much in line with the initial plan. From the actual perspective, mainly component 3 and 4 require strong focus on time-wise achievement towards visible results and impacts.

The Project was originally planned to last for four years and is to be closed in October 2017. Nevertheless, a no-cost time extension (max. 1 year) may be considered for the following reasons:

- A number of municipal revolving funds are in place where further assistance but also additional monitoring & control in managing the funds (disbursements for project investments/replenishments out of energy savings achieved) will be required. Municipalities are building capacities through the UNDP-supported GEF-financed project but will require further support in methodological issues (e.g. public procurement – technical specifications drafting, calculating annual savings from implemented projects).
- Legal improvements (incl. new standards & regulations) on urban and indoor lighting systems are under development and are expected to last beyond project termination date. Being able to provide additional assistance and monitoring the progress it would make sense to have the project team involved in facilitating technical support for another year.

Work planning arrangements are rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.3.3 Finance and Co-financing

The project benefits from having an experienced Task Leader as well as Administrative/Financial Assistant in place that have experience in managing and administration of UNDP projects. The project is generally professionally managed and administered.

Table 3 provides an overview of the budgeted expenditures of the GEF Project of USD 1.6 million. As of end December 2015, USD 739,852, or about 46% of the GEF-funded Project budget, has been expended. Thus, more than USD 860,000 remain in the Project budget for technical assistance, implementation of demonstration projects and other activities for the project.

The largest share of budget has been spent within component 2, the least share in component 3.

Minor reallocations between the project components (approx. 1.2%) have been foreseen at the mid-term stage.

Thus, the spending of the budget is pretty much in plan and according to the period of implementation, as are also the results of the project delivered so far.

Co-financing and in-kind contributions

The project budget includes USD 0.25 million from the Government of Armenia (in-kind) and more than USD 7.0 million in cash from municipalities. USD 1.12 million are sourced from UNDP, which makes the whole planned co-financing contribution USD 8.52 million over the project period.

The project has benefited from additionally leveraged cash resources of about USD 0.91 million from several municipalities and one NGO for the support of the street lighting demonstration projects.

Confirmed Project co-financing to date has amounted to an estimated USD 2.7 million or 32% (by May 2016) following the actual project implementation status, with details from project partners provided in Table 4.

Financial management is rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

Table 3: Project Budget and Expenditures (in USD)

Project Component	Budget approved (in USD)	Disbursed (by end 2015)				Revised budget (planned)		Total (USD)	Remaining unallocated
	from ProDoc	2014	2015	Budget spent	% of budget spent	2016	2017		Total (USD)
Component 1	250,000	48,931.12	65,078.45	114,009.56	45.60	57,600.00	78,400.00	250,009.56	-9.56
Component 2	750,000	320,096.46	146,475.01	466,571.47	62.21	165,500.00	130,151.00	762,222.47	-12,222.47
Component 3	300,000	27,649.05	34,532.88	62,181.93	20.73	150,532.38	73,400.00	286,114.31	13,885.69
Component 4	200,000	30,853.30	35,772.60	66,625.90	33.31	57,500.00	70,600.00	194,725.90	5,274.10
PM Costs	100,000	16,984.42	13,479.08	30,463.50	30.46	39,164.26	37,300.00	106,927.76	-6,927.76
TOTAL GEF	1,600,000	444,514.34	295,338.02	739,852.36	46.24	470,296.64	389,851.00	1,600,000.00	0.00

Table 4: Co-financing of Project Partners (in USD)

Sources & type of co-financing	Name of co-financer	Amount confirmed at CEO Endorsement	Actual amount Contributed at stage of Mid-term Review	Actual % of expected amount
		USD	USD	
GoA (in-kind)	Ministry of Nature Protection of RA	250,000	180,000	72%
City government (cash)	Municipality of Yerevan City/YIC	7,000,000	1,028,077	15%
City government (cash)	Municipality of Sevan	25,000	23,500	94%
City government (cash)	Municipality of Spitak	30,000	36,376	121%
NGO (cash)	Counterpart International Armenia	95,000	0	0%
GEF Agency (Grant)	UNDP	120,000	26,736	22%
GEF Agency (Grant)	UNDP (Beautiful Yerevan)	1,000,000	500,000	50%
Additional co-financing leveraged				
City government (cash)	Municipality of Dilijan	0	900,000	
City government (cash)	Municipality of Alaverdi	0	1,500	
City government (cash)	Municipality of Abovyan	0	2,500	
City government (cash)	Municipality of Goris	0	8,000	
NGO (cash)	French-Armenian Interprofessional Network	0	2,850	
TOTAL		8,520,000	2,709,539	32%

4.3.4 Project Level Monitoring & Evaluation Systems

The elements of the project level monitoring and evaluation system have been defined in the project design as follows:

- Project Inception Workshop: to assist all partners to fully understand and take ownership of the project, and agree on possible revisions of the indicators, targets and their means of verification, while rechecking assumptions and risks.
- Quarterly monitoring of project progress (UNDP Enhanced Results Based Management Platform), update of risk logs in ATLAS from which Project Progress Reports can be generated.
- Annual Project Review / Project Implementation Report (APR/PIR) to monitor progress made since project start and in particular for the previous reporting period (1 July to 30 June).
- Periodic Monitoring site visits.
- Mid-Term Review and Final Terminal Evaluation in accordance with UNDP and GEF requirements.

Inception Report has been prepared, and as a result of the Inception Workshop, has foreseen slight changes in the project targets formulated in an updated Results Framework (log frame). Regular (annual) progress reports are prepared and submitted to UNDP; so far, annual progress reports (2013, 2014, 2015), the 2015 PIR, and a Mid-Term Analytical Progress Report (from May 2016) have been delivered.

In addition, Board meetings and meetings of Technical Advisory Committee are supposed to be used to monitor and present progress to and receive additional inputs and recommendations from stakeholders. However, so far only one Board Meeting (18/12/2014) and two TA Committee meetings were held (6/5/2014, 19/11/2015), and meeting minutes including discussion points and were developed.

Monitoring & Evaluation arrangements are rated **Moderately Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
		MS			

4.3.5 Reporting

As standard practice for all UNDP GEF-supported projects, the process of the annual reviews and ongoing monitoring & evaluation is provided through the Annual Performance Report and Project Implementation Review (APR/PIR). In the case of the GUL Project the PIR is a very important internal assessment and evaluation mechanism that encompasses reporting on progress towards development objectives (log frame update), administrative and financial systems, and thus an important tool for project management.

The progress reports produced by the project management, claim significant progress, both in terms of outputs being produced and sticking to the time schedule as laid down in the Project Document. Starting in the end of 2013, the project has now gone through about 2½ years of implementation (of the planned 4 years).

To the evaluator’s opinion, progress is most visible in the more ‘technically oriented’ components 1 (municipal energy audits, capacity building, awareness), 2 (demonstration projects) and partly component 3 (establishment of financing mechanisms), while component 4 (national policies, codes and standards) and parts of 3 (municipal replication programs) are still progressing and less visible in terms of achievements.

It is obvious that technical reports in the frame of the project are well prepared and summarise the issues they are to highlight properly (e.g. municipal energy audit reports, pilot project factsheets, and other technical publications, such as *LED Road Lighting Design Manual* (translated from external source into Armenian), *Reference Book on Organizations and Services Provided in the Lighting Sector of Armenia*, or the students’ *Guide on Energy Efficient Lighting*).

On the other hand, weaknesses have been observed in the overall project reviews and annual progress reports, since they perceived to be rather descriptive (activity reporting) and less critically reviewing the progress towards the results and impacts achieved (e.g. adaptive management changes and how/if they have been incorporated are not very obvious, only very generic M&E methodology). The lately produced Mid-Term Analytical Progress

Report provides, however, a detailed performance analysis including project exit strategy. This critical analysis shall be continued and reflected in the annual progress reports throughout the remaining project period.

The risk assessment and mitigation planning in the GUL project management reporting is also found in the need of improvement, especially adding more substance and critical review to it. The Project Document only referred to three types of risks (financial, political/regulatory, strategic), which were reported in the last update of the risk log (May 2015) as “mitigated” or at least “partly mitigated”. However, the MTR Consultant is of the opinion that the overall project risks shall be reviewed by PM at the mid-term stage and suggests to add pertaining risks referring to socio-economic and environmental sustainability of the project to be included in the risk log.

Reporting arrangements are rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.3.6 Stakeholder Engagement

Apart from the close linkage with related projects and initiatives in the country and the region, the Project has been already successful in arranging partnerships with stakeholders (municipalities, state organizations, partner projects, private sector, and financial institutions) for the implementation of the project.

These include:

- The project has established formal communication and working relations with 13 municipalities: Yerevan, Alaverdi, Spitak, Abovian, Sevan, Tashir, Stepanavan, Goris, Echmiadzin, Ararat, Kapan, Gavar and Kajaran. These particular municipalities were approached by the project within the reporting period due to the interest in cooperation with the project.
- Standard *Statements of Intent (Sol)* were signed with the municipalities prior starting the audit of lighting systems and evaluation of EE measures in lighting systems.
- Within the scope of the Sols comprehensive energy audit of municipal lighting systems of Alaverdi, Spitak, Abovian, Sevan, Stepanavan, Goris, Ararat, Kapan, Kajaran and Gavar (ongoing) are conducted.
- A study tour for key sector actors (representatives of Yerevan Municipality, Yerevan Illumination Company and National Standards Institute) on advanced technologies in urban lighting was organized from 27 till 30 October 2015 to Belgium. The study tour was co-financed by company Schreder as main supplier of LED luminaries for retrofitting the first street lighting pilot project in Yerevan.
- Cooperation was established with an US based company to test and apply SEAD software (Street Lighting Evaluation Tool) aimed to evaluate the luminance and illuminance, energy consumption and life cycle cost for both LED and conventional fixtures on many common road layouts.
- Cooperation with National Polytechnic University of Armenia (NPUA) on the development and integration of teaching modules is organized within the scope of Statement of Intent signed between UNDP and the University.
- Specialists were invited from the “Center of LED and Optoelectronic Technologies of National Academy of Sciences of Belarus” to provide consultations on required equipment and setting operational procedures for a modern photometric testing laboratory to certify quality of locally produced and imported lighting equipment and devices.
- The project organized a workshop on “Modern lighting, lighting norms and standards, measuring equipment” for about 40 stakeholders together with the “Russian Lighting Research Institute S.I.Vavilov (VNISI)”
- Organization of training sessions for students and secondary classes on lighting topics, jointly with American University of Armenia.
- Ministry of Finance of Armenia and the Municipality of Yerevan city signed an agreement in May 2015 to allocate an EBRD loan of €3.7 million and co-financing grant of €1.9 million from E5P fund (Eastern Europe Energy Efficiency and Environment Partnership, managed by EBRD) to support the modernization of street lighting in the city of Yerevan.

- Communication with other local banks, such as ACBA – Credit Agricole Bank, have been established for setting up new financing mechanisms, e.g. crediting of municipalities without sovereign guarantee and collateral and by offering interest rates that are lower than the average commercial rate in Armenia.

Overall conclusion is that the project management has achieved appropriate partnerships with relevant national stakeholders (municipalities, ministries, national institutions, private sector and financing institutions) and participation of these national stakeholders is visible throughout the whole project. Governmental stakeholders support the objectives of the project and are involved in strategic decision-making and setting directions through the Project Board and Technical Advisory Committee.

Ultimate beneficiaries, such as municipalities, have been proactively supporting the project from the beginning, and mentioned to be very satisfied with results achieved so far – namely being given support in the implementation of pilot projects and development of financial mechanisms, which would allow them to replicate further activities in the future.

Stakeholder engagement arrangements are rated **Highly Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.3.7 Communications

The MTR is to evaluate the effectiveness of the project communication with stakeholders and feedback mechanisms applied in the course of the process, and how communication with project stakeholders contribute to their awareness of project outcomes, activities and long-term investment and how awareness possibilities could be generally expanded under the ongoing project activities.

Communication with project stakeholders

Facilitation of communication between project stakeholders is ensured throughout the project duration. The means of information, networking and feedback loops are formally setup through the Project Board and Technical Advisory Committee. While the Board has had only one meeting so far, the TA Committee (2 meetings) provided useful means to exchange information and knowledge regarding EE and lighting issues on technical levels among involved ministries and national institutions. Since the project management of GUL project is embedded in the MNP’s Climate Change Information Centre it is ensuring a continuous communication with national stakeholders and knowledge management for climate-change and energy efficiency related topics in the country. The means of communication and exchange is ensuring strong commitment among governmental decision-makers.

The PM has also established formal communication and working relationship with altogether 13 Armenian municipalities so far, which were approached due to their interest in co-operation with the project. The relationship was formally based on standard *Statements of Intent (Sol)* that were signed with the municipalities prior starting the audit of lighting systems and evaluation of EE measures in lighting systems. The Sols define the following three main cooperation areas: (i) organization of energy audit of the municipal lighting system, (ii) joint implementation and co-financing of demonstration project, (iii) establishment of a special revolving fund for financing energy efficient technologies’ introduction in lighting system.

Recently, the project has also signed Sol with World Vision Armenia to implement two pilot actions on indoor lighting in a community development centre (Gyumri) and social housing (Aparan community).

Other formal communication and exchange addressed through the project – mainly on technical level and know-how exchange – was in the frame of cooperation with on-going national projects (e.g. UNDP-GEF IEEB Project) and other country initiatives (similar UNDP-GEF projects ongoing in Kazakhstan, Russia), training and certification institutes, civil organisations involved in pilot projects, while on the institutional level co-operations with Institutes from Russia (Lighting Research Institute after S.I.Vavilov - VNISI) and Belarus (Center of LED and Optoelectronic Technologies of National Academy of Sciences of Belarus).

All in all, the networking activities established by the Project Management to integrate national stakeholders and international cooperation partners are contributing to their awareness about the project outcomes and thus are an important element to achieve sustainability of project results.

Communication of project results – awareness of general public about EE lighting

Achieving energy conservation through efficient lighting makes sense from many perspectives, and its benefits impact public institutions, but also businesses and citizens within the country. Public information and outreach contribute to effective decision-making and play a significant role in building confidence in government and its policies. Awareness-raising communications campaigns support the national EE lighting strategies and should promote lighting energy efficiency policies and programmes to be put in place. So, when properly conducted, public awareness and educational campaigns help EE lighting programs gain momentum in the marketplace.

So far, the GUL project has focussed on promoting technical guides, reference books, design manuals and achievements made in the realisation of pilot projects (e.g. published audit reports and pilot factsheets), which are all published on the project website (<http://www.nature-ic.am/publications-and-reports-gul-project/>). Certainly, the “technocratic” aspect of result promotion is to be regarded important part of communication, since providing technical facts and requirements promoted in a transparent and scientific-based manner is considered to increase the quality of discussion about lighting topic and contribute to a serious knowledge exchange among the experts’ community. The project has a “Communication and Outreach Strategy” developed in 2014, with the objective to *“organize media coverage and other public outreach on energy efficient lighting, to build support for the urban programs and also to promote EE lighting in the residential sector. In addition the Project will contribute to global awareness raise on EE lighting by sharing its best practices via partnership with UNEP/ GEF en.lighten initiative.”*

The following activities are supposed to be comprised of:

1. **Research** – questionnaires, surveys and focus group studies to measure the receptivity of partner organizations to lighting communications as well as analyzing current public attitudes and perceptions on lighting and policy.
2. **Public Outreach/Communications Training** – communication skills enhancement for government and project counterparts in effective public affairs, outreach, media relations and communications techniques.
3. **Mass Media Campaigns** – television, radio, print and online media as outreach mediums.
4. **Information Products/Services** – designed for the public to increase knowledge and understanding, i.e. posters, billboards, newsletters, media monitoring, media kits and the website.
5. **Media Relations/Journalist Training** – increase capacity building and improved lighting sector knowledge for journalist and the media.
6. **NGO Capacity Building** – working with NGO community, as well as other community to increase knowledge and participation in lighting-related issues.
7. **Public Meetings/Stakeholder Forums.**

So far, the focus was on educational component addressed to specialists and young professionals (college students, secondary education) and organisations of seminars and workshops for national stakeholders and municipal representatives as well as inauguration events with regard to energy efficient lighting pilots. More than 300 participants at those events altogether reveal the project’s success in addressing stakeholders and multipliers.

Nevertheless, it is recommended to give stronger focus in the remaining project lifetime to the end users of EE lighting technologies – i.e. public administration, private enterprises and citizens – since public awareness on energy efficiency in general remains low in Armenian public perception, and thus population is yet very much unaware of the benefits of energy efficient lighting technologies and how they improve people’s comfort, reduce their operational costs, understand how decision-making at point of sale is influencing energy demand throughout the product’s lifetime etc.

In this respect, what is recommended and where the project shall build upon its capacity and visibility among stakeholders in the country, is to link dedicated lighting campaigns and awareness programs with monitoring their impact to identify if and how project’s achievements lead to market changes and influence consumer behaviour. For instance, the “Residential Energy Consumption Survey” conducted in 2015 that was obtaining reliable data on energy consumer behaviour among residents, shall be specifically repeated over time (e.g. every 2 years) to

ground measurable changes in user behaviour and assess the impact of a project such as GUL towards long-term purchase decisions and energy use. Therefore, as a recommendation to be followed-up by this MTR, public awareness and outreach activities should be monitored and evaluated against their impact on influencing end-users' energy behaviour and thus result in more specific assessment on the *state of the market on EE technologies deployed in Armenia*.

Furthermore, promoters of energy efficient technologies, such as lighting equipment stores, their importers and main customers, shall be included in public campaigns. While it is important that the project keeps objectivity and does not promote specific stores/shops or brands, cooperation with suppliers and vendors should be considered to leverage qualitative aspects of EE lighting in the public perception, something that could be supported in the future by introducing labelling schemes (e.g. EU labelling scheme for eco-friendly products) and support the spreading of EE top products on in the Armenian market. Thus the role of promotion via internet and social media is, as in other countries, expected to play a dominant role. While in-web and in-app purchases of consumer goods and household appliances in Armenia is still in its infancy, the web and social media can play an important role in supporting purchase preferences and customer decision-making. Examples of databases promoting top-rated, high energy efficient appliances (, e.g. topprodukte.at, top-ten.ch, similar to the EU Energy Star for ICT equipment) is just one direction where awareness raising could become more effective.

In addition, what has been recently recommended by an international lighting expert engaged in the project, is to open up the vast information sources provided through the CCIC website (<http://www.nature-ic.am>), relating to climate change and energy efficiency (in buildings, for heating systems, on lighting), but being more or less "hidden" for specialists' access only, for broader public use, by properly organizing contents and making them easier available. Even more, a separate web domain, where e.g. the existing GUL facebook page (<https://web.facebook.com/groups/576980785727318/?ref=bookmarks>) could be integrated, should be considered for easier recognition and accessibility for the public audience. Any future campaigns, publications and events could be interlinked with a main platform on "Energy efficiency and lighting in Armenia".

As regards specific recommendations to be considered by the project in the remaining implementation period, they have been summarized at the end of this report.

Considering overall **project communication** arrangements under the GUL project, the progress made so far is rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.4 Impact and Sustainability

Project impacts

As of the MTR, the project has a good prospect to improve energy efficiency in existing urban lighting schemes of participating municipalities. Although not fully considered throughout the first implementation period, the GUL project still does have also potential to impact in the long-term the newly designed and rehabilitated buildings in the public and residential sectors, since lighting is significant part of energy used in the built environment. For example, 11 municipalities in Armenia have signed to the Covenant of Mayors initiative, from which 4 have within their Sustainable Energy Action Plans (SEAP) approved priority on lighting EE improvement. In addition, all new construction of streets in Yerevan and the road construction funded by ADB and EIB is done with mandatory use of LED.

Energy efficiency in lighting creates financial benefits for municipalities, private citizens, and private companies that provide energy services and advanced lighting. These anticipated financial benefits are powerful incentives for new demand, allocation of investment, and support of policy initiatives, which are all also key factors for the success of the project in terms of delivery of environmental benefits. The project has been specifically designed to lower barriers that tend to slow-down the development of financial incentives.

In supporting national and municipal lighting initiatives, the project also helps indirectly to advance goals of development, beautification, and enhancement of public safety in Armenian cities. All in all, the project is neutral

to social equity and equality issues and doesn't have special impact on issues like gender equality and women's empowerment.

The project has been designed to deliver sustainable impact in the way that knowledge and capacity for improved lighting systems (outdoor and indoor) will be improved, technical specifications for their use and procurement are developed with technical assistance of national and international experts and institutes (mainly from Russia and Belarus), while sustainable financing models to be introduced on Armenian market will allow municipalities to utilise financial benefits as they build upon a longer-term retrofitting and replacement strategy. On another front-end, energy efficiency legislation is to be further improved in regard to minimum energy performance standards for lighting and overall regarding the building energy performance.

This legal and policy framework conditions to be continuously developed and improved throughout GUL project will support the public sector in its transformation process. Energy efficiency aspects will be introduced into long-term management of public assets and infrastructure, with literally visible effects, since lighting improvements in public space are immediately considered as improving quality of life.

On a macro perspective, the impact of the project is of wider sense:

- Energy efficiency is already receiving high governmental priority and is backed by legislative framework in place including targets specified in Armenia's National Energy Efficiency Action Plan (2nd plan recently developed, 2015). Development of specific performance standards for EE lighting and related technical regulations are addressed by the GUL project.
- Armenia is member of the Russia-promoted Eurasian Economic Union (EAEU) and (still) committed to EU approximation strategies, which shall affect the commitment and willingness to further uptake relevant policies and legislation of both alliances in coming years.
- Although general awareness of public about energy efficiency is regarded to be still low in the country, market actors are increasingly showing interest in EE business. This concerns the growing availability and supply of EE lighting equipment by local vendors, the existence of private-owned, local certification institutes that are helping to ensure quality standards to be developed and enforced. But EE is also (and especially) interrelated with promotion of energy efficiency within private and public building, as being supported through the (almost terminated) UNDP-supported, GEF-funded IEEB Project, so there is a need to tackle the potential for future improvements by addressing the quality aspects, availability of proper lighting technologies on the local market and awareness and knowledge about their uses.
- Professionals are trained on integrated building design concepts and specifically through the GUL project on lighting technologies and energy efficiency aspects to be considered herein. Targeted activities will improve the awareness and know-how primarily of municipal experts (technical and procurement staff), with wider impact to sensitize project developers, architects and engineers in achieving higher quality construction (new as well as rehabilitation of buildings).
- The following project achievements will create a sustainable impact of the Project:
 - Successful co-operation with municipalities, technical departments, procurement officers and
 - Demonstration projects create public interest and increase experience with new lighting technologies and resulting benefits through improved quality of living.
 - Newly introduced financial models will

Prospects of Sustainability

Sustainability is generally considered to be the likelihood of continued benefits after the project ends. The purpose of reviewing the sustainability of the project during the Midterm Review is to set the stage for the Terminal Evaluation, during which sustainability will be rated by each of the four GEF categories of sustainability (financial, socio-economic, institutional framework and governance, and environmental). Consequently, the assessment of sustainability at the midterm considers the risks that are likely to affect the continuation of project outcomes.

The MTR Consultant has reviewed the risks identified in the Project Document, Inception Report, PIRs and the ATLAS Risk log and evaluated whether the risk ratings applied are appropriate and up to date.

In addition, the MTR Consultant has started discussions with the Project Team to gear their thinking towards sustainability risk factors, as well as opportunities to build risk management into the project plan in a thorough manner throughout the remaining project period. The following table provides a summary of the updated risk analysis how it has been evaluated by the MTR Consultant.

Table 5: Risk Analysis of the GUL Project – updated at MTR stage

RISK CATEGORY	DESCRIPTION OF RISK	STATUS: INCEPTION REPORT		UPDATED STATUS (at Project Mid-term)		
		Probability Rating from 1 (low) to 5 (high)	Impact Rating from 1 (low) to 5 (high)	Probability Rating from 1 (low) to 5 (high)	Impact Rating from 1 (low) to 5 (high)	Justification
Financial	Financing for demonstration projects and/or municipal programs proves to be unavailable	2	4	1	4	<p>The risk of financial failure has realistically gone down since the project inception. Financing mechanisms are evolving, e.g. the municipal revolving fund has been successfully introduced in Yerevan and other several municipalities.</p> <p>In addition, financing means of other IFIs are being sought and partly assured already, e.g. EBRD has provided loan and grant (through ESP) for municipal street lighting project in Yerevan.</p> <p>Yet, the project is to identify possibility to successfully introduce ESCO model, which is currently not experienced in Armenia and would be another pillar for achieving financial sustainability.</p>
Socio-Economic	Stakeholder ownership and public/stakeholder awareness are not being sustained after project finalisation	N/A (Newly added)		2	5	<p>Municipalities are key stakeholders in sustaining the project outcomes, namely following-up the implementation of EE lighting projects in the future.</p> <p>Apart from public (street) lighting, implementation shall focus on lighting projects in public buildings (e.g. schools, kindergartens, municipal offices) and private sector (office buildings, residential), which needs further awareness measures, promotion of EE lighting technologies and lessons learned to be enforced/shared in the remaining project period, in order to the achieve the envisaged impact.</p>
	Knowledge and capacity requirements for municipal specialists remain low	N/A (Newly added)		3	4	<p>There is a need to focus on capacity and knowledge development for public authorities on executing technical audits for lighting systems, receive methodological guidance when doing procurement, evaluation of best offers, supervising the implementation and others in areas that municipalities may not have sufficient capacity of their own (e.g. related to EE lighting technology).</p> <p>There is a large impact to be expected from capacitated experts on the local level which in turn imposes a post-project sustainability risk in case not being properly ensured throughout the remaining project period.</p>
Institutional framework & Governance	Proposed policy changes are not adopted or not sufficiently enforced	3	3	3	3	Although progress is made on the policy level through amendments on primary law on energy efficiency and renewable energy and some government decrees (e.g. on implementation of EE improvement measures in facilities being (re-) constructed under the state funding, yet the the development and implementation of policy instruments

RISK CATEGORY	DESCRIPTION OF RISK	STATUS: INCEPTION REPORT		UPDATED STATUS (at Project Mid-term)		
		Probability Rating from 1 (low) to 5 (high)	Impact Rating from 1 (low) to 5 (high)	Probability Rating from 1 (low) to 5 (high)	Impact Rating from 1 (low) to 5 (high)	Justification
						and enforcement of updated norms to promote EE lighting in Armenia yet remain work in progress and governmental decisions to large extent pending. Therefore, the governance risk remains and is rated medium to high.
	Inadequate project implementation and coordination with other initiatives	2	2	1	2	The risk for inadequate project implementation and coordination is considered low. The project has made significant progress in highlighting the need for cost-effective energy savings in one of the municipalities' major cost centres, being public lighting. Success was achieved in building partnerships nationally with ministries and public entities, private stakeholders and with transfer of know-how from foreign partners (e.g Russia, Belarus, and intl. experts) and through a study trip to Belgium.
Environmental	Indirect Energy savings and GHG emission reductions achieved through replicative actions are not materialising	N/A (Newly added)		3	4	Until the mid-term period, the project had less emphasis on other areas of EE lighting improvements such as indoor lighting in public and private residential buildings in particular. Unless complementary efforts will be made during the second half of the project to address also these areas, it will be difficult for the project to claim indirect energy saving and GHG reduction benefits at the level of 125 GWh and 50,000 tons of CO2eq per year, as anticipated in the Project Document and confirmed (with latest minor changes) within the Inception Report. Adoption and start of implementation of municipal EE lighting retrofit programs (incl. both, outdoor and indoor lighting) shall be receiving greater attention and cost benefits from switching old, outdated lamps and luminaires to LED shall be put in the foreground for the project to promote intensively, within the participating municipalities and among general public.
	Missing strategy for environmentally safe collection and disposal of used mercury-containing lighting equipment	N/A (Newly added)		3	3	Compact fluorescent lighting (CFL, also named "energy saving lamps") do impose environmental hazards through the mercury they contain, in case not properly disposed of. While the project is promoting the "phase-out of incandescent lighting" with more energy efficient technologies, CFL do need a proper market introduction but also exit strategy (mainly concerning the collection and disposal of used lamps), which is not available yet. Is supposed to be developed with the support of the project, yet remains an environmental risk for the overall sustainability of the project.

Some of risks mentioned above are still valid; the most obvious risks the project faces currently (at the MTR stage) are related to:

- Policy framework and regulations for EE lighting not implemented within the project lifetime
- Complementary efforts to focus on EE lighting replications in public and residential buildings are not achieved and thus targeted GHG emission reductions not achieved
- Strategy for environmentally safe collection and disposal of used mercury-containing lighting equipment not developed and approved
- Knowledge and capacity requirements for municipal specialists remain low

As referred to in section 4.3.5 (Reporting), the MTR Consultant suggests the review of the initially defined project-related risks, their probability and impact, and adding new categories of where risks are in the light of the mid-term review pertaining.

Overall, the project implementation faces currently a medium to high-level risk that is related to implementation of one of the overall project objectives (indirect GHG emission reduction achievement), to outcome 1 (especially on achieving sufficient awareness raising impact) and outcome 4 (development and enforcement of new EE lighting policies, norms and standards) – refer to the review of the *Project Results Framework* (chapter 4.1.2).

Risk mitigation should therefore be focused around the following strategies and activities to be considered throughout the 2nd implementation period of the GUL project:

- Energy efficiency criteria to be incorporated into technical standards and consequently into technical regulations to become compulsory. Progress on this performance-related outcome will provide a key decision by the government to achieve market uptake in the future – not only in the public sector but also related to residential energy use.
- Phase-out of incandescent lighting: there are prevailing technical issues to be sorted out. A technical committee is required to be installed at the standardisation level (National Standards Institute), referring to experiences from best-practice in other countries (e.g. within Eurasian Economic Union – Russia and Kazakhstan). The ban of inefficient lights and replacement by another “transition technology”, such as CFL (compact fluorescent lighting) is associated with environmental issues to be solved on the national level (i.e. safe collection and disposal of mercury containing luminaires). This issues are being addressed at the political/governmental decision level, yet with bigger emphasis required and experiences/best practices from other countries in the region to learn from.
- In order to effectively remove the barriers to residential and public sector indoor lighting EE improvements and reach the anticipated indirect impacts of the project, product quality is an area that the project is recommended to seriously look at during its remaining implementation period. Quality control mechanisms, market monitoring and surveillance mechanisms used in other countries shall be reviewed and after that concluding what realistically could be supported, advocated and adopted in Armenia.
- The project’s expert team provides technical support to municipal technical and procurement staff by elaborating technical specifications and supporting in the tender process. There is a risk that without proper capacity and knowledge on the local level the positive drive and impact of pilot projects will not be maintained or utilised in the future. Procurement guidelines and standardised specification sheets for lighting procurement might support municipality staff, while UNDP assistance could be further envisaged within showcasing (eventually through other project sources) green public procurement programs for municipalities.
- However, for the time being Armenian procurement law does not foresee specific technical requirements of energy efficiency or minimum energy performance standards. Technical support by the GUL project to introduce and adopt such new rules would significantly impact future public tenders and the requirement to use energy efficient technologies for indoor and outdoor illumination of public space and other aspects of energy-related procurement services.

Taking into consideration the prevailing risks and the mitigation strategies to be considered by the project, the **sustainability prospects** are rated **Moderately Likely**.

Likely	Moderately Likely	Moderately Unlikely	Unlikely
	ML		

5 Conclusions and Recommendations

5.1 Conclusions

The GUL Project has been operational for about 30 months (out of planned 48 months) since it has been kicked-off, with about 46% of its TA budget expended. While there appears to be broad acceptance of most of the proposed activities and interventions of the Project, the progress of the Project to date can be characterized as follows:

- **The project has made satisfactory progress on outcomes 1-3 so far. Under outcome 4, the Project has still to cope with the risk of non-achievement of legal/regulatory targets, while having progressed on the gap analysis and preparatory activities for legal decision making, the progress is therefore rated moderately satisfactory.**
- Overall, progress is in line with expectations as log frame indicators are achieved in compliance with the Work Plan. Special attention was paid to the municipal lighting audits and technical-capacity building activities (Outcome 1) as well demonstration projects (Outcome 2), where a higher number of projects than initially foreseen are expected to lead to the achievement of direct energy savings as planned. Current status is that the project will implement 12 demonstration projects on street-lighting (initially 5 planned) and two indoor-lighting pilot activities. As a direct result of the project implementation and support received for the realisation of demonstration projects, about USD 8.2 million co-financing was committed during project development, from which USD 2.7 million were already utilised and some USD 0.91 million (11%) leveraged through additional partners and co-financing means.
- Although the project is not 100% on track regarding implementation of EE legislation and standards, the relevance of the EE topic is high for the Armenian government. Project stakeholders and cooperation partners are fully committed to proceed with the activities according plan. Stronger co-ordination between project management and political decision-makers (e.g. through the IAWG or SC) is required in the second period to get the necessary political commitments and strategies (e.g. phase-out plan for incandescent lighting, developing new criteria for incorporating lighting applications into public procurement procedures) off the ground.
- The project is overall professionally managed and administered, and has delivered substantial results by now:
 - **Municipal energy audits conducted, technical capacity-building and awareness raising activities launched.**
 - The main provisions for energy lighting audits were developed according to the current standards, tested during the pilot site monitoring, gaps revealed, recommendations drafted. The audit methodology was tested and audits conducted and reported for Yerevan city, Spitak, Goris, Ararat, Abovyan, Sevan, Kapan, Kajaran, Gavar and Stepanavan municipalities.
 - In the frames of the International Day of Energy Efficiency and in cooperation with the Union of Architects of Armenia and GEF/UNDP Project on Improving Energy Efficiency in Buildings, a seminar for architects and designers organized. Training conducted by the technology supply company for the respective staff of the Municipality on proper installation and operation of light-emitting diode luminaries (about 20 staff trained).
 - Seminar held on "Technical regulation of lighting devices" application in the frames of Customs Union and issues of establishment of national testing laboratory" by a specialists of the Russian Lighting Research Institute named after S.I. Vavilov and "Center of Light-emitting diode and optoelectronic technologies of National Academy of Sciences of Belarus".
 - Educational module for college students on light and issues and energy efficient technologies and solutions in the sector were developed and presentations delivered for about 180 college students in 5 institutions.

- Seminar on modern lighting, lighting norms and standards, measuring equipment was held for about 50 representatives of state authorities of the RA, design institutions, private sector, educational institutions and academia. A brief guide for high school students on existing lighting technologies, their application, pros and cons, modern energy efficient solutions was prepared.
- Public outreach activities:
 - Reference book on acting organizations and rendered services in the lighting sector of Armenia published
 - LED Road Lighting Design Manual was translated into Armenian and published
 - Guide on Energy Efficient Lighting for Students presented
 - Presentation of a country-specific guide on EE modernization of tunnels
 - Development of documentary on Green Urban Lighting Project
 - Project factsheets produced and published via website
 - GUL project facebook page developed
 - GUL project sub-page provided on CCIC website
- **Pilot projects are yielding energy savings and raising awareness of investors and decision-makers about EE lighting.**
 - The baseline energy consumption was assessed and measurements conducted in preparation for the design of pilot projects in Yerevan city, Alaverdi, Spitak, Goris, Ararat, Abovyan and Sevan towns. The measurements conducted for the installed fixtures for pilot projects.
 - For two pilot streets, based on measurements and monitoring, payback period for energy efficiency investments estimated and used for revolving fund establishment process as indicative figures.
 - For the first two pilot projects (9 km and 1.8 km) with 100% light-emitting diode replacement procurement process and installation finalized in Yerevan: street lighting (482 units) and Zoological garden park type - all with 100% light-emitting diode replacement. Energy efficient lighting pilots are finalised in following small municipalities: Alaverdi (70 units); Spitak (50), Abovyan (83), Sevan (62) towns. Street lighting pilot projects are all with 100% LED replacement, with efficiency requirement sustained at 100 lm/ W.
- **Municipal lighting programmes started to be developed and to lead to widespread deployment of EE lighting.**
 - Municipal programs for lighting upgrades were started to be developed in Alaverdi, Goris and Spitak towns. The lighting system upgrade in Alaverdi was already prepared for implementation, shared with the Municipality and the selected measures assumed as the basis for pilot projects' implementation.
 - Lighting system upgrades were further envisaged and pilot urban areas/settlements agreed upon with the municipalities of.
 - Municipal revolving funds were introduced as a new financing instrument, with funds being established in Yerevan city, and towns of Alaverdi, Abovyan, Spitak and Sevan being approved by municipal councils. Meanwhile, savings of about AMD 25 million (approx. USD 52,000) were achieved on municipal accounts (status April 2016).
- **New national policies, codes and standards related to EE lighting are under development.**
 - The decision of Armenian Government "On implementation of energy saving and energy efficiency improvement measures in objects being constructed (reconstructed, renovated) under the state funding" was developed and submitted to the Government of Armenia. It was approved and published on 25 December 2014.
 - Amendments to Armenian Law "On Renewable Energy and Energy Saving" were adopted by the National Assembly of Armenia in May 2016, and signed by the President of RA on 3 June 2016. The additions and amendments adopted envisage promotion of large-scale introduction of design, construction and operation practices of energy efficient buildings and lighting systems in the Republic of Armenia in line with the concept of energy security of the country and environmental policy for climate change mitigation.
 - The localization of SNiP 52.13330.2011 "Natural and artificial lighting" is underway.

- The ability of the project to create long term impact has been partly achieved so far. Most of activities are ongoing and so are their results and achievements to be viewed in a longer perspective.
- As for the planned remaining activities, continuous review of work plan against available resources and likeliness of timely implementation needs to be properly taken care of and results evaluated & monitored against their outcomes and impacts.
- The completion date of the Project is foreseen for October 2017. No major project delays are to be expected from today's point of view.

5.2 Recommendations

- **Recommendation 1: Legislation framework is improving, but focus is needed to achieve adoptions of new standards and rules for green public procurement to support the market penetration of EE lighting.**
 - The development of a national phase-out policy for incandescent and other inefficient lighting fixtures will be a key milestone to make a shift towards EE lighting on the Armenian market happen. Project shall therefore keep track and support the government in developing the strategy.
 - The Russian Standard for Illumination from 2011, which is to be updated in 2016, is one of the tracks to be followed up and considered for possible adaptation/adoption in Armenia.
 - Project shall further take into account the required quality control and affordability constraints and elaborate measures and policies, such as adequate quality control and social support schemes, by building on the experiences and lessons learned from other countries.
 - Regarding adoption of new rules for procurement of energy efficient lighting, experiences from similar work done in other countries shall be incorporated into the Armenian case.
- **Recommendation 2: Ensure that municipal stakeholders are able to take energy efficiency criteria forward into their daily operations**
 - Procurement advice and specific guidelines on formulation of technical specifications and selection criteria based on 'most-advantageous-tender' concepts shall be developed and introduced to municipal procurement staff, including safeguarding elements, illumination quality levels, product guarantees and environmental aspects. In this respect, specific procurement guidelines for the replacement of old CFLs and LFLs and other types of luminaires and lighting fixtures (as deemed necessary) shall be considered.
 - Project team shall further consider introducing lifecycle costing approaches in public tenders organized in the frame of the demonstration projects. Procurement and technical staff dealing with public tenders shall be trained on this concept.
 - Methodological guidance/manual prepared for audits of public lighting systems shall be relatively straight forward by building on the audits already conducted in the frame of the GUL project as well as on the information that can be drawn from the comprehensive EBRD studies done for the preparation of EBRD Street Lighting Project.
 - Support for private, international, and innovative municipal financing sources shall be given high priority under the remaining project implementation period. In order to attract further EE urban lighting programs, promotional road shows could be considered to attract more donor funds for the capitalisation of the municipal revolving funds.
 - Given the large replication potential for energy efficiency in indoor lighting (public and private residential buildings), remaining project duration shall be used to select a few representative public buildings of different type for more detailed energy audits not addressing only lighting, but their energy consumption in general (so as to contribute to the formulation of broader municipal EE programs later on).
 - With the help of dedicated financing experts, specific guidelines and templates for municipalities to develop model contracts for different kind financing modalities (direct procurement, EPCs, ESCOs etc.) shall be prepared. Additional supporting instruments, such as analytical tools to conduct lighting system audits, or technical, economic and financial feasibility assessments could be made available from other similar projects.
 - Municipal programs for EE public lighting will need to be enhanced in terms of broader coverage (e.g. overall lighting infrastructure retrofit strategy) and especially for the municipalities involved

addressing the plans for retrofitting other remaining streets not included among the covered by UNDP/GEF or other IFIs (e.g. EBRD) support. Lighting programs shall also consider indoor EE lighting retrofit needs in public buildings.

➤ **Recommendation 3: Maintain high level of public outreach and institutionalise public awareness measures in the long term**

- The Project shall maintain the high level of dissemination and public awareness creation activities throughout the remaining project period. Public outreach expert, preferably with international background and relevant expertise shall be nominated to implement dedicated awareness activities.
- Establishment of a testing laboratory for lighting equipment and educational laboratory in a university is already underway. However, it shall be assessed whether any complementary outreach is required e.g. for universities to encourage the effective use of the laboratory for research and educational purposes by a variety of stakeholders.
- Lighting campaigns and awareness programs shall be widened up and addressing the potential for EE in lighting for different end-user groups (users of public and residential buildings). Reinventing the wheel is not necessary, since there is a vast experience to learn from other countries' program experiences¹. Project shall further start measuring impact of campaigns allowing to measure the contribution of EE lighting retrofits towards the change of energy demand in the country, and towards the project finalisation introduce specific monitoring indicators into its M&E strategy.
- In terms of more effective and visible awareness and campaigning, a dedicated website (separate web domain) shall be introduced in Armenia. This website – eventually combined with social media functionality – shall provide the major information hub on energy efficient lighting in Armenia.
- Experiences and lessons learnt from Armenian GUL project shall be referred to in the UNEP's en.light programme website (<http://www.enlighten-initiative.org/>), thus becoming part of the international cooperation network and exchange platform. Further exchange with other countries implementing similar activities (e.g Russia, Kazakhstan, Belarus) shall be maintained.
- It is recommended that the project team are invested to compile "lessons learnt" from the project to contribute to the project's knowledge management, learning and information dissemination strategy. An analytical, thorough and, as required, also critical report summarizing experience and findings of this project would highly benefit the country activities and UNDP in general. As a part of that, an analysis of the pilot project tender results and their evolution over the time in line with the capacity built shall be considered in such review.

➤ **Recommendation 4: Monitoring & evaluation of GHG mitigation levels and project impacts to be reviewed**

- Monitoring of GHG emission reductions and correlating energy savings is to be refined and beneficiaries supported in building own M&E capacities.
 - While direct emission reductions are likely to be achieved, indirect targets require additional action for their achievement; complementary efforts to be made during the second half of the project to address areas with large replication potential are indoor lighting in public and private residential buildings.
 - The targeted GHG reduction impact of the project was reassessed and slightly amended at the project inception phase, but neither the project document nor the inception report was calculating the direct project impact over the entire lifetime of the investment, which would make the assessment consistent with the recommended GEF methodology and other GEF funded climate change mitigation projects. Calculation methodology shall be thus reviewed and updated within the MTR and changes adopted within the *GEF CC Mitigation Tracking Tool*.

¹ Just to mention a few initiatives: the European Green Light Programme (http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/greenlightfolder_final_2013.pdf), European LED Quality Charter (http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/files/documents/eu_led_quality_charter.pdf) or Australian Energy Efficiency Lighting Program (<http://www.energyrating.gov.au/products/lighting>)

6 Annexes

6.1 Annex 1: Mid-Term Review – Terms of Reference

1. INTRODUCTION

This is the Terms of Reference (ToR) for the UNDP-GEF Midterm Review (MTR) of the full-sized project titled “Green Urban Lighting” UNDP-GEF/00074869-00087057 (PIMS#4669) implemented through the UNDP/Ministry of Nature Protection of the Republic of Armenia, to be undertaken in 2016. The project started on the November 11, 2013 and is in its third year of implementation. In line with the UNDP-GEF Guidance on MTRs, this MTR process was initiated before the submission of the second Project Implementation Report (PIR). This ToR sets out the expectations for this MTR. The MTR process must follow the guidance outlined in the document *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* (http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm_Review_EN_2014.pdf).

2. PROJECT BACKGROUND INFORMATION

The overarching goal of the project is to save energy and to reduce emissions of greenhouse gases by increasing energy efficiency of municipal lighting in the cities of Armenia via implementation of municipal investment programs and national policies. The proposed project is in compliance with the national priorities to strengthen the economic and energy independence of the Republic of Armenia by promoting resources efficient and climate resilient growth.

To realize this objective, the proposed project will carry out several activities that will deliver specific outputs. The work is organized in four interrelated components: i) municipal energy audits and technical capacity-building; ii) demonstration projects; iii) replication via municipal lighting programs and associated financial instruments; iv) national policies, codes, and standards on lighting. Collectively, these components seek to put in place cornerstone policy instruments at both the municipal and national level, supported by technical, policy-related, educational, and financial measures to raise capacity, reduce investor risk, and help assure successful implementation.

These activities will contribute to UNDP’s goal of increasing access to sustainable energy services by introducing regulatory and institutions frameworks, promoting technology transfer, expanding renewable energy practices and applying Clean Development Mechanisms under the Kyoto Protocol.

The project activities commenced in late 2013 with conclusion planned for late 2017. The project runs on principal allocations of 1,600,000 USD from GEF and additional input of 120,000 USD from UNDP Armenia. Co-financing is received from towns that provided pilot sites for the demonstration projects as well as in-kind contributions from Government and UNDP.

The Project Outcome Board provides consensus management decisions when guidance is required by the Project Manager and has final authority on matters requiring official review and approval, including annual work plans, budgets, and key hires. The Project Outcome Board actively seeks and takes account of the input of the Technical Advisory Committee that meets annually, with periodic consultation as needed throughout the year. Project Outcome Board meetings are timed, where possible, to occur immediately after the annual meetings of the Technical Advisory Committee.

UNDP acts as the GEF Agency for this project. The project is implemented by the Ministry of Nature Protection (MNP) following UNDP’s National Implementation Modality (NIM). The Municipality of Yerevan acts as the main beneficiary and implementing partner.

3. OBJECTIVES OF THE MTR

The MTR will assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document, and assess early signs of project success or failure with the goal of identifying the necessary changes to be made in order to set the project on-track to achieve its intended results. The MTR will also review the project’s strategy, its risks to sustainability.

4. MTR APPROACH & METHODOLOGY

The MTR must provide evidence based information that is credible, reliable and useful. The MTR will review all relevant sources of information including documents prepared during the preparation phase (i.e. PIF, UNDP Initiation Plan, UNDP Environmental & Social Safeguard Policy, the Project Document, project reports including Annual Project Review/PIRs, project budget revisions, lesson learned reports, national strategic and legal documents, and any other materials that the team considers useful for this evidence-based review). The MTR consultant will review the baseline

GEF focal area Tracking Tool submitted to the GEF at CEO endorsement, and the midterm GEF focal area Tracking Tool that must be completed before the MTR field mission begins.

The MTR consultant is expected to follow a collaborative and participatory approach² ensuring close engagement with the Project Team, government counterparts (the GEF Operational Focal Point), the UNDP Country Office(s), UNDP-GEF Regional Technical Advisers, and other key stakeholders.

Engagement of stakeholders is vital to a successful MTR.³ Stakeholder involvement should include interviews with stakeholders who have project responsibilities, including but not limited to; executing agencies, senior officials and task team/ component leaders, key experts and consultants in the subject area, Project Board, project stakeholders, academia, local government and CSOs, etc. Additionally, the MTR consultant is expected to conduct field missions to the Project's pilot sites.

The final MTR report should describe the full MTR approach taken and the rationale for the approach making explicit the underlying assumptions, challenges, strengths and weaknesses about the methods and approach of the review.

5. DETAILED SCOPE OF THE MTR

The MTR consultant will assess the following four categories of project progress. See the *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* for extended descriptions.

i. Project Strategy

Project design:

- Review the problem addressed by the project and the underlying assumptions. Review the effect of any incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document.
- Review the relevance of the project strategy and assess whether it provides the most effective route towards expected/intended results. Were lessons from other relevant projects properly incorporated into the project design?
- Review how the project addresses country priorities. Review country ownership. Was the project concept in line with the national sector development priorities and plans of the country?
- Review decision-making processes: were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process, taken into account during project design processes?
- Review the extent to which relevant gender issues were raised in the project design. See Annex 9 of *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* for further guidelines.
- If there are major areas of concern, recommend areas for improvement.

Results Framework/Logframe:

- Undertake a critical analysis of the project's logframe indicators and targets, assess how "SMART" the midterm and end-of-project targets are (Specific, Measurable, Attainable, Relevant, Time-bound), and suggest specific amendments/revisions to the targets and indicators as necessary.
- Are the project's objectives and outcomes or components clear, practical, and feasible within its time frame?
- Examine if progress so far has led to, or could in the future catalyse beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework and monitored on an annual basis.

² For ideas on innovative and participatory Monitoring and Evaluation strategies and techniques, see [UNDP Discussion Paper: Innovations in Monitoring & Evaluating Results](#), 05 Nov 2013.

³ For more stakeholder engagement in the M&E process, see the [UNDP Handbook on Planning, Monitoring and Evaluating for Development Results](#), Chapter 3, pg. 93.

- Ensure broader development and gender aspects of the project are being monitored effectively. Develop and recommend SMART ‘development’ indicators, including sex-disaggregated indicators and indicators that capture development benefits.

ii. Progress Towards Results

Progress Towards Outcomes Analysis:

- Review the logframe indicators against progress made towards the end-of-project targets using the Progress Towards Results Matrix and following the *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects*; colour code progress in a “traffic light system” based on the level of progress achieved; assign a rating on progress for each outcome; make recommendations from the areas marked as “Not on target to be achieved” (red).

Table. Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator ⁴	Baseline Level ⁵	Level in 1 st PIR (self-reported)	Midterm Target ⁶	End-of-project Target	Midterm Level & Assessment ⁷	Achievement Rating ⁸	Justification for Rating
Objective:	Indicator (if applicable):							
Outcome 1:	Indicator 1:							
	Indicator 2:							
Outcome 2:	Indicator 3:							
	Indicator 4:							
	Etc.							
Etc.								

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved
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In addition to the progress towards outcomes analysis:

- Compare and analyse the GEF Tracking Tool at the Baseline with the one completed right before the Midterm Review.
- Identify remaining barriers to achieving the project objective in the remainder of the project.
- By reviewing the aspects of the project that have already been successful, identify ways in which the project can further expand these benefits.

iii. Project Implementation and Adaptive Management

Management Arrangements:

- Review overall effectiveness of project management as outlined in the Project Document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement.
- Review the quality of execution of the Executing Agency/Implementing Partner(s) and recommend areas for improvement.

⁴ Populate with data from the Logframe and scorecards

⁵ Populate with data from the Project Document

⁶ If available

⁷ Colour code this column only

⁸ Use the 6 point Progress Towards Results Rating Scale: HS, S, MS, MU, U, HU

Final Report

- Review the quality of support provided by the GEF Partner Agency (UNDP) and recommend areas for improvement.

Work Planning:

- Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved.
- Are work-planning processes results-based? If not, suggest ways to re-orientate work planning to focus on results?
- Examine the use of the project's results framework/ logframe as a management tool and review any changes made to it since project start.

Finance and co-finance:

- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions.
- Review the changes to fund allocations as a result of budget revisions and assess the appropriateness and relevance of such revisions.
- Does the project have the appropriate financial controls, including reporting and planning, that allow management to make informed decisions regarding the budget and allow for timely flow of funds?
- Informed by the co-financing monitoring table to be filled out, provide commentary on co-financing: is co-financing being used strategically to help the objectives of the project? Is the Project Team meeting with all co-financing partners regularly in order to align financing priorities and annual work plans?

Project-level Monitoring and Evaluation Systems:

- Review the monitoring tools currently being used: Do they provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? How could they be made more participatory and inclusive?
- Examine the financial management of the project monitoring and evaluation budget. Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively?

Stakeholder Engagement:

- Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?
- Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?
- Participation and public awareness: To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?

Reporting:

- Assess how adaptive management changes have been reported by the project management and shared with the Project Board.
- Assess how well the Project Team and partners undertake and fulfil GEF reporting requirements (i.e. how have they addressed poorly-rated PIRs, if applicable?)
- Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

Communications:

- Review internal project communication with stakeholders: Is communication regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?
- Review external project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)

- For reporting purposes, write one half-page paragraph that summarizes the project's progress towards results in terms of contribution to sustainable development benefits, as well as global environmental benefits.

iv. Sustainability

- Validate whether the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Management Module are the most important and whether the risk ratings applied are appropriate and up to date. If not, explain why.
- In addition, assess the following risks to sustainability:

Financial risks to sustainability:

- What is the likelihood of financial and economic resources not being available once the GEF assistance ends (consider potential resources can be from multiple sources, such as the public and private sectors, income generating activities, and other funding that will be adequate financial resources for sustaining project's outcomes)?

Socio-economic risks to sustainability:

- Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project? Are lessons learned being documented by the Project Team on a continual basis and shared/ transferred to appropriate parties who could learn from the project and potentially replicate and/or scale it in the future?

Institutional Framework and Governance risks to sustainability:

- Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize sustenance of project benefits? While assessing this parameter, also consider if the required systems/ mechanisms for accountability, transparency, and technical knowledge transfer are in place.

Environmental risks to sustainability:

- Are there any environmental risks that may jeopardize sustenance of project outcomes?

Conclusions & Recommendations

The MTR consultant will include a section of the report setting out the MTR's evidence-based conclusions, in light of the findings.⁹

Recommendations should be succinct suggestions for critical intervention that are specific, measurable, achievable, and relevant. A recommendation table should be put in the report's executive summary. See the *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects* for guidance on a recommendation table.

The MTR consultant should make no more than 15 recommendations total.

Ratings

The MTR consultant will include its ratings of the project's results and brief descriptions of the associated achievements in a *MTR Ratings & Achievement Summary Table* in the Executive Summary of the MTR report. See Annex E for ratings scales. No rating on Project Strategy and no overall project rating is required.

⁹ Alternatively, MTR conclusions may be integrated into the body of the report.

Table. MTR Ratings & Achievement Summary Table for “Green Urban Lighting” UNDP-GEF/00074869-00087057 Project

Measure	MTR Rating	Achievement Description
Project Strategy	N/A	
Progress Towards Results	Objective Achievement Rating: (rate 6 pt. scale)	
	Outcome 1 Achievement Rating: (rate 6 pt. scale)	
	Outcome 2 Achievement Rating: (rate 6 pt. scale)	
	Outcome 3 Achievement Rating: (rate 6 pt. scale)	
	Etc.	
Project Implementation & Adaptive Management	(rate 6 pt. scale)	
Sustainability	(rate 4 pt. scale)	

6. TIMEFRAME

The total duration of the MTR will be up to *15 days* over a time period of *6 weeks* starting from the first day of the mission, and shall not exceed five months from when the consultant(s) are hired. The tentative MTR timeframe is as follows:

TIMEFRAME	ACTIVITY
<i>May 2, 2016</i>	Prep the MTR consultant (handover of Project Documents)
<i>2 days</i>	Document review and preparing MTR Inception Report
<i>within 4 days after receiving the Inception Report</i>	Finalization and Validation of MTR Inception Report - latest start of MTR mission
<i>5-6 days</i>	MTR mission: stakeholder meetings, interviews, field visits
<i>5 days (within 3 weeks after mission)</i>	Preparing draft report
<i>1 days (within 3 weeks after mission)</i>	Incorporating audit trail from feedback on draft report/Finalization of MTR report (note: accommodate time delay in dates for circulation and review of the draft report)
<i>1 week after receiving the draft report</i>	Preparation & Issue of Management Response
<i>1 week after receiving the Management Response</i>	Expected date of full MTR completion

Options for site visits should be provided in the Inception Report.

7. MIDTERM REVIEW DELIVERABLES

#	Deliverable	Description	Timing	Responsibilities
1	MTR Inception Report	MTR consultants clarifies objectives and methods of Midterm Review	No later than 1 week before the MTR mission	MTR consultant submits to the Commissioning Unit and project management
2	Presentation	Initial Findings	End of MTR mission	MTR consultant presents to project management and the Commissioning Unit

3	Draft Final Report	Full report (using guidelines on content outlined in Annex B) with annexes	Within 3 weeks of the MTR mission	Sent to the Commissioning Unit, reviewed by RTA, Project Coordinating Unit, GEF OFP
4	Final Report*	Revised report with audit trail detailing how all received comments have (and have not) been addressed in the final MTR report	Within 1 week of receiving UNDP comments on draft	Sent to the Commissioning Unit

*The final MTR report must be in English. If applicable, the Commissioning Unit may choose to arrange for a translation of the report into a language more widely shared by national stakeholders.

8. MTR ARRANGEMENTS

The principal responsibility for managing this MTR resides with the Commissioning Unit. The Commissioning Unit for this project's MTR is UNDP Country Office.

The commissioning unit will contract the consultant and ensure all necessary support throughout the process, including with travel arrangements within the country for the MTR consultant. The Project Team will be responsible for liaising with the MTR consultant to provide all relevant documents, set up stakeholder interviews, and arrange field visits.

9. TEAM COMPOSITION

The independent international consultant (with experience and exposure to projects and evaluations in other regions globally) will conduct the MTR with support of local expert group and administrative team of the project. The consultant cannot have participated in the project preparation, formulation, and/or implementation (including the writing of the Project Document) and should not have a conflict of interest with project's related activities.

6.2 Annex 2: MTR Evaluative Matrix

Ratings for Progress Towards Results: (one rating for each outcome and for the objective)		
6	Highly Satisfactory (HS)	The objective/outcome is expected to achieve or exceed all its end-of-project targets, without major shortcomings. The progress towards the objective/outcome can be presented as “good practice”.
5	Satisfactory (S)	The objective/outcome is expected to achieve most of its end-of-project targets, with only minor shortcomings.
4	Moderately Satisfactory (MS)	The objective/outcome is expected to achieve most of its end-of-project targets but with significant shortcomings.
3	Moderately Unsatisfactory (HU)	The objective/outcome is expected to achieve its end-of-project targets with major shortcomings.
2	Unsatisfactory (U)	The objective/outcome is expected not to achieve most of its end-of-project targets.
1	Highly Unsatisfactory (HU)	The objective/outcome has failed to achieve its midterm targets, and is not expected to achieve any of its end-of-project targets.

Ratings for Project Implementation & Adaptive Management: (one overall rating)		
6	Highly Satisfactory (HS)	Implementation of all seven components – management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications – is leading to efficient and effective project implementation and adaptive management. The project can be presented as “good practice”.
5	Satisfactory (S)	Implementation of most of the seven components is leading to efficient and effective project implementation and adaptive management except for only few that are subject to remedial action.
4	Moderately Satisfactory (MS)	Implementation of some of the seven components is leading to efficient and effective project implementation and adaptive management, with some components requiring remedial action.
3	Moderately Unsatisfactory (MU)	Implementation of some of the seven components is not leading to efficient and effective project implementation and adaptive, with most components requiring remedial action.
2	Unsatisfactory (U)	Implementation of most of the seven components is not leading to efficient and effective project implementation and adaptive management.
1	Highly Unsatisfactory (HU)	Implementation of none of the seven components is leading to efficient and effective project implementation and adaptive management.

Ratings for Sustainability: (one overall rating)		
4	Likely (L)	Negligible risks to sustainability, with key outcomes on track to be achieved by the project’s closure and expected to continue into the foreseeable future
3	Moderately Likely (ML)	Moderate risks, but expectations that at least some outcomes will be sustained due to the progress towards results on outcomes at the Midterm Review
2	Moderately Unlikely (MU)	Significant risk that key outcomes will not carry on after project closure, although some outputs and activities should carry on
1	Unlikely (U)	Severe risks that project outcomes as well as key outputs will not be sustained

6.3 Annex 3: Documents Reviewed

The UNDP Project Coordinator has submitted a list of documents to the MTR Consultant in advance of the evaluation mission for review:

Nr.	Document Title	Date of preparation
1.	UNDP/GEF Project Document	final version August 1, 2013
2.	PIMS 4669 Armenia Green Lighting PIF	version 21 December, 2011
3.	INITIATION PLAN FOR A GEF PROJECT PREPARATION GRANT (PPG) OR PROGRAMME COORDINATION BUDGET (PCB)	May 2012
4.	Project Inception Report (final)	February 2014
5.	GUL Project Logframe final version	February 2014
6.	Minutes of Project Board & Technical Advisory Committee	May 2014
7.	GEF Climate Change Mitigation Tracking Tool	June 2013
8.	Annual UNDP Progress Reports 2013, 2014, 2015	2013-2015
9.	Project Implementation Review 2015	2015
10.	Mid-Term Analytic Progress Report on Activities performed from Jan. 2014 to May 2016	May 2016
11.	Pilot projects factsheets (Alaverdi, Abovyan, Sevan, Spitak, Isakov, Zoo)	
12.	Lighting system monitoring reports (Isakov, Goris, Spitak)	2014/2015
13.	Municipal EE Revolving Fund – a briefing note	May 2016
14.	Pilot project calculator	May 2016

6.4 Annex 4: Mission Itinerary and meetings held

Time	Venue	Purpose	Other Participants
23 May 2016 – Yerevan			
Early morning		<ul style="list-style-type: none"> • Arrival 	
10:00 – 13:00	Climate Change Programme office (Ministry. of Nature Protection room #533)	<ul style="list-style-type: none"> • Briefing meeting with project team • Sharing additional information • Presentation of the project reports and documentation • Discussion (update) of the mission agenda (if needed) 	<ul style="list-style-type: none"> • Ms. Diana Harutyunyan, CC Related Projects Coordinator • Mr. Artem Kharazyan, Expert • Mr. Armen Gulkanyan, Expert • Mr. Karen Sargsyan, Expert • Mr. Hovhannes Nunyan, Expert • Ms. Marianna Arzangulyan, Expert Team Assistant
13:00 – 14:00	Ministry of Energy and Natural Resources of RA	<ul style="list-style-type: none"> • Stakeholder Ministry 	<ul style="list-style-type: none"> • Mr. Hayk Badalyan, Head of Renewable Energy and Energy Efficiency Department • Diana Harutyunyan • Artyom Kharazyan
14:00 – 15:00	Ministry of Nature Protection of RA	<ul style="list-style-type: none"> • Meeting with UNFCCC Focal Point/responsible department 	<ul style="list-style-type: none"> • Ms. Asya Muradyan, Head of Climate Change and Atmosphere Policy Division of the Ministry of Nature Protection (UNFCCC Focal Point is out from the country)
15:00 – 16:00	Yerevan Illumination Company	<ul style="list-style-type: none"> • Meeting with main beneficiary, discussion on demo projects, revolving fund, city light system improvement plans 	<ul style="list-style-type: none"> • Mr. Vardan Gabrielyan, Director • Mr. Vladislav Harutyunyan, Chief Engineer • Mr. Armen Gulkanyan
16:00 – 17:00	Yerevan Municipality	<ul style="list-style-type: none"> • Meeting with Project Implementing Partner 	<ul style="list-style-type: none"> • Mr. Kamo Areyan, First Vice Mayor • Mr. Tigran Sargsyan, Head of Investment and Projects Department • Ms. Nune Sakanyan, Head of the Unit of Coordination of International Investment Projects • Ms. Diana Harutyunyan
17:00- 18:00	Ministry of Territorial Administration and Development of RA	<ul style="list-style-type: none"> • Stakeholder Ministry 	<ul style="list-style-type: none"> • Artashes Bakhshyan, Deputy Minister of Territorial Administration and Development • Armen Gulkanyan

Time	Venue	Purpose	Other Participants
20:00 – 21:30	Yerevan Isakov - Victory Bridge - Mashtots Avenue and Abovyan city – Yerevanyan Street	<ul style="list-style-type: none"> Visit the project demo sites for assessment of the lighting system improvement 	<ul style="list-style-type: none"> Ms. Artyom Kharazyan Ms. Armen Gulkanyan Mr. Vladislav Harutyunyan Mr. Vahan Mardirossyan
24 May 2016 – Yerevan			
09:30 – 10:30	UNDP Armenia	<ul style="list-style-type: none"> Meeting with Sustainable Growth & Resilience portfolio 	<ul style="list-style-type: none"> Mr. Armen Martirosyan, Sustainable Growth & Resilience portfolio Analyst Ms. Diana Harutyunyan
11:00 – 11:30	Yerevan Illumination Company, Komitas str. Office	<ul style="list-style-type: none"> Visit to the lighting fixtures testing laboratory 	<ul style="list-style-type: none"> Mr. Vladislav Harutyunyan Mr. Armen Gulkanyan Translator
12:00 - 13:00	National Institute of Standards of the Ministry of the Economy	<ul style="list-style-type: none"> Assessment of cooperation status and needs related to the adoption of lighting sector EE standards 	<ul style="list-style-type: none"> Mr. Enok Azaryan, Director Mr. Grigor Nazaryan, Deputy Director Mr. Armen Gulkanyan Translator
14:00 -14:45	Shincertificate office	<ul style="list-style-type: none"> Meeting with project partner (establishment and joint operation of the laboratory) 	<ul style="list-style-type: none"> Mr. Alexander Vardanyan, Director Mr. Armen Gulkanyan
15:00 – 16:00	American University of Armenia	<ul style="list-style-type: none"> Meeting with Project partner (educational modules on EE lighting and educational laboratory) 	<ul style="list-style-type: none"> Mr. Aram Hajyan, Dean of Engineering Faculty Mr. Artak Hambaryan, Associated Director Engineering Research Center
16:15 – 16:45	“ELJEN” LLC, Khorenatsi 28	<ul style="list-style-type: none"> Meeting with local supplier 	<ul style="list-style-type: none"> Ashot Harutyunyan (098 21 65 65) Stepan Shakhbazyan (091 17 20 77) Mr. Armen Gulkanyan Translator
17:15 – 18:00	UNDP CO	<ul style="list-style-type: none"> De-briefing meeting Main conclusions from MTE mission Timeline and next steps 	<ul style="list-style-type: none"> Ms. Claire Medina, DRR Ms. Diana Harutyunyan
17:30	Project office	<ul style="list-style-type: none"> Wrap-up of the day, sharing information on project filing system, project budget, etc. 	<ul style="list-style-type: none"> Ms. Diana Harutyunyan Mr. Armen Gulkanyan

Time	Venue	Purpose	Other Participants
25 May 2016 – Pilot site visits			
09:00 – 09:30	Yerevan Zoological Garden	<ul style="list-style-type: none"> Visit the project demo sites for assessment of the lighting system improvement Discussion with partner municipalities 	<ul style="list-style-type: none"> Mr. Ruben Khachatryan, Director Mr. Artem Kharazyan Translator
10:00 – 10:45	Abovyan Municipality	<ul style="list-style-type: none"> Visit the project demo sites for assessment of the lighting system improvement Discussion with partner municipalities 	<ul style="list-style-type: none"> Mr. Vahagn Gevorgyan, Mayor of Abovyan Ms. Ivanyan Valery, Abovyan municipality, Head of communal department, 093-519010 Mr. Artem Kharazyan Translator
12:00 – 12:30	Sevan Municipality	<ul style="list-style-type: none"> Visit the project demo sites for assessment of the lighting system improvement Discussion with partner municipalities 	<ul style="list-style-type: none"> Mr. Rudik Ghukasyan, Mayor of Sevan, 091-431517 Mr. Artem Kharazyan Translator
14:00 - 15:00	Project office	<ul style="list-style-type: none"> Mission wrap-up 	<ul style="list-style-type: none"> Ms. Diana Harutyunyan Mr. Artem Kharazyan
15:00 – 15:30	EBRD office	<ul style="list-style-type: none"> Discussion on cooperation between projects 	<ul style="list-style-type: none"> Ms. Angela Sax Mr. Artem Kharazyan
26 May 2016			
Early morning	Departure	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

6.5 Annex 5: Audit Trail

To the comments received on (date) from the Midterm Review of (project name)

The following comments were provided in track changes to the draft Midterm Review report; they are referenced by institution ("Author" column) and track change comment number ("#" column):

Author	#	Para No.	Comment/Feedback on the draft MTR report	MTR author response and actions taken
Kharazyan A.	1	1.3	Municipality of Alaverdi was added to the sub-section on " Municipal energy audits conducted, technical capacity-building and awareness raising activities launched. "	Accepted by MTR author
Kharazyan A.	2	1.3	Under same sub-section another outcome was mentioned: "workshop on 'Modern lighting devices, optometric norms and standards, equipment for measurement' was held in cooperation with Russian Lighting Research Institute named after S.I. Vavilov."	Accepted by MTR author
Harutyunyan D.	1	1.3	Another output was added in same section: "Lighting source-testing laboratory is established in cooperation with Yerevan Illumination Company and equipped with basic instruments."	Accepted by MTR author
Harutyunyan D.	2	1.3	Municipality of Kapan was removed from the description of the "baseline energy consumption was assessed and measurements conducted"	Accepted by MTR author
Harutyunyan D.	3	1.3	More details were added on the pilot projects implemented: "Energy efficient lighting pilots are finalised in following small municipalities: Alaverdi (70 units); Spitak (50), Abovyan (83), Sevan (62) towns. Street lighting pilot projects are all with 100% LED replacement, with efficiency requirement sustained at 100 lumen per Watt."	Accepted by MTR author and also added in 5.1. conclusions
Harutyunyan D.	4	1.4 & 4.4	Comment on the "Sustainability" Ranking provided to MT evaluator: "please review this assessment. 11 cities in Armenia joined the Covenant of Mayors and the Sustainable Energy Action Plans (SEAP) approved for 4 cities include priority of lighting EE improvement. All new construction of streets in Yerevan and the road construction under ADB and EIB is done with mandatory use of LED."	Comment noted. MTR author added a section on prospective impact of development of SEAP under CoM initiative being positive for the deployment of LED technology.
Kharazyan A.	3	1.6	Recommendation F.2. was referring to the GHG direct project impact over the entire lifetime of the investment, which would make the assessment consistent with the	MTR author added a note that "GEF CC Tracking tool" includes lifetime project GHG savings.

Author	#	Para No.	Comment/Feedback on the draft MTR report	MTR author response and actions taken
			recommended GEF methodology and other GEF funded climate change mitigation projects. Comment: "In the TT we have included lifetime savings. For all further calculations we will use that method."	
Kharazyan A.	4	3.1	I think that limited financial capabilities of the municipalities and lack of access to capital also need to be mentioned because these are the issues that we try to address with the help of revolving funds mentioned below in the text.	MTR author agrees to add this barrier should be added. Done.
Kharazyan A.	5	3.4	Maybe rephrasing is needed to clarify the meaning of "mercury recycling".	Done. Sentenced rephrased to "MNP has sufficient capacity and knowledge to guide and oversee the conceptual part of the project implementation including professional guidance for achieving the climate change mitigation objectives and overseeing the environmental impacts with regard to mercury-containing lighting equipment (e.g. CFLs),..."
Kharazyan A.	6	4.1.1.	Under 'lessons learnt from other project' a question was: "You mean R2E2 Fund? We could not find any project under such name."	USAID funded project on "Energy Efficiency and Renewable Energy Sources" was replaced by "R2E2".
Kharazyan A.	7	4.1.1	Under sub-section referring to "Extent to which project addresses country priorities and is country-driven" 2 more programmes were proposed to add: <ul style="list-style-type: none"> • Energy Security Concept of the RA (2013) • 3rd National Communication to UNFCCC (2015) While 2 nd National Communication was removed.	Accepted by MTR author
Kharazyan A.	8	4.3.3	In section on co-financing the sentence was removed: "USD 0.095 million are funds co-financed by NGO Counterpart International Armenia, while...."	Accepted by MTR author
Kharazyan A.	9	4.3.5	Related to progress reporting: "There is nine-page section in the Mid-Term Analytical Progress Report (May 2016) with critical review and recommendation towards the project exit strategy."	Sentence was added by MTR author: "The lately produced Mid-Term Analytical Progress Report provides, however, a detailed performance analysis including project exit strategy. This critical analysis shall be continued and reflected in the annual progress reports throughout the remaining project period."

Author	#	Para No.	Comment/Feedback on the draft MTR report	MTR author response and actions taken
Arguelles M. (UNDP HQ)	1		General comment: change the term “UNDP-GEF project” to “UNDP-supported, GEF-funded Project”	Changes were introduced throughout the whole report
Arguelles M. (UNDP HQ)	2		MTR should review the extent to which relevant gender issues were raised in the project design (refer to Guidance document for MTR)	A paragraph was added in chapter 4.4. (Impact and sustainability) related to achievements of goals of development and economic benefits. All in all, the project is neutral to social equity and equality issues and doesn't have special impact on issues like gender equality and women's empowerment.
Arguelles M. (UNDP HQ)	3	4.3.7	Section Communications: I changed the “The MTR is to evaluate...” to “The MTR monitors...” since the MTR is a monitoring tool (and not an evaluation tool).	This change was not adopted, since the meaning of the sentence would be changed. The author is of the opinion that the MTR is both, an evaluation <u>and</u> monitoring exercise, therefore both aspects need to be reviewed.

6.6 Annex 6: Code of Conduct for Evaluators/Midterm Review Consultants

Evaluators/Consultants:

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 limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

MTR Consultant Agreement Form

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

Name of Consultant: ANDREAS KARNER

Name of Consultancy Organization (where relevant): INDIVIDUAL CONSULTANT

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

Signed at _VIENNA_ (Place) on 06 July 2016 (Date)



Signature: _____