

Terminal Evaluation of the UN Environment / GEF project

Lighting Market Transformation in Peru

Final Report



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Evaluation Office of UN Environment

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About the Evaluation

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Brief Description: The UN Environment-GEF project “Lighting Market Transformation in Peru” was approved for four years and executed over a 65-month period (2013-2018) by the Ministry of Energy and Mines (MINAM). UN Environment provided technical supervision and oversight as the designated GEF international implementing agency, and the UNDP Country Office was contracted to provide financial management and administrative support services. This Full-Size GEF Project was funded with a US\$ 1.636 million grant by the Global Environment Facility (GEF) and US\$ US\$ 12,926,530 in co-financing – mostly in-kind - from the Government of Peru.

Key words: Lighting Market Transformation, Peru, Climate change

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Acronyms

ADINELSA	Administration for Electric Infrastructure S.A
ASPEC	Peruvian Organization of Consumers and Users
CENERGIA	Center for the Conservation of Energy and the Environment
CFL	compact fluorescent lamps
COES	Committee for the Economic Operation of the System
COFIDE	Financial Corporation for Development
FONAFE	National Fund for Financing of State Entrepreneurial Activity
FONAM	National Environment Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GW	gigawatt
ELI	Efficient Lighting Initiative
ESL	energy-saving lighting
HID	high-intensity discharge lamp
HPS	high-pressure sodium lamp
IL	incandescent lamp
INDECOPI	National Institute for the Defense of Competition and Protection of Intellectual Property
ktCO₂	kiloton of CO₂
LED	light emitting diode
lm	lumen
MEPS	minimum energy performance standard
MINAM	Ministry of Environment
MINEM	Ministry of Energy and Mines
MVCS	Ministry of Housing, Construction and Sanitation
MW	megawatt
NGO	non-governmental organization
NPD	National Project Director
OLADE	Latin American Energy Organization
OSINERGMIN	Energy and Mining Investment Supervisory Body
PAE	Project for Energy Saving (now: Peru Saves Energy)
PEN	Peruvian New Sol
PMU	Project Management Unit
PSC	Project Steering Committee
PTR	Project Terminal Report
S&L	standards and labeling
SUNAT	National Superintendence of Tax Administration
tCO₂	ton of carbon dioxide (-equivalent)
TJ	terajoule
T8, T12	types of tube fluorescent lamps
TTR	Terminal tripartite review
TWh	terawatt-hour
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme/ UN Environment
UNFCCC	United Nations Framework Convention on Climate Change

Project Information Sheet

Executing Agency:	Peruvian Ministry of Energy and Mines (MINEM) and UN Environment		
Sub-programme:	Climate Change	Expected Accomplishment(s):	Not listed in project documented
UN Environment approval date:	12 Feb. 2013	Programme of Work Output(s):	Programme of Work (POW) 2010/11
GEF project ID:	4173	Project type:	FSP
GEF Operational Programme #:	4173	Focal Area(s):	Climate Change
GEF approval date:	12 Sept. 2012	GEF Strategic Priority:	SP-1: Promoting Energy Efficiency in Residential and Commercial Buildings
Expected start date:	November 2012	Actual start date:	May 2013
Planned completion date:	Nov 2016	Actual completion date:	April 2018 (technical) April 2019 (admin.)
Planned project budget at approval:	US \$ 14,562,530	Actual total expenditures reported as of 30.06. 2018:	<ul style="list-style-type: none"> a. US\$ 1,411,016 (GEF funds only) b. US\$ 12,938,382.71 (co-finance) c. Total US\$14,349,398.71
GEF grant allocation:	US \$ 1,636,000	GEF grant expenditures reported as of 30.06.2018:	<ul style="list-style-type: none"> a. US\$ 1,024,314.58 (Executing Agency-MINEM) b. US\$ 386,702.09 (UN Environment Economy Division - internal execution) c. Total US\$ 1,411,016.67
Project Preparation Grant - GEF financing:	Budget-US \$25,000 Actual- US \$20,000	Project Preparation Grant - co-financing:	US \$ 25,000

Lighting Market Transformation in Peru

Expected Medium-Size Project/Full-Size Project co-financing:	Full size project co-financing: US \$12,926,530	Secured Medium-Size Project/Full-Size Project co-financing:	US \$12,938,382.72	
First disbursement:	1 March 2013	Date of financial closure:	April 2019	
No. of revisions:	3	Date of last revision:	27 December 2017	
No. of Steering Committee meetings:	6	Date of last/next Steering Committee meeting:	Last: November 2017	Next:
Mid-term Review/ Evaluation (<i>planned date</i>):	Nov. 2015	Mid-term Review/ Evaluation (actual date):	Nov. 2015	
Terminal Evaluation (<i>planned date</i>):	July 2017	Terminal Evaluation (actual date):	May – July 2018	
Coverage - Country	Peru	Coverage – Region	Latin America	
Dates of previous project phases:	N/A	Status of future project phases:	N/A	

Source: Terminal Evaluation - Terms of Reference

1. Executive Summary

1. “Lighting Market Transformation in Peru” was implemented over a 65 month-period that began in 2013 and was technically closed in April 2018, it will be administratively closed by April 2019. The project was executed by the Government of Peru’s Ministry of Energy and Mines (MINEM) through the General Directorate for Energy Efficiency (DGEE), with the participation of government entities with mandates relevant to energy-saving lighting (ESL) technologies, and private sector importers and distributors engaged in the national lighting market. This Full-Size Project was funded with a US\$ 1,636 million grant by the Global Environment Facility (GEF) and US\$ 12,926,530 in co-financing (mostly in-kind) from the Government of Peru and private sources. UN Environment was the designated GEF implementing agency and was responsible for providing technical guidance, supervision and oversight. UNDP through its Country Office provided financial management and administrative support services. The project was approved by the GEF in September 2012 and scheduled to begin in November 2012. However, actual implementation started approximately six months later and the project was subsequently extended from November 2016 to April 2018 (and will be administratively closed by April 2019 as per last revised Project Cooperation Agreement). Approximately 86% of the GEF grant was spent as of June 2018.

2. The project’s objective was to accelerate the transformation of the lighting market in Peru through the increased promotion and utilization of energy saving lamps (ESLs), and the phasing-out of incandescent lamp (ILs). The stated project goal was to remove barriers to energy efficient lighting by creating an institutional, legal, financial and technical environment in favor of energy-efficient lighting. It was implemented through five technical components with specific outcomes and outputs. These were: (i) Energy-Saving Lighting Policy and Institutional Support Program; (ii) verification, enforcement and customs enhancement program; (iii) improved ESL recycling practices and facilities; (iv) ESL market actors development; and (v) consumer awareness and improved ESL sales.

3. The evaluation found the project to be strategically relevant to national and global environmental objectives. At the time of the project’s design, Peru lacked norms and standards for regulating the energy efficiency and performance of lighting products that entered the national market. The project’s design supported the implementation of national energy priorities contained in Law 27345 for the Efficient Use of Energy (DS 53/200), which defines Ministry of Energy and Mines mandates in support of energy efficiency (reflected in the above-mentioned project components). The project’s design and implementation approach were also consistent with Peru’s 2010-2040 National Energy Policy, which explicitly encourage efficiency and low carbon emissions in the productive chain.

4. The project’s relevance was reinforced by the receptivity of Peru’s lighting market to ESL technologies, as reflected in the sustained growth of compact fluorescent lamps (CFL) imports and sales in relation to incandescent lightbulbs, followed by growth of LED lighting products in replacement of CFLs and the phasing-out of incandescent lighting (IL).¹ Although the transformation of Peru’s lighting market to ESL is an ongoing process that has been driven by developments in lighting technology and global market trends, the project was designed to accelerate this process through the consolidation of an enabling institutional and regulatory framework, the enforcement of minimum energy performance standards and energy efficiency labeling, environmentally-sound recycling and disposal, and the promotion of energy efficient lighting campaigns targeting the consumer. The project was able to sustain relevance by shifting its focus from the replacement of IL with CFL, to the promotion of LED

¹ These trends are graphically presented in Figures 8 and 11. The importation of LED light bulbs surpassed CFL imports during the first quarter of 2018.

lighting technology which offered comparative advantages in energy efficiency (consuming approximately half the energy of equivalent CFLs) and environmental safety (without the mercury content that is contained in CFLs).

5. The project focus on energy efficiency was additionally relevant to UN Environment's 2010-2013 and 2014-2017 Medium Term Strategies, both of which highlighted climate change as one of six cross-cutting thematic priorities. The project contributed to the MTS's Expected Accomplishment of "low emission growth" and specifically Target 4 "sustainable consumption and production." Likewise, it was supportive of the Bali Strategic Plan that also includes climate change in its thematic areas. The project was additionally relevant to the GEF IV Strategy for Climate Change (Operational Programme 4) and to the objectives of Sub-programme 1: Promoting Energy Efficiency in Residential and Commercial Buildings. The project was linked to a broader context of GEF-funded energy efficiency projects supported by UN Environment's En.lighten initiative, which promoted global market transformation to ESL technologies with the support of leading lightbulb manufacturers such as Phillips Lighting and OSRAM AG.

6. The evaluation findings and associated ratings indicate that overall project performance was moderately satisfactory (MS) based on the evaluation criteria. Despite slow project implementation and low expenditure for most of the project's duration, a majority of outputs had been delivered by the end of the project term, albeit with significant variances between components: The project was moderately successful in establishing a regulatory and institutional framework for accelerated ESL market transformation, with the approval of mandatory energy efficiency labelling for lighting products (with EE ratings and color coding) and the adoption of technical LED lighting specifications for the public sector that affect future government procurements. Minimum energy performance standards (MEPS) for lighting products that exceed EC ecological design standards (equivalent to an A+/++ rating) have been proposed and currently under review; however, final approval by supreme decree will require clearance at senior government levels and could take an additional two to three years. Technical LED specifications for public lighting systems were based on urban standards and should be lowered for rural public lighting systems (applying equivalent wattage to those used for existing sodium vapor lamps) to increase energy efficiency and savings.

7. The project also contributed to improvements in the institutional framework for ESL market transformation. Monitoring of compliance with energy efficiency labelling was assumed by INDECOPI, a government entity that promotes competitiveness and information transparency. However, inspections are directed at lighting product vendors and not the importers or distributors that bear primary responsibility for compliance. The project also contributed to the adoption of electrical residue disposal plans (RAE) that will be required of all public enterprises and monitored by PRODUCE (the Ministry of Production); however, institutional capacities are not in place to implement RAEs nor are there provisions for enforcement or non-compliance. Training seminars were held for market actors and promotional campaigns were conducted in four urban locations, with post-campaign surveys indicating high levels of ESL awareness among consumers.

8. There were pilot initiatives for the installation of LED lighting in public sector buildings, public lighting systems and low-income households. While the planned targets and indicators were met or surpassed for the most part, their impact and demonstration value were limited. This is likely to change with the expected investment of US\$ 25 million to replace CFL bulbs with LED in low-income neighborhoods, under an agreement between the DGEE and Peru's Energy Security Investment Fund (FISE) that exceeds the initial co-financing commitment.

9. The project was less successful in establishing a system for verification of compliance and quality control of incoming lightbulbs through Customs, and has not advanced in the development of CFL recycling and disposal mechanisms or facilities. Both are fundamental towards ensuring compliance with minimum energy performance standards and mitigate potential environmental risks associated with the disposal of used CFL bulbs. The government decision not involve Customs in the proposed verification and quality control system implied slower progress towards establishing a quality control and verification system for incoming light bulbs, which is fundamental to enforce energy performance efficiency standards given the high variance in performance between different brands and countries of manufacture. The government's decision to not authorize the involvement of Customs undermines the viability of the proposed verification and quality control system, although one national laboratory is in process of obtaining international accreditation to conduct quality control testing. The absence of control mechanisms for incoming lighting products could also undermine the viability of enforcing the MEPS once these are approved.

10. Of more immediate concern are the lack of mechanisms or facilities for the safe collection, recycling and disposal of CFLs. This component was part of the global strategy promoted by En.lighten yet has not progressed beyond a general proposal – CFL recycling is not considered to be viable in Peru given the lack of facilities and environmental risks associated with mercury residues. At present, specific regulations for CFL disposal are not in place, and discarded bulbs are disposed in underground landfills for electrical waste. The few enterprises that collect discarded CFLs are mostly Lima-based and do not provide service on a national scale. There are potential environmental and health risks associated with the inadequate disposal of CFLs - particularly in smaller municipalities and rural areas that lack collection services - as the national stock is gradually expended and phased out during the next years.

11. The evaluation findings suggest that there is a high likelihood of impact. The transformation of Peru's lighting market towards ESL technologies continues and is driven by global lighting technology and market tendencies that have direct influence on the national market. Over the past decade, Peru's lighting market and consumer attitudes have been responsive to new ESL technologies, as demonstrated by the shift from incandescent lighting (IL) to compact fluorescent lamps (CFLs), and subsequent growth of LED imports and sales - overtaking those of CFLs with IL bulbs practically phased out at this stage. Indeed, the national lighting market has been responsive to LED technology and surveyed consumers appeared generally well informed and responsive. Recent consumer surveys indicate high levels of awareness of energy efficiency labeling and the benefits of LED bulbs over CFLs and IL. While consumer awareness of ESL is likely to be higher in urban areas that have greater access to information, the ongoing transformation process is likely to gradually decrease the availability of CFLs on a national scale and replace national stocks with LED bulbs.

12. The project has supported Peru's ongoing market transformation by catalyzing regulatory improvements and raising consumer awareness through energy efficiency labeling, LED specifications for the public sector, information dissemination and promotional campaigns. The combined effects of these initiatives have enhanced conditions for continued market transformation. However, the full achievement of the project objective and goal will require the approval of minimum energy performance standards (MEPS) for lighting products that are presently under review, and implementation of a national quality control and verification system for incoming lighting products.

13. Project design was well-conceived and comprehensive, integrating both the systemic and institutional dimensions of ESL market development. The support provided to regulatory improvements, minimum energy performance standards, quality control and consumer awareness were complemented by training and capacity building for partner institutions and

market actors, the provision of technical assistance and institutional coordination. However, the project was also over-ambitious in the scale of impact that was expected in relation to the allocated timelines. In several cases, timeframes were inadequate to achieve essential deliverables – approved MEPS, CFL collection and disposal facilities, mechanisms to verify compliance of incoming lighting products with energy performance standards – that are still pending. The combination of short timelines and slow project execution generated delivery pressures, encouraging the simultaneous implementation of outputs regardless of their strategic sequencing. This led to missed opportunities for synergy and cross-component linkages, i.e. establishing collection and disposal mechanisms/facilities prior to the accelerated replacement of CFL bulbs.

14. Project finances were managed in satisfactory manner, despite the occurrence of disbursement delays and administrative “blackouts” during the transition to the UMOJA financial management system in 2015. However, these obstacles were overcome as the new system became operational and both financial reporting and disbursements proceeded without critical incidents. Unspent budgets were re-programmed to the following year through yearly budget revisions.

15. Efficiency was the project’s weakest aspect, despite a favorable market context and the provision of financial management and administrative support services by the UNDP country office with UN Environment implementing agency support. The project’s commencement was delayed, followed by slow implementation and low financial delivery that tended to improve over time; on average the project spent 78.93% of the allocated annual budgets by the end of 2017. The project was implemented in a challenging environment that was influenced by presidential and congressional elections, recurrent institutional changes and high staff turnover. The Project Management Unit (PMU) went through four National Project Directors and three National Project Coordinators in less than six years. Output delivery and expenditure tended to improve as of 2015, following the consolidation of a comparatively stable project team. Several of the focal points from partner institutions were recently assigned and had limited knowledge of the project’s activities. Institutional memory is weak and the continued engagement of government partner institutions is unlikely under the present circumstances. In retrospect, the levels of institutional preparation and readiness needed to ensure effective stakeholder engagement were often not in place.

16. Monitoring and reporting was consistent with UN Environment and GEF guidelines, yet were inconsistent due to the inconsistent use of outputs that varied between the initial set of 17 outputs (appearing in the semi-annual progress reports and final project report) and a downscaled version of 5 outputs (in the annual PIR reports) that were not formally approved, lack indicators and duplicate the outcomes. The project monitoring reports do not offer a substantive analysis, and the PIRs tend to dwell more on the status of activities rather than their outputs or outcomes. A planned mid-term evaluation was canceled due to the limited progress that had been achieved at that stage. On a positive note, a consultant was recruited to provide monitoring and management support to the energy efficiency project portfolio, under the supervision of the UN Environment Task Manager based at the Climate Mitigation Unit.

17. Financial and socio-economic sustainability are highly probable, again due to receptiveness of Peru’s lighting market and consumers to energy-saving lighting technologies. The importation and sale of LED bulbs have gradually overtaken those of CFLs, with similar prices for equivalent lightbulbs. The anticipated investment of US\$ 25 million for the replacement of CFL with LED bulbs in low-income neighborhoods will reinforce the financial sustainability of Peru’s ongoing lighting market transformation. Consumer surveys that were recently conducted in the four urban areas indicate high levels of awareness on ESL

and the energy efficiency advantages of LED technology over compact fluorescent lamps. Institutional sustainability, on the other hand, is weak and there do not appear to be provisions for the continued engagement of the Steering Committee or other coordination mechanisms. Institutional responsibilities for compliance and oversight of mandatory labeling and LED specifications have been defined and are likely to be sustained over time, and one national laboratory (José Feliu Bosch) is expected to receive accreditation for quality control testing of incoming lighting products. The creation of a website for energy efficiency (<http://iluminacioneficiente.minem.gob.pe>) that is hosted by the Ministry of Energy and Mines is likely to contribute to institutional sustainability. However, broader and more inclusive institutional arrangements that are not project-dependent are necessary to ensure coordination and follow-up to ensure the approval of proposed minimum energy performance standards, a quality control and verification system, and adequate CFL collection and disposal services.

18. The environmental sustainability of replacing CFLs with LED technology is likely to be high, given the lack of toxic residues in LED lighting products. However, the continued phasing-out of existing CFL stocks could raise environmental risks in the short/medium term, to the extent that adequate collection and disposal mechanisms are not in place to cover the national territory (at present CFL collection services are largely limited to the Lima metropolitan area).

19. Several lessons emerge from the project experience

- Project performance was conditioned by a difficult operating environment. Despite the advantages of a favorable market context that is receptive to ESL technology, the project was implemented in a challenging environment that was influenced by national elections, recurrent institutional changes within the public sector and high staff turnover. Thus, the levels of preparation and readiness that were needed to ensure effective and timely implementation were not in place. This suggests that the holding of national elections within the lifespan of the project carries a high likelihood of disruption, and should be factored as a risk in project design and assessment.
- Outcomes and key deliverables were overly ambitious in relation to the timelines that were allocated for their achievement. The project duration was largely determined by GEF guidelines, and the initial four-year timeframe was eventually extended to compensate for initial delays. Yet delivery expectations were sometimes unrealistic in relation to the time that was available. In retrospect, the timelines allocated to consolidate the regulatory and institutional framework (2-3 yrs.) or achieve full compliance with mandatory labeling (2 years) were unlikely to be realized, based on empirical experience and the country context.
- The combination of short timelines and slow execution generated delivery pressures that encouraged the simultaneous production of outputs that were situated at different stages of the project's causal pathways.² Although this approach contributed to raising budget delivery, it also led to missed synergies between components that ultimately limited the scale of impact. (iv) Projects that propose revised regulatory or legal frameworks require medium-term timelines that are aligned with national governance and policy cycles. In practice, the project timeframes allocated to modify existing frameworks or catalyze other systemic changes often tend to fall short of the actual timelines needed to implement policy, regulatory or institutional change processes. This suggests the need to consider alternate approaches – for example, applying an incremental approach by which an initial project phase would be approved to develop enabling policy or regulatory improvements, followed by a “main” project devoted to the framework's implementation. The combined 8 or 10-year period of a two-phase project approach is more compatible with country

² As described in the Theory of Change analysis (Section 5).

governance cycles and the dynamics of policy or legislative change; and therefore might be better positioned to achieve the expected outcomes.

20. A follow-up project has not been proposed and there does not appear to be a work plan for achieving pending deliverables (aside from the anticipated CFL replacement initiative involving DGEE, FISE and OSINERGMIN that will start this year). The most immediate recommendation centers on the need to ensure that a collection and disposal system is in place for replaced or discarded CFLs. While current regulations mandate the underground disposal of toxic electrical waste and several enterprises collect used CFL bulbs in the Lima metropolitan area, a more comprehensive system is needed to safely dispose the national stock of CFLs as these are increasingly replaced or discarded during the next 4-5 years; this issue should followed up on by MINEM's General Directorate of Energy Efficiency in collaboration with the Ministry of Environment, which is mandated to oversee the disposal of electrical waste.

21. Another fundamental recommendation concerns the need to establish formalized, longer-term institutional arrangements that are not project-dependent, to coordinate the completion of pending deliverables. These include (i) the office approval of MEPS by government decree, (ii) the activation of a quality control and verification system for incoming lighting products with the participation of Customs, (iii) the adjustment of technical LED specifications for rural public lighting systems in order to maximize energy efficiency and rationalize cost, and (iv) the establishment of an operating CFL collection and disposal system to mitigate potential environmental risks. The institutional structure of the Inter-Sectoral Working Group, a legally-recognized option that is being applied to other contexts (i.e. support of biosafety policies and Peru's moratorium on transgenic seed), offers an option that enables the participation of non-governmental actors and merits further consideration on the part of MINEM and the main stakeholders.

22. Overall project performance is rated as moderately satisfactory, based on the evaluators findings. A table with summary assessments and ratings for the evaluation criteria is included with the conclusions of this report.

2. Introduction

23. The UN Environment-GEF project "Lighting Market Transformation in Peru" was approved for four years and executed over a 65-month period by the Ministry of Energy and Mines (MINAM). UN Environment provided technical supervision and oversight as the designated GEF international implementing agency, and the UNDP Country Office was contracted to provide financial management and administrative support services.

24. This Full-Size Project was funded with a US\$ 1.636 million grant by the Global Environment Facility (GEF) and US\$ US\$ 12,926,530 in co-financing – mostly in-kind - from the Government of Peru. As international GEF implementing agency, UN Environment had responsibility for providing technical guidance, supervision and oversight. UNDP provided through its Country Office financial management and administrative support services. The project was approved by GEF in September 2012 and scheduled to start in November; actual implementation began in May 2013 and was subsequently extended from November 2017 to April 2018 in consideration of its slow inception and low delivery.

25. The project's objective was to accelerate the transformation of the lighting market in Peru through the increased promotion and utilization of energy saving lamps (ESLs), and the

phasing-out of incandescent lamp (ILs). The stated project goal was to remove barriers to energy efficient lighting by creating an institutional, legal, financial and technical environment in favor of energy-efficient lighting.

26. With the advance of energy efficient lighting technologies, the focus of the project shifted from high-performance compact fluorescent lamps (CFL) and the phasing out of incandescent light (IL) bulbs, to the higher-performance and light emitting g-diode (LED) lighting technology as it became available on the national market.

27. Project design and implementation were centered on five technical components:

ESL (Energy-Saving Lighting) Policy and Institutional Support Program

Verification & enforcement and customs enhancement program

Improved ESL Recycling Practices and Facilities

ESL market actor development

Consumer awareness and improved ESL sales

28. The Ministry of Energy and Mines (MINEM) was the designated national executing agency (NEA). Direct responsibility for the project's operation and achievement of expected outputs and outcomes was delegated to the General Directorate for Energy Efficiency (DGEE) through a Project Management Unit (PMU). The project involved a broad range of national partners³ that included the National Institute for the Defense of Competition and Intellectual Property (INDECOPI), National Customs Authority (SUNAT), Ministry of Production (PRODUCE), Financial Corporation for Development (COFIDE), Ministry of Housing, Construction and Sanitation (MVCS), Ministry of Environment (MINAM), National Environment Fund (FONAM) and Philips as the largest provider of lighting fixtures in Peru. Several were represented in the Project Steering Committee (with UN Environment) that represented the project's highest decision-making level; others were expected to join a planned Technical Working Group (with representatives of power distribution utilities, private sector importers and distributors, and NGOs) that did not materialize.

29. The project is required to undergo a Terminal Evaluation (TE) on completion of project activities, in accordance with UNEP evaluation policy and GEF guidelines for implementing agencies. The evaluation is expected to assess project performance in terms of its relevance, effectiveness, efficiency, sustainability, level of participation and national ownership, financial management, and monitoring. Through the assessment, the evaluation should provide evidence of results to meet accountability requirements. It should also contribute to learning, feedback and knowledge sharing between UN Environment, GEF, the national executing agency and other partners by articulating findings and lessons that are operationally relevant for future initiatives.

3. Evaluation Methods

30. The evaluation was guided by the following overarching/strategic questions:

- To what extent were all the appropriate bottlenecks identified? (was there an access to finance gap and how has this been addressed? For example, lack of access to available

³ The project's partners are listed in Figure 3.

trade, working and growth capital upstream/ low affordability of products downstream for consumers especially rural?

- To what extent have the interventions have been appropriate to address bottlenecks/ problems to lighting transformation in Peru (enabling environment/ policy gap, product quality gap, consumer awareness gap)?
- Incremental cost of Energy Saving Lighting (ESLs): How would the project overcome the risk of additional cost involved in shifting to ESLs especially for the poor rural households? (STAP)
- How has this project addressed or influenced the issue of Financial and organizational difficulties to implement the CFL recycling and disposal arrangements (under investment by private sector in CFL recycling plants identified as a challenge in meeting key indicator - the number of CFLs recycled- PIR 2015)
- How unique is this project vis a vis other prior and existing national, regional and global projects in lighting market transformation- how does this build on prior projects eg. GEF and WB financed Multi-country Energy Efficient Lighting Initiative (ELI) (ended in 2000)

31. These were complemented by more specific questions that were directed at specific focus groups (Appendix D), addressing the evaluation criteria of relevance, design, effectiveness, financial management, efficiency, monitoring and reporting, and sustainability. Due to the volume of questions and short duration of the evaluation meetings, the evaluators were not able to ask all questions to the targeted respondents, and instead streamlined the interviews by integrating questions in a manner that covered the fundamental issues and evaluation criteria. Gender and human rights issues were considered to the extent they were relevant to the evaluation; the project's focus on lighting market transformation did not carry a gender dimension, nor was one considered in its design – emphasis has been on the consumer population at large. However, the evaluators have considered the extent to which female respondents were reached by the various surveys and public awareness activities.

32. The evaluation approach encompassed the following stages and methods:

- Desk review of the project documentation: The project document, annual PIR reports for the 2014-17 period, the 2017 semi-annual progress report, budgeted and actual annual expenditure, reports on the consumer awareness campaigns, and the draft final project report. Data collection continued into the country visit with the receipt of technical documents – the market transformation strategy, the proposed minimum energy performance standards (MEPS), a regulatory impact assessment of the MEPS and others. The desk review provided the basis for the Inception Report that was the evaluation's first deliverable (First and Second Weeks of May).
- Skype interviews were held with the UN Environment Task Manager and UN Environment Fund Management Officer to capture their views of the project's programme and administrative performance, as well as their expectations of the evaluation. (First and second weeks of May).
- The evaluators jointly conducted a one-week country mission to interview the National Project Coordinator and Project Management Unit (PMU), the Directorate of Energy Efficiency's Director (who also served as National Project Director), and partners from the various public and private sector entities - government agencies, academia, laboratories, importers and distributors - involved in the implementation of project components and/or the Project Steering Committee. ⁴ All meetings were based in Lima. Additional Skype interviews were conducted with representatives of regional electric power companies in Cusco and Arequipa provinces that had participated in the project's demonstration

⁴ The list of interviewed persons is annexed to this report.

activities. The country visit marked the end of the data collection phase. (Third week of May).

- The country visit was followed by the analysis of data and preliminary articulation of evaluation findings, drawn from the desk review and the interviews with the implementing agency and national partners. Data from the different sources were triangulated to identify trends in project performance and stakeholder perceptions. This was compared with quantified assessments of output delivery and expenditure, and developed into set of substantive findings, lessons and recommendations that addressed the evaluation criteria contained in the Terms of Reference. (First-third weeks of June).
- Internal discussion of preliminary findings. Preliminary findings were shared (in Power Point format) with the project Task Manager from UN Environment's Climate Mitigation Unit, the UN Environment Fund Management Officer and focal points within UN Environment's Evaluation Unit. This provided an opportunity to inform the UN Environment implementing unit of the direction of the evaluation, discuss critical issues and adjust findings based on evidence given, and build early consensus around the main findings (Fourth week of June).
- The previous analysis and findings fed into the drafting of the draft Terminal Evaluation Report that will be submitted to UN Environment's Evaluation Unit and Climate Mitigation Unit for internal review, and subsequently forwarded to the NEA, project team and main partners for their consideration (Fourth week of June – third week of July).
- Finalization of the Terminal Evaluation Report. The comments and suggestions provided by UN Environment, the NEA, the project team and main project partners will be considered by the evaluator, and corrections/revisions introduced to the draft report as needed. The revised draft report will represent the final version of the Terminal Evaluation Report. (Fourth week of July)

3.1 Team Roles and Responsibilities

33. The independent evaluation team was led by an international consultant who served as Team Leader and carried full responsibility for the evaluation deliverables as established in the Terms of Reference. The Team Leader was supported by a national consultant with expertise in electric lighting systems and markets, who assumed the technical analysis of project deliverables and provided inputs to the draft evaluation report.

34. The evaluation agenda for the country visit was prepared by the Project Management Unit in consultation with the DGEE and other project partners. The agenda is annexed to this report (Appendix E).

4. The Project

4.1. Context

35. The Peruvian Government has actively pursued energy efficiency since the 1980s, through the creation of the Energy and Environment Centre (CENERGIA) in 1986. This was followed by the Energy Savings Project (Proyecto de Ahorro Energético o PAE) in 1994 that organized the first energy conservation campaign that focused on consumer awareness and the promotion of the recently-introduced compact fluorescent lamp (CFL) technology. Market trends have supported ESL with CFL imports increasing more than ten-fold between 1993 and 1995. The PAE was given the EU Global Energy Award in 2001 in recognition of its efforts, and was terminated in 2004.

36. The legal/regulatory framework for energy efficiency in Peru is based on the Law for the Promotion of Efficient Use of Energy (Ley 27345 de Promoción del Uso Eficiente de la Energía) that was approved in 2000 and declared the efficient use of energy as an issue of

national interest. The law designated the Ministry of Energy and Mines (MINEM) as the competent national authority for the promotion of energy efficiency, with functions that include the design and implementation of sectoral EE programs, the provision of technical guidance, and the implementation of EE labeling for energy-consuming equipment and appliances. For these reasons, MINEM was designated as the national executing agency for this project.

37. These developments helped in leveraging donor support for energy efficiency, as reflected in the multi-country Efficient Lighting Initiative (ELI) – a US\$ 15 million program that was designed by the International Finance Corporation (IFC) and funded by GEF to accelerate the market penetration of energy-saving lighting technologies in developing countries. The ELI was implemented in Peru between 2000-2004 through Edelnor, a national power distribution utility; the US\$ 2.1 million budget was used to distribute approximately 80,000 CFLs and organize promotional CFL campaigns involving distributors and manufacturers, provincial utilities and the national consumer defense association (ASPEC). This contributed to concrete savings in energy, with CFLs consuming approximately one-fifth of the energy used by incandescent bulbs (IL). However, these actions also increased the potential environmental risks associated with CFL mercury content (up to 50 mg./bulb) and the lack of regulations or designated facilities for their disposal.

38. While subsequent years brought a decline in activity as governments and policy priorities changed, energy efficiency was again brought forward to the political agenda with the 2007 issuing of a regulation for the implementation of the aforementioned Energy Efficiency Law, with sections addressing (i) the generation of an energy efficiency culture through awareness campaigns and training; (ii) promotion of CFLs; (iii) policy planning, and (iv) the creation of new regulations for energy demand indicators and monitoring, technical regulations for energy performance standards and labeling of selected electrical appliances. This regulation enabled the formulation of minimum energy performance standards (MEPS) for industrial and electrical equipment (but not lightbulbs or lighting products). There was also early work on EE testing procedures and labeling by INDECOPI, the national consumer protection institute.

39. At the time of the project's commencement, energy efficiency test procedures and voluntary EE labeling standards had been developed for refrigerators and freezers, lighting equipment (lamps and ballasts), electric motors, electric and gas water heaters, industrial boilers and solar thermal and photovoltaic systems. However, standards and labeling were applied on a voluntary basis and weren't mandatory. Nor were there internationally-accredited laboratories in Peru for testing incoming lighting samples.

40. The project document identified threats and barriers that lowered the natural uptake of energy energy-efficient lighting technologies, particularly CFLs. These were divided into the following categories 5 and have directly influenced the design of this project:

- Cost and technological properties
- Awareness and consumer preferences
- Organization of the lighting market
- Institutional and policy barriers
- Environmental barriers (mercury content).

⁵ Historically, the main barrier undermining the adoption of energy-efficient lighting by consumers was their high cost. Fortunately CFL costs have steadily declined over time and on average were half the cost of incandescent lighting when the project began. This process would be repeated with LED technology when it started to enter Peru's lighting market.

- **Cost and technological properties**

4.2. Project Objective and Components

41. The project's objective was to accelerate the transformation of Peru's lighting market through increased promotion and use of energy saving lamps (ESLs), and the phasing-out of incandescent lamp (ILs). The stated goal was to remove barriers to energy efficient lighting by creating an institutional, legal, financial and technical environment in Peru that is in favor of energy-efficient lighting. The project's focus and strategy were subsequently (and successfully) shifted from CFL to the more efficient LED bulbs that were entering Peru's lighting market.⁶

42. The project was organized into five components with corresponding outcomes that are described below:

- **Component 1: ESL institutional and regulatory support program. Outcome 1: Improved institutional, and regulatory framework to promote a sustainable market for CFLs and phase-out of ILs.**
- **Component 2: Verification & enforcement and customs enhancement program. Outcome 2: All traded lighting products meet quality, environmental and energy performance standards and an effective.**
- **Component 3: Improved ESL recycling practices and facilities. Outcome 3: Identification of recycling options related to fluorescent technologies and procedures defined for destruction of ILs and recycling of CFLs.**
- **Component 4: ESL market actor development. Outcome 4: Importers and retailers/vendors, electricity utilities as well as housing are familiar with the advantages of ESL products and are able to promote ESLs. Increased installation of efficient lighting in public buildings.**
- **Component 5: Consumer awareness and improved ESL sales. Outcome 5: Enhanced consumer awareness and education, and significant improvements of ESL products sales and reduction in the sales of IL in all regions.**

4.3. Stakeholders

4.3.1. Government Stakeholders

43. As described above, the project was executed by the government of Peru through the General Directorate for Energy Efficiency (DGEE) of the Ministry of Energy and Mines (MINEM). The project's implementation was largely driven by DGEE with varying levels of involvement of ministries and public sector agencies with lighting and energy-related mandates. A more supportive role on the part of the national Customs system (SUNAT) was needed to enable the planned quality control and verification system for incoming lighting products that never materialized.

44. Other government stakeholders included the following:

- **The Ministry of Environment (MINAM) is the national GEF Focal Point and was responsible for the "approval, and execution of a mechanism for the collection, recycling, and safe disposal of the discarded CFLs and other fluorescents" under the third component. MINAM focal points also participated in discussions on minimum energy performance standards and labeling for lighting products. A ministry representative sat on the Project Steering Committee.**

- **The National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI)** was involved in the labeling initiative and consumer awareness components. INDECOPI recently assumed the inspection of mandatory labeling for lighting products to support its enforcement.
- **The Development Finance Corporation (COFIDE)**, a public-private entity, was one of the main co-financiers to the project and has developed a credit portfolio of energy efficiency and renewable energy projects (BioNegocios) with funding from JICA (Japan) and KfW (Germany).
- **The National Environment Fund (FONAM)** provided co-financing for the demonstration of energy efficiency improvements (including lighting) and participated in training activities under the fourth component, and was represented in the Project Steering Committee.
- **The Ministry of Construction and Social Housing (MCVS)** budgeted funds to install energy efficient lighting in buildings and low-income housing, and provided in-kind co-financing in support of the project's demonstration activities.
- **The Ministry of Production (PRODUCE)** is the government entity responsible for technical standards and regulations for industry, and participated in discussions on minimum energy performance standards and technical specifications for lighting products. It is also responsible for ensuring that enterprises have plans for the disposal of electrical wastes (RAE) and that these are implemented.
- **The National Quality Institute (INACAL)** served on the Project Steering Committee, and participated in discussions for the design of minimum energy performance standards and national lighting efficiency strategy. It also elaborated a procedure for the accreditation of national Product Certification Entities that would certify energy equipment quality.
- **The Energy and Mining Investment Supervisory Body (OSINERGMIN - Organismo Supervisor de la Inversión en Energía y Minería)** ensures compliance with the Electricity Concessions Law (LCE) of 1992 and enforcing fiscal obligations. OSINERGMIN is one of the entities supporting the US\$ 25 million agreement for the replacement of CFL bulbs with LED among low-income families, in collaboration with DGEE and FISE.
- Finally, there are state-owned power companies that provide electricity in different regions. These are: ElectroPeru, EGASA, San Gabán, EGEMSA and EGESUR. Likewise, ADINELSA is responsible for rural electrification facilities and grid systems. Some of these participated in the training activities that were implemented under the fourth component.

4.3.2. Non-governmental Stakeholders

45. Peru's lighting market is largely driven by producers of lighting products (Philips, Osram, General Electric and various Chinese brands), importers and distributors such as Sodimac and Marsano, among others. These entities were consulted during the design of the market strategy, participated in training activities on ESL and LED technology in particular, and are required to comply with mandatory energy efficiency labeling for lighting products.

46. The Lima-based José Feliu Bosch laboratory benefited from project-funded technical training in quality control and is in process of obtaining international accreditation. This will make it the only national laboratory that is internationally recognized to test the compliance of incoming lighting products with the minimum energy performance standards (once these are approved).

47. The Peruvian Consumer Protection Association (ASPEC) is a non-profit organization with the objective of defending the rights of consumers, that monitors the credibility of information provided by producers and supports consumer awareness. It was expected to participate in the project's fifth component, which did not happen. However, ASPEC remains an important stakeholder that can support the monitoring of labeling compliance, the

promotion of LED and future ESL technologies, and promote the safe disposal of CFL bulbs.

48. **CENERGIA is an NGO that promotes energy efficiency. Its services include studies for state institutions in the energy sector and implements projects aiming at the application of energy efficiency and environmental impact mitigation. Although CENERGIA was highlighted as an important non-governmental stakeholder in the project document, it did not participate in the actual project.**

49. **There are 18 private electric power companies operating in Peru that service an important share of the national population in different regions, and which have a vested interest in energy efficiency.**⁷

4.4. Project Implementation Structure and Partners

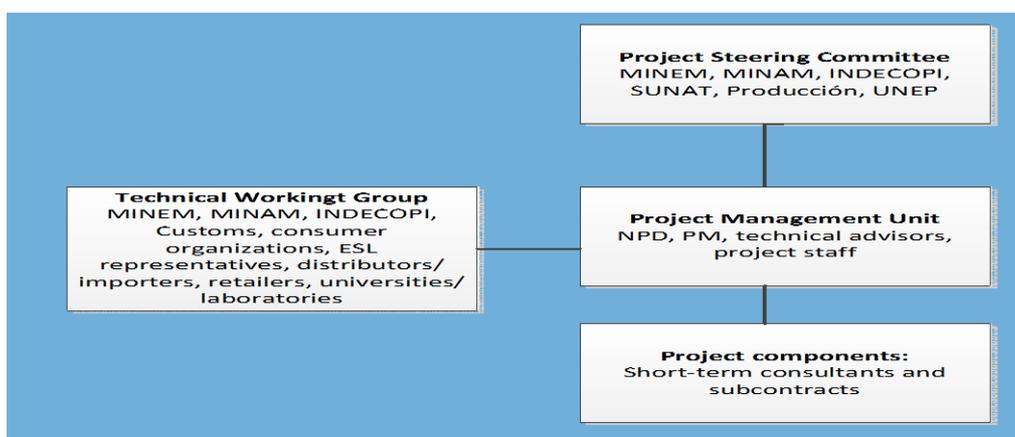
50. **The Ministry of Energy and Mines (MINEM) was the designated national executing agency for the project, with responsibilities to (i) ensure the achievement of the project objectives, outcomes and outputs, (ii) coordinate the different project stakeholders, (ii) manage budgetary and in-kind resources that were allocated to the project, and (iii) monitor implementation and expenditures, reporting on progress in a timely manner. Within MINEM, the head of the General Directorate for Energy Efficiency (DGEE) served as the National Project Director on behalf of the government. A Project Management Unit (PMU) was created and staffed by a National Project Coordinator (paid with GEF funds), technical advisors (partly funded by GEF) and financial support staff. In practice, this arrangement was highly unstable due to staff turnover. The project went through five national directors and three project coordinators over a five-year period.**

51. **An international consultant (associated with En.lighten) assumed the role of external technical advisor on an intermittent basis, providing technical advice on specific issues (CFL recycling and disposal, minimum energy performance standards) as well as guidance on impact monitoring.**

52. **A broad range of institutional and sectorial stakeholders were intended to be represented on the Project Steering Committee (PSC) and Technical Working Groups that supported the project's execution. The following organigram illustrates the project's implementation arrangements and stakeholder composition as they were designed in the project document.**

⁷ These are: Santa Cruz, GEPSA, Corona, AIPSA, SDF, Atogongo, Shougang, CAHUA, EEPSA, EDEGEL, ENERSUR, EGENOR, KALLPA, EGASA, TERMOSELVA, CHIONANGO and ELECTROSELVA.

Figure 1: Implementation Arrangements: Distribution of Project Stakeholders



Source: Project document

53. The Project Steering Committee (PSC) was the highest decision-making authority and had the role of (i) guiding and overseeing project performance, and enhancing and optimizing the contributions of partner organization. The PSC was diverse and included representatives from MINEM, MINAM (Environment Ministry); INACAL; INDECOPI; the Ministry of Production, Ministry of Housing, Construction and Sanitation (MVCS); FONAM; COFIDE; SUNAT (Customs); and the UN Environment Task Manager. Meetings took place annually (sometimes twice a year) and are well-documented. Steering committee members have evidently contributed to project coordination; and have commented on technical reports (in the absence of the Technical Working Group) and endorsed work plans. However, the PSC appears to have had an informative rather than deliberative role. This is not necessarily a negative observation, as a more proactive dynamic was prevented by changing partner focal points; several PSC members that were interviewed by the evaluators had attended few meetings and had limited knowledge of project activities.

54. As mentioned, the Technical Working Group was not formed and Steering Committee members have provided technical advice to the PMU on specific issues within their competence. However, this arrangement tended to limit the range of stakeholder involvement in project coordination and oversight to government entities, with less consistent participation by non-governmental partners (power distribution utilities, private sector importers/distributors and retailers, consumer organizations, universities/institutes and NGOs) that were initially expected to conform the technical group.

4.4.1. Coordination with other projects

55. The project implementation experience offers a case study of cross-project synergy or complementarity, in this case with the UNDP/GEF “Energy Efficiency Standards and Labeling in Peru” initiative that was also executed by MINEM. This project was similar in approach and focused on market transformation for energy efficient appliances - refrigerators and freezers), water heaters, air conditioners and electric motors. The collaboration between both GEF projects was planned from the onset, and the project document anticipated that “the project will work closely with this initiative in the areas of formulation of mandatory standards and labeling, capacity building for key public and private entities, capacity strengthening of laboratories as well as of entities involved in verification and enforcement (MINEM, INDECOPI, Customs), market assessment and consumer awareness campaigns. Both were based at MINEM which facilitated interaction between project teams and the coordination of activities. Their joint collaboration has led to extension of mandatory energy efficiency labeling to include

lighting products, approved by government supreme decree. This represents one of the main achievements of this project, and builds on those of the parallel UNDP-GEF initiative.

4.5. Changes in Design during Implementation

56. The project was designed and approved in 2012, but only became fully operational in 2014 with the consolidation of a more stable project team. During this period, the introduction of LED technology started to have profound effects on Peru's lighting market that continue to this day. As the importation and sale of LED bulbs gained an increased share of the market, with CFLs declining and incandescent lighting already in process of being phased out (by the market), the project emphasis was shifted from the replacement of incandescent with compact fluorescent lamps, to the substitution of CFLs with LED technology. This transition was accomplished effectively and represented a good practice in adaptive management on the part of the PMU, DGEE and UN Environment.

57. During the project's inception a Referential Plan was prepared by an international consultant, with the aim of developing a roadmap that would facilitate the project's implementation. This included the downscaling of the 17 outputs that are in the approved project document to 5 outputs that did not include indicators or targets, and in several cases duplicated the project's outcomes. This was not a good design practice, as the downscaling of outputs did not distinguish product from result and lowered the scale of expected deliverables. These outputs were adopted without formal approval during a transition in project directors, and were applied inconsistently to the project's monitoring and reporting activities. The five outputs were used as reference in the annual PIR reports, whereas the original set of 17 outputs appeared in the semi-annual progress reports and final project report. However, the evaluators were assured that the changes made to the outputs have not had any influence on the project's execution, which was based on the approved Results Framework.

4.6. Project Financing

58. The combined project budget of 14.56 million (GEF grant and co-financing) was adequate to implement the project and generate the planned results. In practice, the project faced difficulties in spending the approved budget on schedule and delivery rates were low. This led to the project's extension from November 2016 to April 2018.

59. Budget allocations between the project components were fairly balanced in relation to the deliverables that were expected. The largest share of the budget was earmarked for the ESL sales and replacement campaigns (Component 5), followed by policy and institutional support (Component 1) and recycling practices and facilities (Component 3). The cost of running the Project Management Unit absorbed less than 10% of the GEF grant.

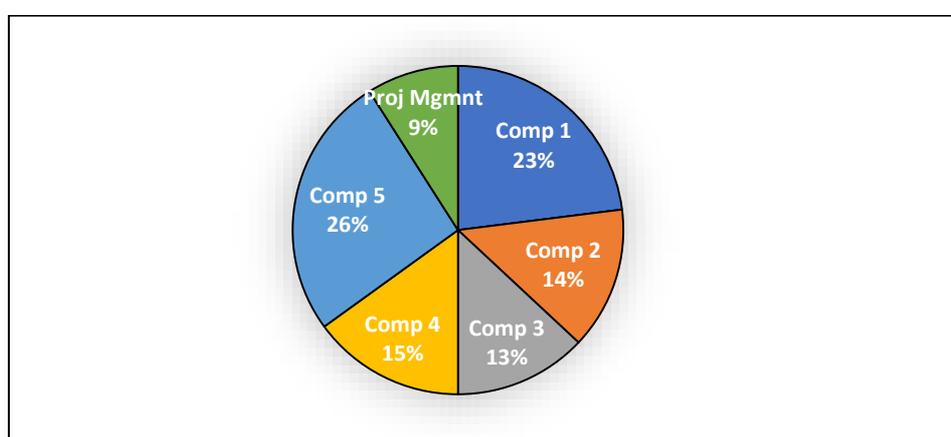
60. Budget allocations to the five project components are summarized below, followed by the distribution of the GEF grant:

Figure 2: Distribution of the Project Budget by Component (Source: Prodoc)

Lighting Market Transformation in Peru

Component	Total (USD)	GEF (USD)	Co-fin Total	Cash		In-kind	
				Gvrt	Private/NGO	Gvrt	Private/NGO
1 ESL policy and institutional support	1,417,126	384,000	1,033,126			1,033,126	
2 Verification & enforcement strengthened	1,015,000	215,000	800,000			800,000	
3 ESL recycling practices and facilities	1,196,000	216,000	980,000			980,000	
4 ESL market actors development	890,000	190,000	700,000			700,000	0
Demonstration in public buildings	814,358	50,000	764,358	614,358		150,000	0
5 Consumer education and awareness	1,129,400	279,400	850,000			850,000	0
Increased ESL sales and campaign	6,910,646	145,600	6,765,046	6,225,046	400,000	140,000	0
PM	1,190,000	156,000	1,034,000			1,034,000	0
TOTAL	14,562,530	1,636,000	12,926,530	6,839,404	400,000	5,687,126	0

Figure 3: Distribution of GEF Funds by Project Component (%)



Source: Project Document

5. Theory of Change

61. The Theory of Change (ToC) paradigm was applied to the analysis of the project's design, looking at the sequence of desired changes ("causal" or "impact" pathways) to which the project was expected to contribute. ToC shows the causal linkages that connect changes at different results levels and how these connections influence performance and impact. The causal pathways connect outputs to their outcomes and to the higher "intermediate states" that precede impact and must be in place to attain the project objective. Causal pathways show the most direct routes to the expected outcomes by indicating the strategic sequence of deliverables that must be followed to maximize cumulative impact. The ToC methodology also identifies "impact drivers" that move implementation processes forward, and the "external assumptions" that influence design and performance yet are outside the project's control. In this context, the insight derived from the ToC analysis is useful for assessing the project's design and implementation strategy.

62. The project objective was to "accelerate transformation of the lighting market in Peru through enhanced promotion and implementation of the utilization of energy saving lamps (ESLs) and the phasing-out of incandescent lamp (ILs) imports and sales." This would feed into the stated goal of "...removing barriers to energy efficient lighting by creating an institutional, legal, financial, technical environment conducive to energy- efficient lighting, through the

promotion of high-performance and environmentally sustainable new technologies such as CFLs and the phase-out of inefficient ILs.”

63. The project’s causal or impact pathways are illustrated in Figure 4. They show articulation between the five outcomes, and between outputs and their respective outcomes. Many outputs feed into others that are on the same pathway, providing inputs and sometimes enabling their realization. The articulation of outputs and outcomes across the five project components indicates a comprehensive and integrated approach. This is a positive finding that underscores the importance of considering their implementation sequence.

64. A main pathway emerges from the analysis. The point of departure is the “improved institutional and regulatory framework” (outcome 1) that provides a foundation for the design of the market transformation strategy, MEPS and energy efficiency labeling. This is the only outcome that is directly linked to the other four: The institutional-regulatory framework and market transformation strategy are likely to influence the determination of energy performance standards (outcome 2), the formulation of recycling and disposal mechanisms (outcome 3) and the replacement of IL and CFLs over time (outcome 2). An updated institutional-regulatory framework would also have bearing on public awareness campaigns and training activities (outcome 4), and enabling increases in ESL sales and replacement of IL (CFL) bulbs over time (outcome 5). As a result, the first outcome was essential to enable the project’s full implementation and achieve the other outcomes. Whereas the fifth outcome -and in particular, the “significant improvement of ESL sales with reduced IL sales of IL in all regions” – represents the intermediate state that precedes impact and needed to be reached in order to achieve the project objective.

65. The main causal pathway connected the outcomes according to the following sequence: (i) Outcome 1: “improved institutional and regulatory framework” > outcomes 2: determination of energy performance standards, outcome 3: formulation of recycling and disposal mechanisms, outcome 4: public awareness campaigns and training activities and outcome 5: public awareness campaigns and training activities; (ii) outcome 3: formulation of recycling and disposal mechanisms > 2; (iii) outcomes 2: determination of energy performance standards and outcome 4: public awareness campaigns and training > outcome 5: enabling increases in ESL sales and replacement of IL (CFL) bulbs over time; (iii) outcome 5 > project objective. As noted earlier, outcome 5 and in particular the increased sale of LED (and replacement of CFLs over time) represents the intermediate state prior that is a requisite for impact. The relevant finding is that the proposed institutional and regulatory frameworks should be in place at an early state to enable the achievement of successive outcomes that are on the same pathway and enhance conditions for project impact. This has been difficult to do within a 4-year project period: Proposed regulations for MEPS are currently under review and their approval is expected to require 2-3 more years beyond the project’s termination.

66. In terms of strategic sequence, the third outcome – implemented recycling mechanisms and facility –should precede the second outcome, under which all traded lighting products would meet environmental, quality and energy standards, and be subject to quality control. This has not happened in practice, and replaced CFLs were disposed of in designated underground storage areas for toxic electrical waste, in accordance with standing regulations.

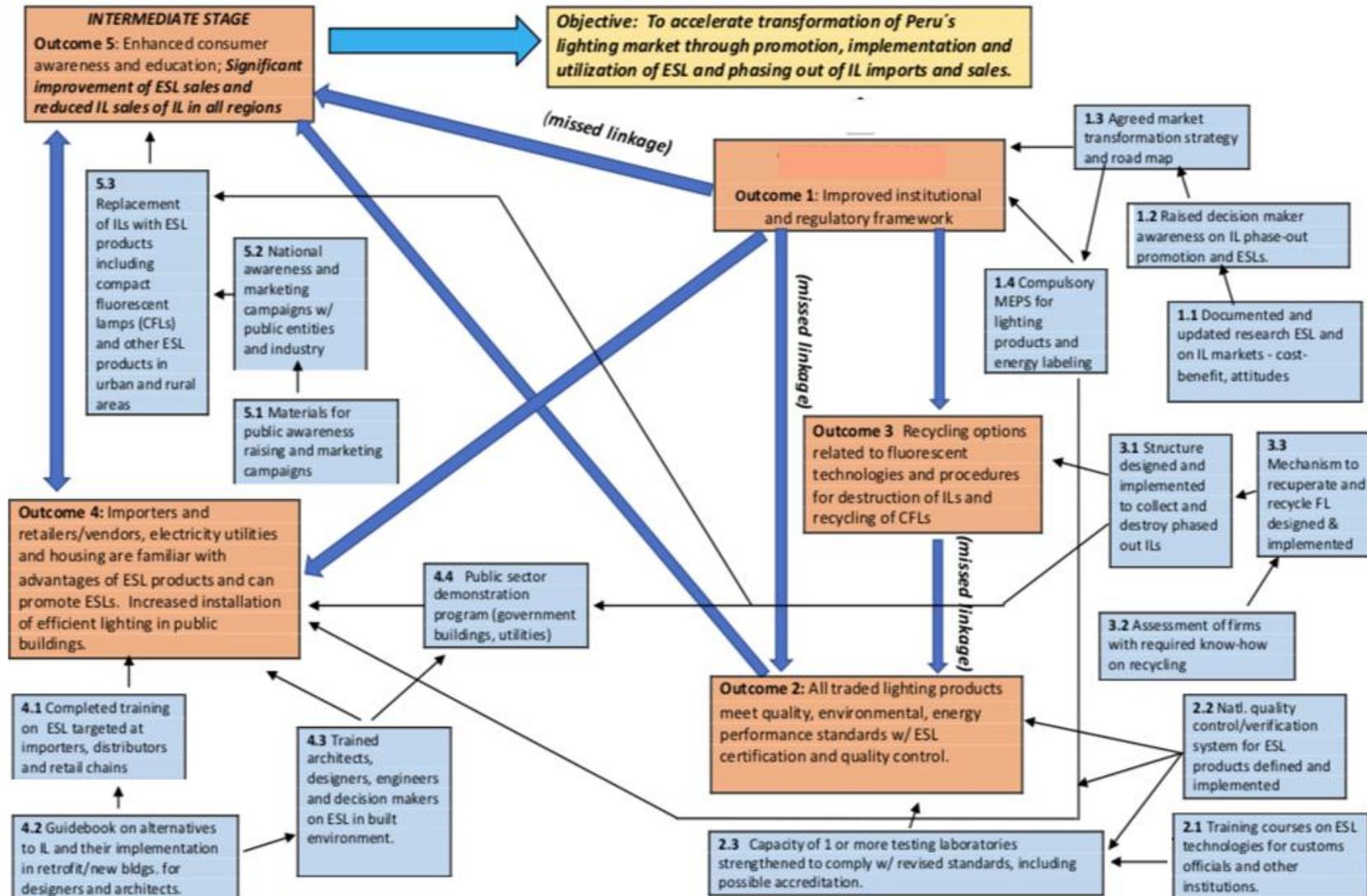
67. Output pathways are well-articulated and lead directly to the respective outcome. There is a logical progression in the sequence of outputs for each of the project’s five components:

- *Component 1:* Output 1.1 (ESL and market research) > outputs 1.2 (raised decision-maker awareness) > 1.3 (agreed market transformation strategy) > 1.4 (compulsory MEPS and labeling) > outputs 1.3 and 1.4 > outcome 1 (improved institutional and regulatory framework). The proposed MEPS are under review and their approval will take time; as a result, the first outcome has not yet been fully achieved. This has had influence on the

progress that was achieved towards updating regulations for CFL recycling and disposal, and in establishing a lighting product verification and quality control system (the second and third outcomes). It could also *limit the energy efficiency benefits to be derived from trading lighting products, or from increased ESL sales and IL substitutions in all regions (outcome 4).*

- **Component 2:** Output 2.1 (ESL training courses) > outputs 2.3 (raised laboratory capacity) and 2.2 (quality control and verification system) > outcome 2 (all traded lighting products meet environmental, quality and energy performance standards). The analysis suggests that the achievement of output 2.2 was essential to reach the second outcome. The absence of an integrated regulatory framework for ESL lighting fixtures could weaken the implementation of recycling mechanisms and establishment of performance/certification standards (outcome 2). It could also limit the scale of traded lighting products (outcome 3) and increased ESL sales and IL substitutions in all regions (outcome 4).
Component 3: Output 3.2 (assessment of firms with recycling capacity) > output 3.3 (recycling mechanism designed) > output 3.4 (recycling facility implemented) > outcome 3 (recycling options). Recycling and updated disposal options were proposed but not implemented in time for the demonstration activities or thereafter, in part because the planned institutional and regulatory frameworks (outcome 1) weren't in place. The lack of national CFL recycling and disposal services raises the environmental risks associated with the replacement of mercury-containing compact fluorescent lamps over time, particularly in smaller municipalities and rural areas (outcome 3).
- **Component 4:** Output 4.2 (guidebook on IL alternatives and retrofitting) > outputs 4.1 (trained importers and distributors) and 4.3 (trained architects, engineers and decision-makers) > output 4.4 (public sector demonstration program) > outcome 4 (improved knowledge of importers, retailers and utility companies on ESL. Outputs 4.1, 4.3 and 4.4 connect directly to the fourth outcome. In addition, output 3.1 (implemented recycling facility) also feeds into the fourth outcome (increased installation of efficient lighting in public buildings). In addition, there are two cross-component pathways that converge on outcome 4: Output 1.4 "compulsory energy performance standards and labeling" feeds into this outcome by establishing the standards that will influence the design of the training courses, and guide the demonstrations of efficient lighting. In addition, the mechanisms and structure for recycling phased-out bulbs (outputs 3.1 and 3.3) support the planned demonstration initiatives and training curricula.
- **Component 5:** Output 5.1 (public awareness materials and marketing campaign) > output 5.2 national awareness and marketing campaigns) > output 5.3 (replacement of ILs with ESL products) > outcome 5 (consumer awareness and significant improvement of ESL sales with reduced IL sales of IL in all regions). Once again there are cross-component linkages that need to be activated to fully achieve this outcome. The lack of an appropriate institutional-regulatory framework (outcome 1) could limit the scale and impact of the fifth outcome, which is one of the Intermediate States preceding the objective. The determination of quality and performance standards (outcome 2) and establishment of a national quality control/verification system for ESL products (output 2.2) are likewise needed to increase ESL sales and phase-out ILs on a greater scale over time. Finally, there are links with outputs 3.1 and 3.3 (recycling mechanisms and structure) that also influence the extent to which IL bulbs can be disposed of and replaced in an environmentally sound manner.

Figure 4: Casual Pathways Linking Outputs to Outcomes



68. The analysis suggests that different clusters of outputs and outcomes need to be implemented sequentially to maximize their effect and establish enabling conditions for achieving the project objective. As noted, this is a challenging task within a four-year period. The general intent of projects is to advance simultaneously on as many components as possible (a tendency that is reinforced by delivery pressures). This may accelerate financial delivery and budget expenditure, yet will not generate the cumulative impact of a sequenced implementation approach that follows the causal pathways and is better aligned with national cycles. Programming implementation based on progressive output and outcome linkages would improve the quality and relevance of project deliverables, without overriding the absorptive capacity of national partners. The down side is that an incremental process of this type is likely to require a longer (and more realistic) implementation period.

69. Project design and performance were additionally influenced by drivers of impact that moved the implementation process forward, and by external assumptions that were outside the project's control:

70. *Impact Drivers:*

- The national government's commitment to energy efficiency policies national energy policies, especially the 2009-2018 Referential Plan on Efficient Use of Energy.
- Demonstrated cost and energy-savings from ESLs that benefit consumers.
- Evolving ESL technologies that require continued engagement and adaptive management on the part of MINEM, importers/retailers and key stakeholders to ensure energy efficiency.
- Planned coordination and collaboration with UNDP-GEF project "Energy Efficiency Standards and Labeling in Peru" (GEF ID 3791) that is also executed by MINEM.

71. *External Assumptions:*

- There is political will and commitment to approve the enabling institutional, legal and regulatory revisions that are needed to transform the national lighting market and promote ESLs.
- Participating government institutions, lighting fixture importers/retailers and other stakeholders demonstrate adequate commitment and have the capacity to participate fully in the project.
- External producers and suppliers of IL bulbs (i.e. Phillips) are willing and able to actively support recycling on the scale envisioned.
- There is low staff turnover within the NEA and Project Implementation Unit, ensuring continuity and timely implementation.

6. Evaluation Findings

6.1. Strategic Relevance

6.1.1. Relevance to UN Environment's Mandate, MTS and Thematic Priorities, POW

72. The project's focus on energy efficiency is highly relevant to UN Environment's 2010-2013 and 2014-2017 Medium Term Strategies, both of which highlight climate change as one of six cross-cutting thematic priorities. The project contributed to the MTS's Expected Accomplishment of "low emission growth" and specifically Target 4 "sustainable consumption and production." It had direct global relevance to Sustainable Development Goal 7, which foresees "access to affordable, reliable, sustainable and modern energy for all."⁸ Likewise, it was supportive of the Bali Strategic Plan that also includes climate change in its thematic areas.

⁸ <https://sustainabledevelopment.un.org/sdg7>

73. This was one of the first GEF-supported energy efficiency projects in South American and as such has had pilot value for subsequent initiatives that were approved in Bolivia and Chile among other countries. The project enabled the participation of UN Environment's En.lighten initiative that gave technical advice for global market transformation to ESL technologies. En.lighten was supported by the GEF, OSRAM AG, Philips Lighting and the National Lighting Test Centre (NLTC); the initiative continues as United for Efficiency.

74. These examples underscored the project's direct relevance to global climate change and energy efficiency, especially. The project supported the transformation of Peru's lighting market by initially promoting replacement of incandescent (IL) to compact fluorescent lighting (CFL), and subsequently to LED technology as this became available. At the time of the project's design, available data indicated that the full replacement of ILs to CFLs would generate global savings of approximately 800 TWh in electricity consumption and reduced CO₂ emissions of 470 Mt (based on 2010 data), with increased savings to 1,200 TWh and 700 Mt CO₂ respectively by 2030. Likewise, it was estimated that a full market shift from ILs to CFLs would reduce world electricity for lighting demand by an estimated 18%. In addition to raising the potential for energy efficiency on a national scale, the project's shift from CFLs to the promotion of LED lighting technology enhanced its environmental relevance (LED bulbs being mercury-free).

6.1.2. Donor Priorities

75. The project has direct relevance to the GEF IV Strategy for the Climate Change Focal Area (Operational Programme 4) and to the objectives of Sub-programme 1: Promoting Energy Efficiency in Residential and Commercial Buildings. It also has significance as the first in a series of GEF country projects that support lighting market transformation to ESL in the region, through the design of an integrated approach that was based on En.lighten's global strategy. The project has demonstration value and offers lessons that have influenced the design of subsequent projects in Chile and Bolivia among others.

76. Energy efficiency for the productive and residential sectors is increasingly present in the financial portfolios of regional and national development banks. In the case of Peru, one of the main co-financers to the project was the Financial Corporation for Development (COFIDE), which contributed US\$ 5.9 million (cash and co-financing) from its energy loan portfolio. The Inter-American Development Bank (IDB) has also supported energy efficiency through loans and credits to COFIDE and the national public housing authority. Germany's national development bank, the Kreditanstalt für Wiederaufbau (KfW), has also been involved in energy efficiency and renewable energy in Latin America, reporting EU 3,400 million between expended and committed future funds in 2014. In recent years, KfW has promoted energy efficiency and renewable energy in Peru.

6.1.3. Relevance to Regional, Sub-regional and National Priorities

77. The project's objective and implementation strategy were consistent with national and sub-regional energy priorities, and were supportive of existing market trends towards energy efficiency. The project's attention to promoting market and consumer shifts to ESLs built on ongoing tendencies by which IL use has declined to practically nil in terms of imports and sales, with sustained growth in LED importation and consumption. After the project had started, it was able to successfully shift focus from replacing IL with compact fluorescent lamps (CFLs),

to promoting LED as the technology became commercially available. This has raised the project's relevance in terms of energy efficiency and environmental impact. ⁹

78. Although lighting market trends towards ESLs have continued independent of the project, the work that was done in developing mandatory labelling (effective as of April 2018), proposed minimum energy performance standards and technical LED specifications for interior lighting (required for public sector buildings) have addressed one of the main problems identified in the project's market study: The variance in performance between LED lamp bulbs from different manufacturers, with performance test results below the levels claimed for the product. Such measures stand to inform the consumer and facilitate their adaptation to new efficient lighting technologies over time. On the other hand, the demonstration work done with public lighting systems – for example in the town of Aguascalientes in Cuzco province - was too limited in scale to have national relevance.

79. At the time of the project's design, Peru lacked norms and standards for regulating the energy efficiency and performance of lighting products that entered the national market. Indeed, the main problems identified by a technical market study¹⁰ contracted in 2016 were false publicity and misleading practices by which lighting with lower or different efficiency levels than reported were sold on the open market. The study calculated that CFLs dominated the market by representing 72% of the national light stock, whereas LED remained at an incipient level with less than 5% of total national lighting bulbs. However, market tendencies in the importation of lighting products have demonstrated a marked trend towards increased LED importation and use, surpassing CFL imports during the first trimester of 2018.

80. The project's design addresses national energy priorities that are reflected in Law 27345 for the Efficient Use of Energy (DS 53/2007) which provides the enabling legal precedent for the project. The law assigns the Ministry of Energy and Mines (MINEM) the authority to promote efficient use of energy, EE programs and the implementation of mandatory labeling for electrical equipment and appliances. The law also foresees support to public awareness and financial mechanisms for replacing inefficient lighting products and other appliances. It includes provisions for an EE program within public sector, with mandatory audits and minimum lighting standards. The Law for the Promotion of Efficient Use of Energy mandates MINEM to formulate energy efficiency policies and elaborate a Referential Plan for Efficient Use of Energy (2009-2018).

81. The project is consistent with Peru's 2010-2040 National Energy Policy, which explicitly encourages efficiency and low carbon emissions in the productive chain. It was also supportive of the 2008-2012 UN Country Programme (CP) and UNDAF that were in effect at the time; the Country Programme included the outcome of "better sustainable utilization of the energy potential" with the related output of "feasibility analysis of power plants, including renewable energy, efficient use of energy and advanced fossil fuel technology" and target of "at least two projects implemented with the private sector".¹¹

^{9 9} The difference in energy efficiency between LEDs and CFLs is asset. LED offers energy savings of 9kW/h compared to CFL 1.8kW/h (based on monthly consumption for a bulb used 3hours/day). These are equivalent to monetary savings for LED of S/.0.45 and S/. 0.82 for CFL (1 USD) S/ 2.50). Carbon emissions are also lower: 2.72 kCO2 for LED compared to 4.54 kCO2 for CFL. LED bulbs offer the additional advantage of being mercury-free.

¹⁰ *Informe Final, Kiev Asociados (2016)*

¹¹ As listed in the Project Results Framework.

6.1.4. Project Complementarity or Duplication

82. “Lighting Market Transformation in Peru” is modelled on an integrated approach to energy efficiency that combines regulatory and institutional arrangements, training, pilot replacement demonstrations and consumer awareness. This approach was linked to the “Global Market Transformation for Efficient Lighting” project that established methods for labeling and quality certification.

83. As noted earlier, there were synergies with the GEF-UNDP project “Energy Efficiency Standards and Labels in Peru” that was executed in parallel by MINEM. This project developed standards and labels for electric equipment, and additionally subsequently supported the adoption of mandatory labeling for lighting products. Both projects have also shared training events on certification procedures, compliance monitoring and enforcement with SUNAT, INDECOPI and customs officials. The cooperation between both projects was fruitful and led to the approval of mandatory energy efficiency labeling for lighting products.

6.1.5. South-South Cooperation

84. Cooperation between countries was not central to the project’s design, except for a study tour to GELC facilities in China for technical laboratory staff. Some training events involved other GEF lighting market project participants from neighboring countries, i.e. Chile but this was more the initiative of the donor than national governments. The Peru project began earlier than the other GEF country projects and therefore opportunities for collaboration were limited by the different stages of implementation. Project training activities have contributed towards a cooperation agreement between DGEE and Mexico’s National Energy and Electricity Institute (CANAME) for laboratory testing and quality control.

Rating of Strategic Relevance: Satisfactory

6.2. Quality of Project Design¹²

85. Overall the project’s design is comprehensive and relevant to global, national and donor priorities. It has supported GEF IV’s strategy to promote energy efficiency and ESL through integrated projects that are designed from a common template. There is complementarity with UNDP-GEF’s “Energy Efficiency Standards and Labeling in Peru”, also executed by MINEM and recently concluded.

86. The project proposes an integrated approach to lighting market transformation, through five components that are mutually supportive. These span an improved regulatory and institutional framework (component 1), which provides a foundation for designing and implementing recycling and disposal mechanisms (component 3), designing training activities (components 2), and informing consumers and private sector on developing ESL technologies and standards (components 4 and 5). Collectively the five project components follow a natural

¹² This analysis is based on the Results Framework as presented in the approved project document. Subsequent to the project’s approval, a Referential Plan was designed by an external consultant (through En.lighten) that resulted in the downscaling of the initial 17 outputs to 5 outputs. The changes to the outputs (and deliverables) were adopted without formal approval, at a transitional stage when the NPD and NPCs were being replaced. However, the new outputs lack indicators and targets, literally duplicate existing outcomes, and undermine the distinction between results and products. Despite the inclusion of these outputs for monitoring and reporting purposes (in the annual PIR reports), actual implementation appears to have followed the original set. For these reasons, the evaluators do not recognize the revisions made to the outputs and base their analysis on the original Results Framework contained in the project document.

sequence that addresses barriers to energy efficiency that are highlighted in the project narrative 13. After the project's design, its approach was adjusted to LED lighting technology as it became commercially available.

87. The project is well-formulated and integrative in its approach. Its design links systemic (regulatory framework), institutional (institutional framework and capacity building) and individual (consumer) dimensions of energy efficiency. The implementation strategy seeks cooperation with private sector and consumers. Stakeholders were consulted during the project's design: A project preparation workshop was held in February 2012 with various stakeholders from the government (MINEM, MINAM), private sector (Philips, General Electric, Schröder, Osram) and academic institutions (Pontificia Universidad Católica del Perú, PUCP).

88. The Results Framework is well structured and articulated and shows linkages between outputs, outcomes and components. The budget allocation for the project appears adequate to deliver the expected outputs, assuming timely and efficient implementation.

89. The main design problems are related to short timelines for key deliverables and processes, which had to be implemented in parallel to meet the timeframe, particularly after initial delays. The project duration was largely determined by GEF guidelines, and the four-year timeframe was eventually extended to compensate for initial delays.

90. Time and delivery pressures have understandably driven the project's implementation. This has raised project delivery levels over time. However, there were also missed opportunities for synergies and mutual reinforcements between components that may ultimately have limited the scale of impact. The project's design was ambitious in relation to the expected deliverables: Five project components with five outcomes and seventeen outputs were compressed into a four-year period that required continuous institutional coordination – and faced national elections, two changes of government and successive changes of national project director (four) and project coordinator (three). Other countries have applied a three to five-year gap between the introduction of mandatory energy labeling and adoption of minimum energy performance standards (MEPs), to adjust the standards to market and technological trends. This is considered a "good practice" that was not possible within the project timeframe. However, the gap is occurring in practice since the approval of MEPS will require another 2-3 years of government clearances and approvals before becoming official, during which time they can be adjusted.

91. Project components that feed into each other along shared causal pathways, did not connect in practice. For example, the mechanisms and facility for recycling and disposing compact fluorescent bulbs (outcome 3) was needed in advance of the scheduled replacement of CFLs to LED in public sector buildings and among lower-income families (outcome 4), and to address existing market tendencies.

The disconnect between CFL replacement and having a functional system for the collection, recycling and disposal of discarded or phased-out lamps actually raised the environmental risks associated with CFL mercury residues. Likewise, the outcome of having an enabling regulatory/institutional framework in place should have been realized in advance of the other project components to facilitate their implementation and raise overall impact. This wasn't possible within the approved (or extended) project timeframe, and less so given the slow inception period and successive staff changes.

¹³ They are: Cost and technological properties; awareness and consumer preferences; market organization; institutional/policy barriers; and environmental barriers (mercury content).

92. In retrospect, outcome indicators such as the “establishment by yr. 2-3 of an appropriate institutional and regulatory framework for an energy efficient lighting market with an agreed strategies and a road map for accelerating the sales of ESLs and phase-out of ILs”, the “full operation of an effective and affordable CFL certification and quality control scheme by the end of yr. 3”, or full compliance with mandatory energy consumption labelling by the second year (output 1.4) were unlikely to be reached within these periods. There were overlaps in the implementation of project deliverables that were perhaps necessary to improve momentum and compensate initial delays. As a result, the strategic sequencing of outputs and outcomes according to their impact pathways was not followed.

93. The project document acknowledges the risk of low government commitment (not that of staff turnover) yet this is understated. The challenges of delivering ambitious results within an evidently short timeframe were not mentioned. Despite the benefit of a preparatory design phase, the formulation of the third project component did not consider the lack of technical capacities or financial resources to recycle CFLs with mercury content. The three main enterprises that manage CFL disposal do not have recycling capabilities and current practices (and legislation) continue to rely on underground disposal.

94. Thus, the demonstration initiatives for the replacement of IL bulbs with CFLs (and subsequently CFLs with LED) was disconnected from the availability of environmentally appropriate recycling and disposal services. The third project component foresaw the implementation of a recycling mechanism and facility, yet these were unlikely to be operational in time for the planned replacement of CFL bulbs. This raises the risk that the discarded CFL bulbs (that emit mercury) will not be disposed in an environmentally sound manner, particularly outside the Lima metropolitan area.¹⁴ Having the CFL recycling and disposal mechanism for each of the demonstration sites would have ensured disposal according to international environmental standards and maximized the project’s demonstration value.

95. Some of the most important outcomes and outputs were influenced by externalities that were outside the project’s influence. Their full achievement was undermined by a changing institutional environment and the extended coordination, policy and legislative processes involved in their approval and implementation. This would have required technical support and oversight beyond the project period. This risk was evident in reading the project document and should have been flagged (and adjustments to timelines or expectations considered).

96. This example underscores a broader finding that is recurrent in project evaluations: When projects aim to modify existing institutional, policy or legal frameworks, the allocated timeframes almost always fall short of the actual timelines that are needed to implement policy or institutional change processes. This suggests the need to consider different approaches – for example, devoting an initial project phase to develop the enabling institutional and regulatory framework (with support for policy advocacy and lobbying), followed by a “main” project phase devoted to the framework’s implementation. The combined 8 or 10-year period of applying a two-phase approach would be better aligned with governance cycles and the dynamics of policy and legislative change; and therefore, more likely to achieve the expected outcomes.

97. The project’s institutional arrangements were inclusive. The combination of project steering and technical committees enabled the incorporation of public, private and civil society

¹⁴ The mercury content of one CFL can range from 0-50 milligram (mg), depending upon when and where the lamp was manufactured. A regulatory framework and facilities for the disposal and recycling of CFLs are still lacking in Peru.

stakeholders, ensuring technical guidance and oversight. In this respect, the project strategy assumed a catalytic function by articulating different actors around a common goal. However, the sustained engagement of the different institutions and stakeholders was undermined by frequent staff changes and required considerable coordination effort on the part of the project team.

98. A detailed assessment and rating of quality of project design was conducted during the inception stage of the evaluation, and is annexed to this report.

Rating of Quality of Project Design: Moderately Satisfactory

6.3. Nature of External Context

99. The project benefited from lighting market trends that have been receptive to new ESL technologies. Since 2014 the importation of LED lighting products has risen steadily, accompanied by a gradual decline of CFL imports and almost full halt of IL imports. During the first trimester of 2018, Peru imported 9.6 million LED bulbs, surpassing compact fluorescent (7.5 million) and incandescent (0.3 million) bulbs.¹⁵ Urban consumers were particularly well-informed of advances in energy-efficient lighting technology and there are ongoing transformational tendencies in the lighting market that support the project objective. Consumer surveys conducted in four urban centers (Lima, Arequipa, Huancayo and Iquitos) in 2017 indicated high levels of awareness on energy efficiency and cost-effectiveness, with 80% of respondents identifying LED bulbs as the most energy-saving technology and 54% selecting light bulbs per their energy efficiency labeling. Peru's lighting market has been adjusting to energy efficient technologies – from IL to compact fluorescent, and presently towards LED - independent of the project's intervention. Indeed, market trends and consumer awareness are the main drivers of lighting energy efficiency in Peru.

100. Despite the favorable market context, the project was implemented in a challenging environment that was affected by institutional changes and high staff turnover. During the full project cycle there were national presidential and congressional elections. The levels of preparation and readiness that were needed to ensure effective inception and implementation were often not in place, due to successive institutional changes within Peru's public sector:

- The project's implementation involved four National Project Directors and three National Project Coordinators over a five-year period.
- The National Environment Commission (CONAMA) was upgraded to ministerial status as Ministry of Environment (MINAM). This led to a process of institutional re-structuring with high staff turnover. Although MINAM was designated to assume a lead role in the project's CFL recycling and disposal component, its mandate for waste disposal management was only assigned in December 2016 (previously being the attribution of the Ministry of Health).
- The Directorate of Policy and Regulatory Analysis – the project's main partner within the Ministry of Production (PRODUCE) – was transferred from the Ministry of Economy in 2014 and its staff have had limited participation in the project. Institutional restructuring and changing project focal points were also noted in MINAM, COFIDE and the Ministry of Housing, Construction and Sanitation (MCVS).
- Both Ministry of Environment (MINAM) and Ministry of Production (PRODUCE) are responsible for enforcing the Plan for the Management of Electric Residuals (RAE) that will become mandatory for public entities. However, the lack of recycling mechanisms and facilities, combined with inconsistent capacities among targeted entities to effectively plan the disposal of their electrical wastes, undermines the implementation of RAEs as well as the achievement of the third outcome in general.

¹⁵ According to data reported by SUNAT – Aduana.

- The second project component (“verification & enforcement and customs enhancement program”) was weakened by the government’s decision to exclude Customs from the proposed quality control and verification system, despite the training provided. Hence, Customs is not positioned to verify or enforce minimum energy performance standards and only registers the types of lighting products entering Peru from abroad. Likewise, provisions for sanctions or penalties in the case of non-compliance are presently lacking. An important achievement is the upcoming international accreditation of a national laboratory (*José Feliú Bosch*) for testing lighting products to verify compliance with minimum performance standards.
- Ministry of Energy and Mines’ (MINEM’s) Directorate of Energy Efficiency and the project team have also been through successive staff changes, as reflected in the assignment of several National Directors and National Coordinators over the project lifetime. This slowed the project’s full implementation, which only commenced in 2015 with the formation of a more stable project team. Despite the generally satisfactory performance of the current Project Management Unit, the combined staff turnover, slow start-up and persistent low delivery (influenced by various external factors) would prevent the timely achievement of outputs and outcomes.

101. There were (and are) no waste collection and disposal enterprises with the technical or financial capabilities to recycle CFLs with mercury content. Instead, discarded CFLs are disposed by underground confinement in accordance with existing regulations. This weakened the viability of the project’s recycling component that was expected to attend the increased replacement of IL and CLF lighting products.

Rating of Nature of External Context: Moderately Unfavorable

6.4. Effectiveness

6.4.1. Achievement of Outputs

102 The project work plan foresaw the delivery of 17 outputs that were divided among the five components. Overall output delivery was moderately satisfactory, based on the indicators and targets listed in the Results Framework. At the time of the evaluation, 10 outputs had been fully completed and 7 were either in progress, partially completed or not achieved. Some outputs such as the approval of mandatory energy efficiency labeling, technical lighting standards (for the public sector) and proposed minimum performance energy standards (MEPS) are substantive and have had - or are likely to have - tangible effect on the lighting market.

103. Outputs associated with consumer awareness and pilot demonstration activities (the fourth and fifth components) appeared to have an overall high level of achievement, followed by the outputs addressing MEPS, labeling and technical specifications (the first component); whereas there was less progress towards the delivery of outputs under the second (quality control and verification) and in particular the third (recycling and disposal) components. Output delivery was affected by the project’s slow start-up and inception, and much of the progress documented in this report was achieved during the last two years.

104. The project outputs that appear in the Results Framework are described in the following matrix, followed by their target indicator(s), level of achievement and evaluation comments:

Figure 5: Assessment of Output Achievement

Output	Performance Indicators and Targets	Achievement Rating	Comments on Output Achievement
<p>1.1 Documented results and updates of market research on the status of the ESL and IL markets in Peru, cost and benefits, attitudes of importers, retailers, and vendors and end-consumers</p>	<ul style="list-style-type: none"> • Full set of data on market lighting product, number of lighting points and consumer attitudes (Y1). • At least 2 workshops on surveying and info systems (Y2). • Information system on lighting products established at MINEM (Y 1). • Report on measurement of indicators, one after Y1 and one (impact analysis) before- the end of the project. 	<p>Satisfactory</p>	<p>The output was mostly completed. The first market study was undertaken in 2015 with quantified costs/benefits and analysis of consumer perceptions. A subsequent study with updated information was completed in 2017. Sample surveys were conducted in 6 regions, reaching 2,300 respondents.</p> <p>The proposed information system was not supported by market research findings and not implemented; instead an information system for incoming lighting products was designed for Customs that is being applied to verify the type of product entering (and not for the purpose of verifying energy efficiency or enforcing quality control).</p>
<p>1.2 Awareness raised among key decision makers on the phase-out of ILs and promotion of ESLs in Peru.</p>	<ul style="list-style-type: none"> • 2-4 one or two-day events organized in Y1 and again in Y3. Participation of at least 25 officials per event, of which 80% rates the event as good/excellent. • Dedicated website available by Y1 with project info on ESL and linked with MINEM and UNDP/GEF project on standards and labelling. • A counter is put in the webpages to monitor number of visitors 	<p>Satisfactory</p>	<p>The output was completed. Training was conducted with participation of major producers (Philips, Osram), architects and the School of Engineers. The 70+ participants exceeded initial expectations.</p> <p>A website exists with ESL information. Numbers of visitors are monitored.</p>

Lighting Market Transformation in Peru

<p>1.3 Agreed detailed market transformation strategy and road map</p>	<ul style="list-style-type: none"> • Preparatory work (assessment, strategy and scenario definition) carried out and discussed in 1-2 national workshops, by end of Y1 • Road map and strategy (including institutional-organizational and incentive arrangements) agreed upon and adopted in Y2 	<p>Satisfactory</p>	<p>The output was completed. A market strategy and roadmap were developed with technical assistance from En.lighten and GELC (China), and validated at stakeholder workshops.</p>
<p>1.4 MEPS for lighting products and energy labeling are made compulsory</p>	<ul style="list-style-type: none"> • Regulation for mandatory application of MEPS and energy consumption labeling has been adopted by the end of Y2; • Energy label categories (A-G) are quantified based on reliable market data • Discussion at 1-2 national workshops with public and private sector stakeholders in Y1 	<p>Moderately Satisfactory</p>	<p>This output was partially completed. MEPS have been drafted and are in process of internal review by MINEM; formal approval (Ministerial Resolution followed by Supreme Decree) and adoption is expected to take another 2 years or more. Technical lighting specifications (<i>fichas técnicas de homologación</i>) were approved and are mandatory for the public sector, with national coverage planned in future. <i>Peru Compra</i>, the national entity responsible for public sector purchases, has incorporated these specifications for public sector indoor LED lighting bids. Mandatory energy labeling was approved by Supreme Decree in 2017 and entered into effect in April 2018; the parallel GEF-UNDP “Energy Standards and Labeling” project led this process.</p> <p>There may be need for further revisions: The proposed MEPS are ambitious by international standards according to a contracted study, while specifications for rural public illumination are based on urban standards and are considered to be unnecessarily high by ADINELSA (the national rural electricity provider), reducing potential energy savings. Energy labeling is based on reliable market data, yet discrepancies in energy efficiency rating criteria used for CFLs and LEDs (based on different international directives) were noted by Philips representatives. These observations need to be considered by DGEE and corrective action taken if needed.</p>
<p>2.1 Completed training courses on</p>	<ul style="list-style-type: none"> • At least 125 customs, INDECOPI and other officials are trained in about 5- 	<p>Satisfactory</p>	<p>Training was conducted for INDEPCOPI, INACAL and Customs personnel with the support of En.lighten.</p>

Lighting Market Transformation in Peru

<p>ESL technologies targeted at customs (and officials of other institutions)</p>	<p>8 events on documentary control/quality inspection procedures and proper recording of imported CFLs and inspection of CFLs at sites of distribution and retail chains</p>		
<p>2.2 National quality control and verification system for ESL products is defined and implemented</p>	<ul style="list-style-type: none"> • CFL quality supervision system is to be operational by the middle of Y3 and will include documentary control/inspection by customs officials for all imported CFLs; and a minimum of ten INDECOPI quality control inspections at distributors and retail outlets of CFLs each year 	<p>Moderately Unsatisfactory</p>	<p>An operational quality control and verification system was not implemented and the participation of Customs was not authorized by government. Customs enforcement is limited to verifying the type of lighting product entering the country without verifying performance standard or energy efficiency. Enforcement and penalization provisions have not been determined, and official approval of the proposed MEPs is expected to involve an extended process. Verification of energy efficiency labeling has been adopted by INDECOPI and is now taking place on a sample level, with compulsory labeling having entered into effect in April 2018.</p> <p>The full delivery of this output was essential to reach the second project outcome.</p>
<p>2.3 Capacity of one or more testing laboratory is strengthened to ensure compliance with revised standards including possible accreditation.</p>	<ul style="list-style-type: none"> • At least two labs are accredited and internationally recognized to perform testing of lighting products. 	<p>Satisfactory</p>	<p>The output was largely met: One laboratory is currently in process of receiving international accreditation. Technical personnel from national laboratories participated in a study tour to the GELC facility in China, where they observed laboratory tests and received lectures from technical experts. One of the participating labs (<i>Laboratorio José Feliu Bosch</i>) has since invested in upgrading its installation and will be accredited by INACAL for testing lighting products. To the extent that the MEPS and technical guidelines are implemented, it is expected that there could be demand for a second accredited laboratory. The evaluators were told that two foreign laboratories have expressed interest in assuming this function in Peru.</p>

Lighting Market Transformation in Peru

<p>3.1 A structure designed and implemented to collect and destroy phased-out ILs'</p>	<ul style="list-style-type: none"> • Regulations for the collection and destruction of ILs and recycling and disposal of not functioning and discarded CFLs adopted by the end of the third year. About 500,000 CFLs a year disposed and recycled by 2016 and 2 million CFLs a year by 2018 	<p>Unsatisfactory</p>	<p>I. A business plan for the collection and recycling of CFLs was prepared by En.lighten, but the proposed mechanism or facility has not been designed or implemented. There is no recycling of discarded CFLs in Peru, and existing electric waste disposal regulations and practices address underground storage in landfills. Public sector entities are expected to prepare and execute Plans for the Management of Electric and Electronic Residuals (<i>Reglamento Nacional para la Gestión y Manejo de los Residuos de Aparatos Eléctricos y Electrónicos</i> or RAEE), but capacities and enforcement mechanisms are lacking. The enterprises that handle CFL waste collection do not have the technical knowledge or resources to recycle CFLs or handle mercury residues. As CFL are increasingly replaced by LED technology, the lack of an organized collection and disposal mechanisms, particularly in smaller municipalities and rural areas, could raise environmental risks.</p>
<p>3.2 Assessment of existing firms having the required know-how within Peru or outside on recycling.</p>	<ul style="list-style-type: none"> • Publication by the end of Y1 on issues - and options for CFL recycling and disposal with recommendations, incentive plan and technical guidelines - and discussed and presented in 1-2 workshops 	<p>Moderately Satisfactory</p>	<p>The assessment was made and a business plan prepared by En.lighten for discussion with national stakeholders. However, some project respondents considered the plan to be general in scope with limited applicability. None of the enterprises in Peru involved in collection of CFLs practice recycling.</p>
<p>3.3 Feasible mechanism for recuperation and recycling fluorescent lamps (including financial costing) designed and implemented.</p>	<ul style="list-style-type: none"> • Regulations for the collection and destruction of ILs and recycling and disposal of not functioning and discarded CFLs designed and discussed at workshops in Y2 and ultimately adopted by the end of Y3 	<p>Moderately Unsatisfactory</p>	<p>Regulations were approved that require public sector entities to prepare and execute Plans for the Management of Electric and Electronic Residuals (RAEE). However, the technical capacities, financing and enforcement mechanisms to achieve this are not in place. Nor are there facilities for recycling; instead, collected CFLs are stored in underground landfills, in accordance with existing regulations.</p>

Lighting Market Transformation in Peru

<p>4.1 Completed training courses on ESL techniques and technologies targeted at importers, distributors and retail chains</p>	<ul style="list-style-type: none"> • Practitioners (distributors and retailers of lighting products; staff of power utilities involved in ESL campaigning) are able to promote CFLs • At least 10-20 workshops and trainings with at least 25-30 participants each event • 80% of participants rate the event as good/excellent 	<p>Satisfactory</p>	<p>Training and informational events were implemented with major importers and distributors/retailers, i.e. Phillips Lighting, Sodimac, Comercial Marsano. The evaluators cannot assess the level of participant satisfaction, although the feedback provided by trainees that were interviewed was generally positive. Project reports indicate that a total of 1,359 persons received training or were otherwise informed on ESL technologies.</p>
<p>4.2 Guidebook on the alternatives to IL and their implementation in retrofit and new buildings for designers and architects.</p>	<ul style="list-style-type: none"> • Publication of the Guidebook by the beginning of yr 3, incorporating results of the assessment 	<p>Satisfactory</p>	<p>The output was completed.</p>
<p>4.3 Trained architects, designers, engineers and decision makers on ESL in built environment.</p>	<ul style="list-style-type: none"> • At least 250 'lighting in built environment' practitioners' become familiar with the integration of ESLs and luminaires in new housing developments and other promising markets (5-10 training events). 	<p>Satisfactory</p>	<p>The output was completed with participants that included the national Housing Fund (<i>Fondo de Vivienda</i>) and the College of Architects. Project reports indicate that 1,359 persons were informed on ESL technology.</p>
<p>4.4 Public sector demonstration program (government buildings, utilities).</p>	<ul style="list-style-type: none"> • At least 500,000 efficient lighting (CFLs, efficient fluorescents) installed together with appropriate luminaries. • Regulations approved by the end of yr3 on efficient lighting in buildings, 	<p>Satisfactory</p>	<p>The output was completed. 750,000 LED lighting bulbs were installed in demonstration locations, exceeding the minimum target of 500,000. Mandatory technical LED lighting specifications (<i>fichas de homologación</i>) were approved for public sector buildings and are now in effect. According to ADINELSA, rural public lighting regulations are equivalent to those for urban settings, lowering potential energy savings. The evaluators have suggested that this</p>

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			matter be reviewed by DGEE and corrective actions taken if necessary.
5.1 Materials for public awareness raising and marketing campaigns are developed or adapted into Peruvian conditions.	<ul style="list-style-type: none"> A comprehensive set of specific materials for public awareness campaigns have been prepared. 	Satisfactory	The output was completed.
5.2 Nation-wide awareness raising and marketing campaigns with relevant public entities and effective participation by industry (importers and suppliers, distributors and retail chains).	<ul style="list-style-type: none"> Required promotion materials produced following public awareness raising and marketing campaigns by the end of Y1 and updated incorporating the results of Output 1,1 (consumer preference and attitude surveys) 	Satisfactory	The output was completed. Public awareness materials were prepared for the campaigns. A consumer survey conducted in 2017 has revealed high levels of awareness regarding lighting energy efficiency.

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<p>5.3 Replacements of ILs with ESL products including with quality compact fluorescent lamps (CFLs) and other ESL products in urban areas and rural areas</p>	<ul style="list-style-type: none"> • Pilot initiatives supported with Government funds. Distribution 1.5 million CFLs to lower-income/rural households; 500,000 ESL in public buildings; 1500 HPS in street lighting. 	<p>Satisfactory</p>	<p>The output is ongoing. Pilot initiatives were implemented on a limited scale: 125 high-pressure sodium lamps (HPS) for street lighting were replaced with LED technology in the town of Aguas Calientes, Cusco province (in collaboration with ELECTROSUR ESTE and Kyeong Il Industry); and a control system installed to monitor and manage the system. There was also an exchange of 680 IL bulbs for LED with residents of three municipalities. The substitution of CFLs with LED among low-income households is in process of commencement and is expected to meet or surpass the 1.5 million target, through signed agreement with FISE (the national energy fund for social inclusion) and OSINERGMIN (the national supervisory body for investments in the energy and mining sectors). The agreement foresees a significant increase in co-financing for this purpose that would reach 81 million soles (approximately US\$ 25 million), exceeding the initial programmed amount by almost US\$ 7 million. However, this will not be accomplished during the project period and requires follow-up by DGEE.</p> <p>The replacement of 500,000 ESLs in public buildings is already mentioned as a target for Output 4.4, and attributed to that output.</p>
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Rating of Output Achievement: Moderately Satisfactory

6.4.2. Achievement of Direct Outcomes

105. Outcome achievement was logically influenced by the project's performance in delivering outputs: The satisfactory levels of output production under the first, fourth and fifth components brought the project closer to the expected outcomes of an improved regulatory and institutional framework, higher consumer awareness and ESL sales, and trained market actors. Conversely, the limited progress that was made towards key outputs of the second and third components ultimately prevented the creation of CFL recycling and disposal mechanisms and facilities, or an operational quality control and verification system for incoming lighting products. In all five components, the level of outcome achievement was influenced by external factors that were outside the project's control as described below.

<i>Outcome 1:</i>	<i>Indicator and Target:</i>	<i>Achievement Rating:</i>
<i>Improved institutional, and regulatory framework to promote a sustainable market for CFLs and phase-out of ILs</i>	<i>Establishment by Y2-3 of an appropriate institutional and regulatory framework for an EE lighting market with an agreed strategies and road map for accelerating the sales of ESLs and phase-out of ILs</i>	<i>Moderately Satisfactory</i>

106. The early consolidation of an enabling regulatory and institutional frameworks was essential in enabling the full achievement of other outcomes as well as the project objective. The evaluators consider that the first outcome was partially reached, with evidence of regulatory improvements in the approval of mandatory energy efficiency labeling and technical specifications for indoor LED lighting (the latter being mandatory the public sector). Whereas the approval of minimum energy performance standards (MEPS) – possibly the project's most important deliverable - is pending, with proposed standards currently under review by MINEM. Additional stages involving different levels of government are required to approve the MEPS that are expected to take an additional 2-3 years. Technical concerns on some of the regulatory changes have been expressed by key partners (described below that should be reviewed by DGEE to determine if further adjustment is needed.

107. The outcome has contributed to improvements in the lighting market regulatory framework through the following associated deliverables:

108. *Mandatory energy efficiency labeling* *Technical regulations for mandatory labeling (Reglamento Técnico sobre el Etiquetado de Eficiencia Energética)* entered into effect in April this year, representing the project's most tangible achievement. This was realized through the support of the GEF-UNDP "Energy Efficiency Standards and Labeling in Peru" project that was executed in parallel with MINEM. In addition to providing consumers with product information, the level of energy efficiency is rated by category and color coding. The cost of for labeling is assumed by the manufacturer or alternatively the importer or distributor.

Figure 6: Proposed Minimum Energy Performance Standards: CFL and LED (MEPS)

Compact Fluorescent Lamps (CFL)		Light Emitting g-Diode (LED)	
Potency (W)	MEPS (lm/W)	Potency (W)	MEPS (lm/W)
$P < 7$	45	$P \leq 3$	70
$7 > P \leq 11$	50	$3 > P \leq 5$	75
$11 < P \leq 16$	54	$5 < P \leq 9$	80
$16 < P \leq 20$	57	$P > 9$	90
$20 < P \leq 23$	59		
$P > 23$	62		

Source: DGEE

109. A related institutional improvement is the inclusion of lighting products under the mandate of INDECOPI, the government consumer protection institute. INDECOPI has started this year to periodically monitor commercial distributors and wholesalers to verify that all lighting products carry appropriate labeling. However, interviewed distributors have noted that enforcement (and possible penalties) are directed at the wholesale and retail vendors, and not the importer or distributor which bears primary responsibility to ensure proper labeling.

110. Another technical concern that was raised by one producer is that inconsistent efficiency standards are being applied in labeling the efficiency of CFL and LED bulbs, being based on different energy standards directives that were issued by the European Union in 2010 and 2012. The result is that LED products are receiving a lower efficiency rating than A-rated CFL bulbs, which are actually less efficient and potentially hazardous environmentally. This is misleading to the consumer and potentially harmful environmentally, given the absence of information on toxicity. In order to distinguish these differences, CFL bulbs would need a AA or AA+ rating instead. The evaluators feel that this issue should be considered by the DGEE and discussed with the concerned parties; and amendments introduced to ensure comparability in labeling between lighting technologies.

111. *Mandatory LED technical specifications for the public sector* Another tangible regulatory improvement is the adoption of technical specifications (*fichas técnicas de homologación*) for indoor lighting LED products that are now mandatory for government. These are the first technical specifications adopted for the public sector in Peru: 36 technical fichas were approved by ministerial resolution, establishing that all indoor LED lighting purchases by the public sector must meet the specifications. This will have direct repercussion on government LED lighting bids and contracts.

112. However, there may be need for a separate set of LED specifications for rural public lighting systems, in recognition of the difference in urban and rural requirements - public lighting in rural areas serve as “markers” to identify locations, and do not require the intensity of lighting that is used in urban areas with greater demographic concentration and road traffic. Interviewed representatives of ADINELSA (the authority responsible for rural electrification facilities) consider that the required wattage for rural LED lighting should be lowered in relation to urban specifications. This would raise energy efficiency by applying the LED equivalent (25-30W) to the replacement of existing 50W sodium vapor lamps.

Figure 7: Mandatory LED Lighting Specifications for the Public Sector

<i>Entity</i>	<i>Good or Service</i>	<i>CUBSO Code</i>	<i>Technical Denomination</i>	<i>Approving Resolution</i>	<i>Date of Publication</i>
Ministerio de Energía y Minas (MEM)	Panel LED 60x60cm, de ≤40W de ≥4000 Lúmenes, luz blanca fría.	39111544-00365269	Luminaria LED de 60x60cm, de ≤40W, de ≥4000 Lm de 6500k	N° 494-2017-MEM/DM	01/12/2017
Ministerio de Energía y Minas (MEM)	Panel LED 60x60cm, de ≤40W, de ≥4000 Lúmenes, luz cálida	39111544-00365271	Luminaria LED de 60x60cm, de ≤40W, de ≥4000 Lm de 2700k - 3000k.	N° 494-2017-MEM/DM	01/12/2017
Ministerio de Energía y Minas (MEM)	Panel LED 60x30cm, de ≤20W, de ≥2000 Lúmenes, luz blanca fría	39111544-00365272	Luminaria LED de 60x30cm, de ≤20W, de ≥2000 Lm, de 6500k.	N° 494-2017-MEM/DM	01/12/2017
Ministerio de Energía y Minas (MEM)	Panel LED 60x30cm, de ≤20W, de ≥2000 Lúmenes, luz blanca	39111544-00365273	Luminaria LED de 60x30cm, de ≤20W, de ≥2000 Lm, de 4000k - 4500k	N° 494-2017-MEM/DM	01/12/2017

Ministerio de Energía y Minas (MEM)	Panel LED 60x30cm, de ≤20W, de ≥2000 Lúmenes, luz cálida	39111544-00365274	Luminaria LED de 60x30cm, de ≤20W, de ≥2000 Lm, de 2700k - 3000k	N° 494-2017-MEM/DM	01/12/2017
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113. **Minimum Energy Performance Standards (MEPS).** This is potentially the project’s greatest contribution, being essential to the enforcement of energy efficiency parameters for the national lighting park. The MEPS represent Peru’s first mandatory set of energy performance standards and, once approved, would have direct impact on the quality of incoming lighting products and national lighting market, in addition to the Construction Code and related EM010 technical standards.

114. Draft MEPS have been designed agreed on among the project partners, and is under consideration within MINEM for approval by Ministerial Resolution, after which it would proceed to the Council of Ministers for eventual approval as Supreme Decree. This process requires political lobbying and negotiations with interest groups that are outside the project’s scope and timeframe; it is estimated that any approval would take between 2.3 more years.

115. A technical study that was commissioned by the project ¹⁶ found the MEPS to be ambitious with standards exceeding those that other countries have adopted (including the standards recommended by En.lighten, which did not have a significant role in designing the MEPS). The study found that the LED energy performance requirements were above those used for ecological design (IEE=0,2 – Class “A”), which are among the EC’s highest requirements, i.e. equivalent to A++ and A+. Incandescent and halogen lamps so do not meet the MEPS as their efficiency of 10-25 lm/watt would fall below the proposed 45-62 lm/watt. The possible energetic, financial and socio-economic effects of having high MEPS should be considered by DGEE and revisions introduced during the ongoing review process if considered viable.

116. Another technical observation is the need to review the proposed minimum efficiency standards with consideration of white light characteristics to the visible spectrum, as defined by its color temperature and chromatic reproduction index, and pf its useful life. The exclusion of these factors could affect the consumers’ comfort and raise the volume of waste disposal.

Outcome 2: <i>All traded lighting products meet quality, environmental and energy performance standards and an effective verification and quality control system is established</i>	Indicator and Target: <i>Full operation of an effective and affordable CFL certification and quality control scheme by the end of Y3.</i>	Achievement Rating: <i>Moderately Unsatisfactory.</i>
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¹⁶ *Análisis de Impacto Regulatorio para la Propuesta de Estándares Mínimos de Eficiencia Energética*, Kiev Asociados (2017)

117. The target for this outcome was not achieved, although national capacities for quality control and laboratory testing have been improved. There is not a verification or quality control system for lighting products that is operational. The government’s decision to not involve Customs in the proposed verification and quality control system lowered the viability of this outcome. The role of Customs is presently limited to registering the type of lighting product entering the country. Enforcement mechanisms with provisions for non-compliance need to be designed.

118. As mentioned, market trends have been responsive to evolving ESL technology and lighting products with higher efficiency standards. LED bulbs have consistently increased their share of the market in relation to CFLs, in terms of imports and sales. These trends contributed to the partial achievement of the outcome. Yet the pending challenge that was identified in the 2017 regulatory impact study 17 is the variance in performance between different brands and manufacturers, at levels that are often below those claimed by the product. Having a quality control and verification system in place (with minimum energy performance standards) continues to be fundamental for ensuring compliance with ESL policies.

119. There are positive developments as well. A Peruvian laboratory (Laboratorio José Feliu Bosch) joined other laboratories on a study tour to GELC in China, and has since invested in upgrading its facilities and equipment to receive accreditation from INACAL for energy efficiency testing. This is an important achievement that will raise national capacities and Peru’s level of preparedness to enforce EE regulations.

120. Another positive development is the verification of energy efficiency labeling by INDECOPI, the government’s national institute for competitiveness and product transparency. Labeling enforcement entered into effect in April this year, and was preceded by information awareness and communications activities (3D headsets included) for importers, distributors and wholesalers under the fourth project component. The evaluators had very little interaction with wholesale and retail distributors, some of whom claimed that most vendors were unaware that mandatory labeling had entered into effect with possible penalties for non-compliance. It was also noted that INDECOPI’s inspection activities are directed at wholesale and retail vendors at commercial points of sale, when primary responsibility for labeling compliance is considered to be with the importers and distributors that introduce the merchandise. There is concern among vendors of unsold stocks of light bulbs that predate the April deadline and were never labeled.

<i>Outcome 3:</i>	<i>Indicator and Target:</i>	<i>Achievement Rating:</i>
<i>Identification of recycling options related to fluorescent technologies and procedures defined for destruction of ILs and recycling of CFLs</i>	<i>- Regulations for collection and destruction of ILs and recycling and disposal of CFLs adopted by end of Y3 - CFL recycling and disposal is taking place to ensure that increased CFLs will not lead to mercury release. Installation of only good quality CFLs and collection/return of ILs</i>	<i>Unsatisfactory</i>

¹⁷ *Kiev Asociados*

- Provision of only good quality CFLs and collection/return of replaced ILs in all sponsored programs.

121. This component advanced the least towards its expected outcome, in part because the design did not consider the absence of recycling enterprises or the technical capacity for achieving it. There were also internal changes within partner government institutions; for example, MINAM only recently assumed the mandate of overseeing electrical waste management. The feedback received from interviewed respondents suggests that recycling CFLs with mercury content is not viable in Peru. The evaluators were told that replaced CFL bulbs continue to be disposed in underground storage spaces for toxic electrical waste, following the existing regulations. A business plan to implement this component was elaborated by En.lighten and discussed with project partners but was not applied. The limited progress towards this outcome raises the potential environmental risks of disposing CFL bulbs that contain mercury residues, particularly in the smaller cities and rural areas that lack collection services or use open landfills. This risk is likely to increase as the lighting market continues to shift to LED technology and the national stock of CFLs is consumed and disposed of.

<i>Outcome 4:</i>	<i>Indicator and Targets</i>	<i>Achievement Rating:</i>
<i>Importers and retailers/vendors, electricity utilities as well as housing are familiar with the advantages of ESL. Increased installation of efficient lighting in public buildings.</i>	<i>- Distributors, retailers and power utility staff involved in ESL campaigns are able to promote CFLs - At least 500,000 efficient lighting bulbs installed together with luminaries.</i>	<i>Satisfactory</i>

122. The fourth outcome was fully achieved according to its performance indicators. The main importers, distributors and vendors of lighting products are aware of the advantages of ESLs. This outcome was influenced by the project: Two training workshops on energy efficient lighting were streamed in four regions with 9,000 and 5,000 views each, consumer awareness campaigns were implemented, and mandatory labeling was introduced. A key contributing factor is the natural evolution of Peru’s lighting market, which has been responsive to improvements in ESL technologies over the past years - from incandescent to compact fluorescent to LED. Likewise, information on CFL and subsequently, LED energy efficiency is disseminated by the main lighting product producers and distributors, i.e. Philips and Sodimac, to their branches in Peru.

123. Regarding the demonstration of ESL with public lighting, 750,000 inefficient lamps (T12b) were replaced with more efficient lighting technology (T8 and T5) in public sector buildings, surpassing the minimum target. The approval of mandatory technical specifications for LED lighting for the public sector (under the first component) is likely to lead to increased use of ESL by the public sector.

124. The substitution of CFLs with LED among low-income households is in process of commencement and is expected to surpass the initial 1.5 million target, through a signed agreement by DGEE with FISE (the national energy fund) and OSINERGMIN (the national supervisory body for investments in the energy and mining sectors), to fund 81 million soles (approximately US\$ 25 million). This represents a significant increase of co-financing over the initially committed sum by almost US\$ 7 million. It will start this year and is planned to continue beyond the project period.

<i>Outcome 5</i>	<i>Indicator and Targets</i>	<i>Acheivement Rating</i>
<i>Enhanced consumer awareness and education. Significant improvement of ESL product sales and reduced IL sales in all regions.</i>	<i>A minimum of 75% of consumers are aware of the benefits of CFLs (changed to LED).</i>	<i>Satisfactory</i>

125. The fifth outcome appears to have been reached. Market trends over the past years indicate high consumer receptivity to ESL. There has been sustained growth in LED imports and sales, in comparison to CFLs that are gradually declining and IL that has fallen to practically nil. Although the evaluators were unable to obtain updated information on LED sales, importation trends for different lighting technologies between 2014 and 2018 (first trimester) supports the notion of increased ESL awareness and sales.

126. The project supported the achievement of this outcome with public awareness campaigns, the demonstration of LED technology for public lighting systems, and substitution of IL and CFL bulbs on a pilot basis. Awareness campaigns were conducted in the urban centers of Lima, Huancayo, Arequipa, Iquitos and Cusco through different mediums – publicity caravans, educational and photographic exhibits, contests and other public events were organized at selected locations (parks, shopping centers). An estimated 11,570 persons were exposed to the promotional campaign. National ESL awareness campaigns were also disseminated through social media messaging and prize contests.

Figure 8: Trends in the Importation of Lighting Products by Technology (millions of units) 2014-2018



Source: SUNAT ADUANAS

127. According to the final report provided by the contracted firms (Holiday Producciones and Speedymens) the ESL awareness activities were implemented with the following results:

- 1.2 million people were reached through more than 15,700 interactions on social networks.
- 5,300 people informed in public spaces in Metropolitan Lima
- 7 million people exposed to more than 18,300 interactions on social networks
- More than 6 million people were reached each week through a nationwide radio campaign (the campaign was spread over 3 weeks)
- More than 5.5 million people saw the billboards placed in the Lima Metro. Billboards were also placed on fences in the main streets, avenues and shopping centers of the cities of Lima, Arequipa, Cusco, Huancayo, Iquitos, Huánuco and Pucallpa.
- More than 10,800 people were informed in schools, parks and squares in the cities of Iquitos, Huancayo, Arequipa, Cusco and Lima.
- Activities in Lima included a pilot activity to collect and replace inefficient bulbs at the end of their useful life. Approximately 680 bulbs and 46 kilos of electric waste were sent to final disposal (underground confinement).

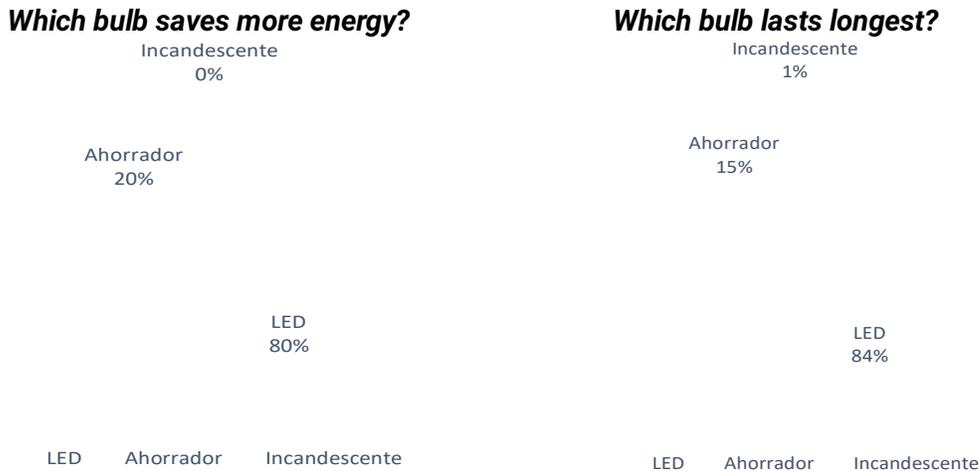
Figure 9: Images of LED Consumer Awareness Campaigns



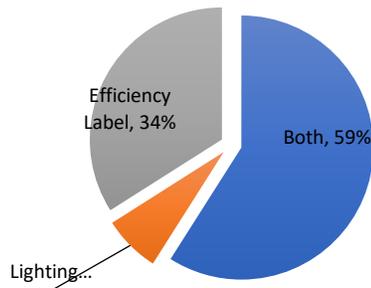
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128. Because of these activities, consumer awareness on ESL is likely to be higher in the aforementioned urban areas, as reflected in consumer surveys that were conducted in the four pilot locations following the awareness campaigns. The surveys covered 600 respondents (46% of whom were female) in four pilot locations, and indicate that a significant majority of consumers (80%) are aware of the energy efficiency and performance advantages of LED, while 64% measure the level of illumination according to the lumens. Some of the survey results are presented below:

Figure 10: Consumer Surveys - Selected Findings¹⁸



What criteria do you use to select the best bulb?



Source: Resultados de Encuestas BTL en Regiones (2017)

129. Pilot initiatives were implemented on a limited scale: At a cost of US\$ 20,000, 125 high pressure sodium (HPS) street lamps were replaced with LED lighting technology in the town of Aguas Calientes, Cusco province (in collaboration with ELECTROSUR, the local energy provider, and Kyeong Il Industry) and a control system installed to monitor the street lighting system. However, ELECTROSUR,¹⁹ does not have plans to up-scale the use of LED technology for public lighting,

¹⁸ Translation: Ahorrador = Compact Fluorescent Lamp (CFL); Incandescente = Incandescent Light (IL)

¹⁹ Electrosur Este

noting that electricity tariffs need to be revised to incorporate the costs of LED technology for public lighting. There was also the exchange of 680 IL for LED bulbs with residents of three municipalities.

130. The substitution of 1.5 million CFLs with LED bulbs among low-income households was not achieved in the project lifetime. However, it is expected that this target will be achieved and surpassed under a US\$ 21 million cooperation agreement between DGEE, FISE (the national energy fund) and OSINERGMIN (the supervisory body for investments in energy and mining) that will begin this year and continue beyond the project. This exceeds the initial co-financing commitment by almost US\$ 7 million, increasing the scale of impact that was initially foreseen.

131. Lighting market trends will continue to be the main driving force in the substitution of IL and CFL bulbs with LED, although this tendency could lag in rural areas where the offer of LED is more limited and consumers are less informed.

Rating of Outcome Achievement: Moderately Satisfactory

6.4.3. Likelihood of Impact

132. Impact is likely and driven largely by market trends and consumer receptivity to ESL technologies. As illustrated in Figure 13, the evolution of Peru's lighting market behavior has been marked by declining imports of IL bulbs and more recently, CFLs coupled by a growing share of LED bulb imports (Figure 7). During the first trimester of 2018, importations of LED bulbs (9.6 million) overtook imports of CFLs (7.4 million) and ILs (0.3 million). This trend is also reflected in LED sales; although official figures aren't available, interviewed representatives of the Sodimac and Marsano lighting product commercial centers estimate that more than 80% of light bulb sales are presently LED. Consumers appear to be informed, receptive to energy efficiency labeling, and generally responsive to new technologies. As noted earlier, consumer surveys indicate that a majority of respondents are aware of the benefits of ESLs and consult energy efficiency labels when purchasing light bulbs. Indeed, 80% of surveyed respondents were aware of the energy efficiency advantages of LED over other lighting technologies. These advances are indicative of a positive impact in terms of energy efficiency, given the significant differences in energy consumption between a 100w incandescent bulb and its conversion to compact fluorescent (equivalent to 20w or one-fifth the consumption) and LED (10w or half the consumption of an equivalent CFL).

133. The available data indicates that Peru's lighting market has been in process of rapid transformation over the past years, with positive response to ESL technology (Figures 7 and 9). The project – and the parallel UNDP-GEF "Energy Efficiency Standards and Labeling in Peru" initiative – have helped in accelerating this process by introducing mandatory EE labeling and LED specifications for the public sector, and by promoting public awareness. The expected accreditation of a national laboratory for quality control testing will enhance national preparedness to for EE verification and quality control. Likewise, the anticipated approval of minimum energy performance standards (MEPS) – with provisions for enforcement and non-compliance - would raise the level of impact by enabling the implementation of the control and verification system.

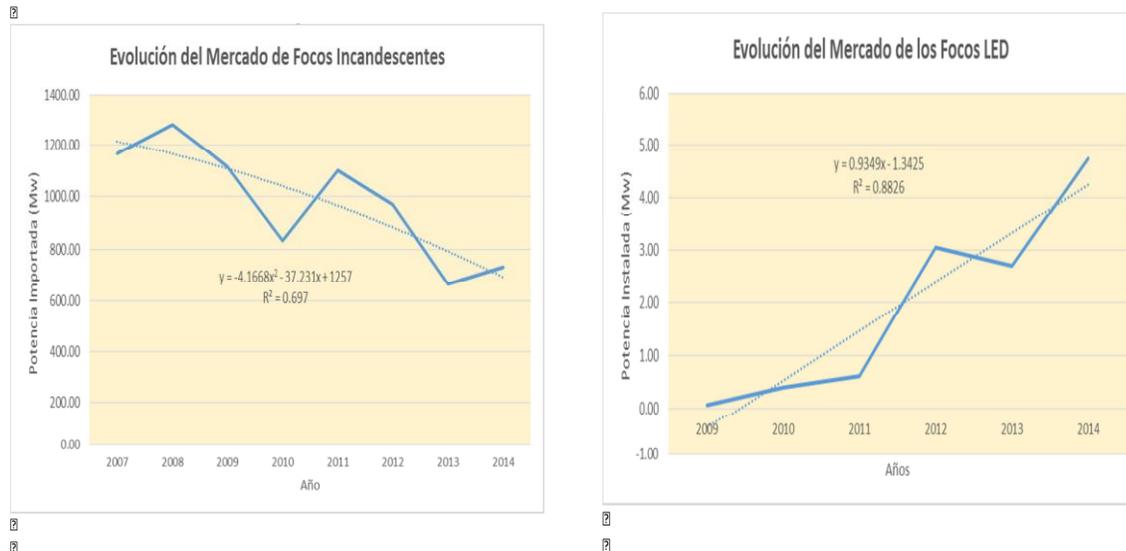
134. The introduction of energy efficiency standards will very likely lead to increased energy savings over time. According to a contracted regulatory impact assessment study,²⁰ the

²⁰ *Análisis de Impacto Regulatorio de Estándares Mínimos de Eficiencia Energética*, Kiev Asociados (2016)

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implementation of 36 technical specifications for LED indoor lighting products (approved by ministerial resolution and are now mandatory for public sector procurements) is expected to reduce carbon emissions by an estimated 395,946 tCO₂e by 2030. The use of consistent technical lighting specifications that are energy-efficient may also improve cost effectiveness in public sector lighting procurements and services.

Figure 11: Historical Evolution of LED and IL Lighting Market: 2007-2014 (Mws)



Source: Kiev Asociados (2017)

135. The project's main impact is linked to the approval of the proposed minimum energy performance standards (MEPS) that are presently being reviewed by MINEM. The MEPS were formulated on the basis of international good practices, and alternative scenarios were analyzed according to their energy efficiency and economic benefit-cost. The MEPS feasibility study estimated that the full implementation of proposed MEPS across the national lighting market between 2018-2027 would generate financial savings ranging between US\$ 511-829 million, as a result of the decline in electricity consumption to 1136-1356 GW.h/year. Much of the financial savings would accrue to the consumer. The study estimated that MEPS implementation would require a total government investment of approximately US\$ 26 million for continued consumer awareness programs, the implement of ESL regulations, and quality control and verification. 21

136. Energy efficiency is likely to double to the extent that CFLs are substituted by LED technology. Likewise, environmental benefits are likely to accrue over time as the national lighting park progressively converts to LED. In the short to medium term, however, increased CFL disposal could also have a negative environmental impact and particularly so in smaller municipalities and rural areas where toxic waste disposal facilities are lacking. This underscores the urgency of establishing a national system for CFL collection and disposal to contain the risk of mercury contamination.

Rating of Likelihood of Impact: Highly Likely

²¹ *Ibid.*

6.4.4. Financial Management

137. The project's financial management was satisfactory and no critical issues were detected by the evaluators. The project components were adequately funded in relation to the scale of intervention and expected deliverables. The current project team considered that sufficient resources had been made available to the project; instead, the challenge has been spending the funds that were allocated according to schedule. The project's implementation was extended by 17 months – from November 2016 to April 2018 without increasing the original budget, and funding shortfalls were not experienced. An exception was the budgeted NPC salary, which was considered to be low in relation to other projects and allegedly contributed to at least one resignation.

138. The project faced difficulties in spending its budget on schedule, as reflected in slow implementation and very low expenditure levels during most of the project term. This was aggravated by the limited progress achieved under the second and third project components (quality control and verification; CFL recycling and disposal). Budget allocations were adequate yet exceeded the project's spending capacity for most of the project period. This underscored the inadequacy of timelines that were allocated to generate key outputs and outcomes, and the limited preparedness of the NEA and government partners that faced internal institutional changes and high staff turnovers during most of the project period. At the writing of this report, the project team had been through four National Project Directors and three Project Coordinators.

139. Administrative processes – staff recruitment, procurement of goods and services, negotiation of cooperation agreements – were handled effectively by UN Environment and the UNDP Country Office, which was contracted to assist financial management and reporting. There were initial difficulties on the part of the project team in understanding the required financial management and reporting guidelines, however these difficulties were overcome over time with assistance from the UN Environment Fund Manager. The most critical observation regarding the project's financial management concerned the transition by UN Environment to the UMOJA financial accounting system in 2015, which led to recurrent disbursement delays and administrative "blackouts" that affected project implementation. However, this was not a significant factor in the project's low financial delivery, and both the project team and National Project Director considered that UN Environment and UNDP were efficient in providing financial management services.

140. Government co-financing commitments were met and ultimately surpassed. An important additionality was the recent approval of 81 million soles (approximately US\$ 25 million) to replace CFLs with LED bulbs for low-income families, under an agreement with FISE, the national energy security fund, and OSINERGMIN (the regulating agency for energy and mining investment). This represents a US\$ 7 million dollar increment over the initial 51 million soles that were allocated for this purpose under the fourth project component.

141. Financial data was submitted by the project administrator to the UNDP Country Office, which prepared the mandatory quarterly expenditure reports that were submitted to UN Environment in January, April, July and October. According to the project team and UN Environment Fund Manager, financial reports were generally submitted in a timely and satisfactory manner, and major discrepancies over the reported expenditures did not arise. Likewise, the project was required to undergo annual audits that confirmed the transparent management of funds.

Rating of Financial Management: Satisfactory

6.5. Efficiency

142. The project has experienced recurrent obstacles that slowed implementation and lowered output delivery considerably. The project was initially scheduled to end in November 2016 and was subsequently extended to April 2018 (and will be administratively be closed in April 2019). The project’s unsatisfactory implementation for much of the implementation period – in particular between 2013 and 2015, when less than half the allocated annual budgets were spent - reflected low levels of institutional preparedness that were reinforced by changes of government, institutional re-organizations and continuous staff turnover. As national executing agency, the DGEE underwent four changes of Director (and National Project Director) during the project’s implementation period, while four National Project Coordinators have had to be hired.²² Several of the interviewed partner representatives – including some who participate in the Steering Committee - had recently assumed their present positions and had very limited knowledge of the project. The discontinuity has clearly disrupted the implementation process, institutional coordination and especially, the timeliness of outputs and results.

143. While output production and financial delivery showed gradual improvement over time – surpassing 50% for the first time in 2017 – overall efficiency was low throughout the project period. Indeed, project efficiency is rated as “moderately satisfactory” given the combination of slow execution and low expenditure during the initial implementation period, aggravated by successive changes within the project team, requiring a 17-month extension. This was followed by improved trends in programmatic and budget delivery, aided by the consolidation of the PMU as of 2015. By the end of 2017 (and six months before the technical closure), the cumulative project expenditure of US\$ 1,291,364.05 amounted to 78.93% of the approved budget.

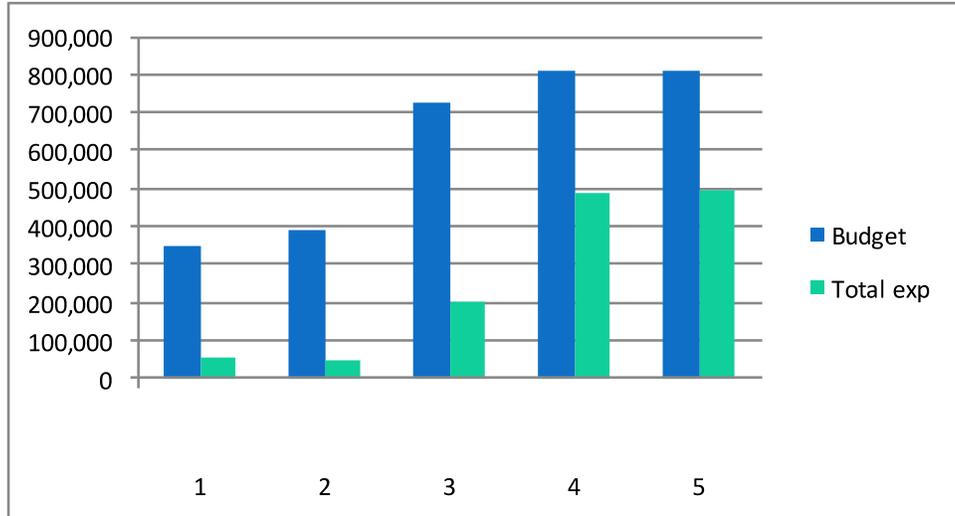
This pattern is illustrated below in the difference between budgeted and actual expenditures:

Figure 12: Financial Delivery: Annual Programmed and Expended Annual Budgets 2013 – 2017 (USD)

	Years	Budget	Total exp
1	2013	352,116	58,785.76
2	2014	391,932	46,236.81
3	2015	723,804	204,007.43
4	2016	807,172	488,554.55
5	2017	806,029.07	493,779.50

²² The NPC salary was considered low in relation to other international cooperation projects and was a contributing factor to the high turnover of this post.

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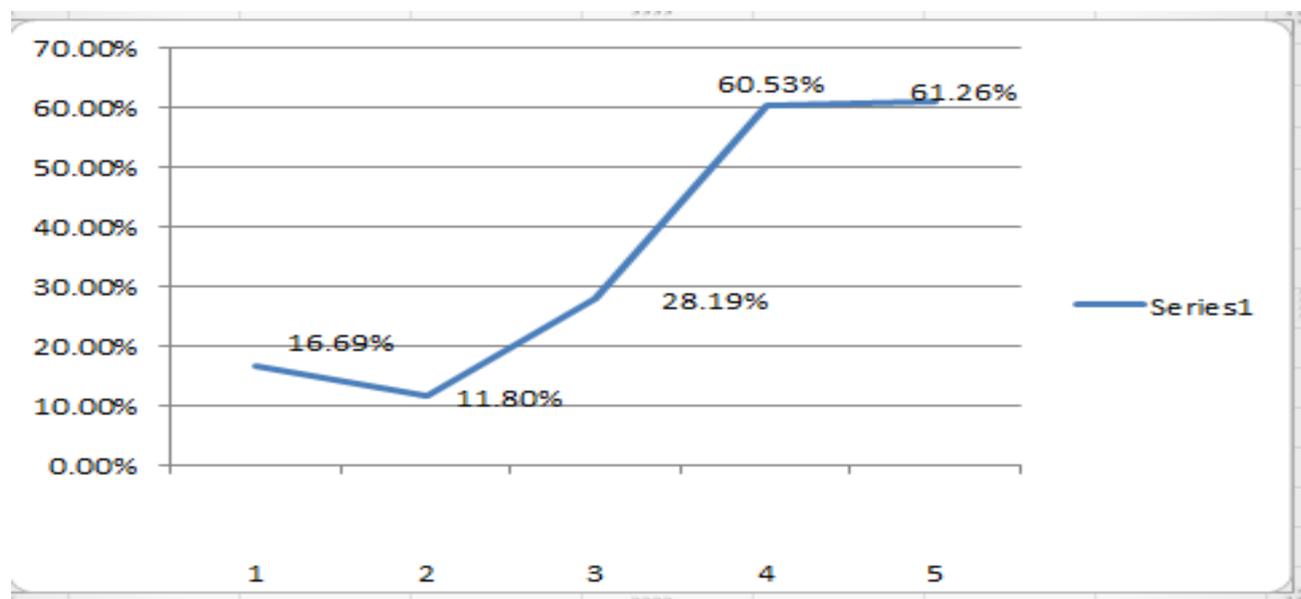


Source: Based on UN Environment data

144. The level of project cost-effectiveness is debatable, with arguments supporting both sides. The first year of implementation was largely lost to low institutional preparedness, slow project start-up and staff turnover. On the other hand, the project was extended by 17 months in compensation without an increase to the budget. Funding the participation of a technician from the National University's electrical laboratory in a study tour to GELC in China may not have been cost-effective as the laboratory had never intended to seek accreditation for lighting product quality control testing. On the other hand, the exposure to advanced laboratory techniques that was received is likely to have improved the participant's academic capacities in fields that are relevant to quality control and verification. Although financial delivery has been consistently low, the project has assisted the DGEE in signing a US\$ 25 million (81 million soles) agreement for the replacement of CFL bulbs with LED in low income neighborhoods, that exceeds the initial co-financing commitment by almost US\$ 7 million.

Figure 13: Annual Financial Delivery Rates (% of Expended vs. Allocated Budget): 2013 – 2017

Lighting Market Transformation in Peru



Sources: Based on UN Environment data

145. Despite unsatisfactory delivery and successive staff changes, financial management was satisfactory (see Section 6.4.4) and has not been a contributing factor to low efficiency. Unspent funds were re-programmed into the following year's budget through annual budget revisions. While there were administrative and disbursement delays on the part of UN Environment in 2014 because of the transition to UMOJA, this has not had any considerable effect on project performance or delivery when measured against the factors. In this respect, the outsourcing of administrative and financial management services to the UNDP's Peru Country Office has been a positive contributing factor. Indeed, there were positive synergies between UNDP and UN Environment in the project's financial and administrative management. Another positive example of partnership was the project's collaboration with the GEF-UNDP "Electrical Lighting and Labeling" project that was instrumental to the design and subsequent approval of mandatory energy efficiency labeling.

Rating of Efficiency: Moderately Satisfactory

6.6. Monitoring and Reporting

146. The project's design included a budgeted Monitoring and Evaluation Plan which is annexed to the project document. The M&E Plan is outcome-based and incorporates the indicators of the Results Framework. A M&E budget of US\$ 82,500 was approved with the following breakdown:

- Inception Workshop: US\$ 7,500
- Progress Reporting: US\$ 30,000 (US\$ 1,500 X 5 components X 4 years)
- Mid-Term Evaluation: US\$ 22,500
- Terminal Evaluation: US\$ 22,500

147. The M&E Plan was viable and adequately budgeted for a project of this scope, with tangible means of verification for the various indicators. Almost half of the M&E budget – US\$ 40,000 – was funded with the government co-financing contribution.

148. However, the evaluators have not found indications that monitoring findings led to adaptive management decisions, aside from the decision to shift the project focus from CFLs to LED technology considering evolving ESL technologies (although this decision was made during the inception phase, prior to the actual implementation of activities, and is not directly attributable to monitoring). The annual Project Implementation Reviews (the main monitoring document required by GEF-funded projects) include a section (Sec. 3. "Action plan to address MS, MU, U and HU rating") in which the Coordinator and UN Environment Task Manager assess implementation bottlenecks.²³ . Much of the narrative in this section does not seem to propose strategic adaptive management actions. For example, the 2015 PIR (covering a problematic start-up phase) tended towards somewhat generic responses such as prescribing "...Strict compliance with the implementation schedule of En.lighten's technical team in assessing the status of the existing national collection and recycling capacities", proposing "...an enhanced environmental regulatory and operational framework", or noting that "MINAM should be heavily involved." Such suggestions may not have offered the direction that was needed for adaptive management purposes, and would have benefited from greater specificity - or at least followed by an internal "how to" discussions. Likewise, the initial draft of the final project report is analytically limited in scope and depth.

149. While subsequent PIRs have been somewhat more specific in assessing implementation bottlenecks, the analysis was focused on activities rather than products and does not seem to have had much impact in terms of adaptive management. Many Action Plan recommendations also rely on the role of En.lighten and the need for the project team and partners to comply with En.lighten's implementation schedule 24. Likewise, many of the remedial actions that are proposed involve En.lighten, an externally-based entity that conducted intermittent missions to Peru and did not have a consistent country presence.

150. A Referential Plan was prepared in 2014 by a consultant to address the challenges that were faced by the project's inception phase. The Plan recommended the scaling-down of project outputs (from 17 to 5) to facilitate implementation under a more integrated and streamlined approach. However, the new outputs lacked indicators and targets, and additionally duplicated outcomes that were already part of the Results Framework (without distinguishing products from expected results). The changes to the outputs and expected deliverables were adopted by the project team without formal approval, at a transitional stage when both the NPD and NPC were in process of being replaced. They have not influenced project work plans or actual implementation; and project monitoring documents are inconsistent in the selection of outputs to be assessed: Whereas the monitoring assessments of the annual PIRs were based on the revised outputs, the semi-annual progress reports and Final Report reverted to the initial set of outputs that are in the project document. The use of different sets of outputs for monitoring purposes is not a good practice, and has been detrimental to the documented analysis of project performance.

151. A positive contribution to project monitoring was the contracting of a consultant to support the UN Environment Task Manager of the GEF Climate Mitigation unit. The consultant conducted several country missions to Peru and met with the project team; in such cases, monitoring was complemented with technical guidance.

152. The evaluation schedule was partially met: The combination of low institutional preparedness, high staff turnover (affecting both the project team and NEA) and excessively ambitious timelines for key deliverables, contributed to a critically slow implementation process

²³ Section 3 "Action plan to address MS, MU, U and HU rating"

²⁴ i.e. 2016 Project Implementation Review (PIR) pp.

that fell well behind the planned schedule. The resulting lack of progress “on the ground” led to the cancellation of the Mid-Term Evaluation that had been scheduled in 2014. The decision to cancel the MTE was justified from a cost-efficiency perspective – there was very little to evaluate at the time. However, an opportunity was also missed to discuss critical project’s issues between the parties and seek consensus on the way forward.

153. The most important adaptive management action was the project’s extension by 17 months in response to start-up delays and low delivery. The decision was influenced more by slow implementation and low expenditure rather than specific monitoring findings. The extension has enabled the project to achieve moderately satisfactory levels of performance and results 25 that would otherwise have not been possible.

Rating of Monitoring and Reporting: Moderately Unsatisfactory

6.7. Sustainability

154. The sustainability of results is influenced by political, institutional and socio-economic factors that are outside the project’s influence. However, the evaluators consider that Peru’s lighting market will continue to gravitate towards LED and new ESL technologies as they become available, following the market trends of the past years. The lighting market has been receptive to ESL technologies independently of the project, which assumed a supportive role by promoting technical lighting standards and mandatory labeling, while informing consumers of the benefits of ESL and LED in particular.

155. Social and financial sustainability are likely to be high based on the present market tendencies and consumer perceptions. The receptiveness of consumers to LED lighting products and their pricing structure reinforces the financial sustainability of Peru’s lighting market transformation: There have been sustained increases in LED imports since 2014 (charted in Figure 9) that exceeded those of CFLs during the first trimester of 2018. The share of LED bulbs within Peru’s installed electricity potential (measured in megawatts) has also improved in relation to IL and CFLs. These trends suggest that consumers are informed of the benefits of LED lighting products; indeed, consumer surveys conducted by the project in four urban centers in 2017 indicated high awareness of lighting efficiency and the benefits of LED over IL and CFLs (Figure 8). It is highly likely that compact fluorescent lamps will be entirely replaced by LED for residential lighting over the next three to four years as CFL imports continue to decline and expired bulbs are disposed of.

156. The resilience of the ESL market and increasing LED imports are proxy indicators of financial sustainability. This has and continues to be driven by the private sector – producers, importers and distributors - and consumer. Financial sustainability is reinforced by a growing portfolio of renewable and efficient energy investments among regional and national development banks (IDB, COFIDE) and donors (KfW) for financing lighting efficiency improvements in housing programs. As mentioned earlier, the DGEE recently signed a US\$ 25 million agreement with FISE and OSINERGMIN to replace CFLs with LED bulbs in low-income neighborhoods that will commence this year.

²⁵ By April 2017, approximately 97% of the initially approved budget had been disbursed.

157. Sustainability at policy levels is moderately likely considering the current stage of progress. It is highly likely that mandated energy efficiency labeling (approved by government decree) will be sustained over time. Likewise, mandatory specifications for LED lighting products purchased by the public sector are very likely to be applied in government procurement and bidding processes. However, power company representatives have noted that the cost and tariff structures for public lighting will require adjustment to accommodate the shift to LED products.

158. The adoption of minimum energy performance standards (MEPS) for lighting products is pending, yet is essential to ensure energy efficiency over time. Final approval of the MEPS will require clearance at different levels of government, a process that may take 2 or 3 additional years. The evaluators consider the likelihood of MEPs approval within this period to be moderately likely given the present institutional and political juncture. However, policy sustainability is further weakened by the lack of an operational quality control and verification system that includes provisions for enforcement. The government decision to not authorize the involvement of Customs is indicative and suggests that such a system is unlikely to be developed in the foreseeable future. A National Strategy for Energy Efficiency was developed by the project but this has not been approved or adopted, and is unlikely to advance after the project has been closed.

159. Although the project has contributed to the clarification of institutional responsibilities for energy efficiency – and a national website²⁶ on energy efficiency is now hosted by the Ministry of Energy and Mines - institutional sustainability appears to be weak under the present circumstances. The discontinuity of project staff, counterparts within the DGEE, and focal points of partner institutions has been high and disruptive to the project's implementation. During the project period, there were two national elections followed by institutional changes within the public sector. While the project team was able to achieve a level of continuity from 2015 onwards, there is little reason to assume that the present institutional arrangement will continue over time. At the time of the evaluation, the project team had been through three National Project Coordinators and four National Project Directors (DGEE Directors), the latest change happening at the time of writing this report. There are no plans for a follow-up project, nor has the Steering Committee achieved the momentum needed to continue meeting after the project's closure. The planned Technical Working Group did not materialize. Unless a more permanent arrangement is sought -for example, establishing an Inter-sectoral Working Group (Grupo de Trabajo Inter-sectorial) on energy efficiency, a legal instrument that brings government, private sector and civil society representatives together to shape policies - it is unlikely that there will be progress towards key deliverables that are pending such as the quality control and verification system or a CFL recycling and disposal mechanism. Institutional discontinuity could have bearing on the eventual approval of minimum energy performance standards (MEPS), which requires coordination and lobbying at different levels of government.

160. Environmental sustainability is likely as the lighting market continues to shift to LED lighting products that do not contain toxic substances. On the other hand, environmental sustainability is threatened by the lack of progress towards establishing CFL collection/recycling mechanisms and disposal facilities under the third component. National regulations have not changed in this respect and CFL bulbs are disposed in underground landfills with other toxic electrical wastes. This raises environmental risks that are potentially hazardous to public health: As CFL bulbs are increasingly replaced and discarded, there will be need for organized and environmentally-sound collection and disposal services that are presently unavailable in most of

²⁶ The MINEM's Energy Efficiency website can be accessed at <http://iluminacioneficiente.minem.gob.pe/>

the national territory; at present, the few enterprises that collect discarded CFLs are based in Lima and do not have recycling capabilities.

161. The project has played a catalytic role in improving the regulatory framework for lighting products through the approval of mandatory energy efficiency labeling and technical LED specifications for the public sector, and the development of proposed minimum energy performance standards. It is also likely to have contributed to enhanced consumer awareness of the benefits of LED through the various publicity campaigns that were conducted, although this cannot be reliably measured.

Rating of Sustainability: Likely

7. Conclusions, Lessons and Recommendations

7.1 Main Findings

162. The evaluation findings indicate that “Lighting Market Transformation in Peru” was moderately successful in generating the expected outputs and outcomes. The project effectively supported enhanced consumer awareness and increased energy-saving lighting (ESL) sales (component 5), and informed urban market actors (importers, distributors and retailers) of the advantages of LED and energy-saving lighting technology (Component 4). The project was moderately successful in developing an enabling regulatory and institutional framework (Component 1) and unsuccessful in its efforts to establish mechanisms and a facility for compact fluorescent lamp (CFL) recycling and disposal. After the project was approved, its focus was shifted from the promotion of CFLs to LED technology, which offers advantages in energy efficiency and environmental safety; this was done effectively and represented good adaptive management.

163. The project identified the appropriate bottlenecks in its design. The project’s design and implementation strategy addressed key issues and mandates that contained in landmark Law 27345 for the “Efficient Use of Energy” (DS 53/2007). Although market transformation towards ESL technology was already underway, the project addressed the need to ensure that minimum energy efficiency standards were met among the various incoming lighting products from different manufacturers and countries, which were found to have high variance in their performance. Related to this, the project also responded to the need to ensure energy efficiency labeling to inform consumers and enforce appropriate product information. While prices for LED lightbulbs have stabilized and are approximate to those for equivalent CFLs, and the combination of market trends and investment portfolios in energy efficiency do not suggest a finance gap, the US\$ 25 million agreement between the Directorate for Energy Efficiency and the Energy Security Investment Fund for the replacement of CFL with LED bulbs among low-income households should broaden access to energy-efficient lighting. There is likely to be a slower uptake in the use of LED in rural areas, albeit more influenced by availability than income.

164. Project interventions were generally appropriate in addressing the main challenges related to lighting market transformation in Peru, by focusing efforts on updating the ESL regulatory framework through minimum performance standards, lighting standards for the public sector, mandatory labeling and quality control. However, achievement levels in terms of results and impact fell below expectations: The minimum performance standards have yet to be approved, mandatory labeling only came into effect towards the end of the project, and the environmental

threats posed by accelerated CFL substitution and disposal were not been addressed in a satisfactory manner.

165. Project outcomes addressing consumer and market actor awareness were fully achieved. This is reflected in the consumer surveys that followed the awareness campaigns, and in the sustained increase of LED imports and sales. These outcomes were driven for the most part by ongoing market trends and consumer receptivity to ESL technologies, with the project assuming a supportive role through information dissemination, awareness raising and the approval of mandatory energy efficiency labelling for lighting products. The importation and sale of LED bulbs have absorbed a growing share of the national lighting market and presently surpass those of CFLs, with IL bulbs in process of being phased out. Likewise, the main importers, distributors and vendors of lighting products are more aware of the advantages of ESLs, in part due to the training workshops and information dissemination activities conducted by the project.

166. Pilot initiatives were implemented to promote LED with some demonstration impact. Minimum targets for the replacement of inefficient lighting in public buildings were exceeded, although there was little impact on public lighting systems (one pilot project was implemented in the town of Aguas Calientes, Cusco province). A greater scale of impact is expected over the next year, through a recent agreement between the General Directorate for Energy Efficiency (DGEE), the Energy Security Investment Fund (FISE) and national energy regulatory entity OSINERGMIN for the allocation of US\$ 25 million to replace CFLs with LED bulbs in low-income households on a national scale. This would address the financial gap of shifting the national lighting market to improved ESL technologies, complementing the gradual reduction in the price of LED bulbs that are currently equivalent to CFLs in terms of cost to the consumer.

167. The project was moderately successful in establishing a regulatory and institutional framework for accelerated ESL market transformation. The early consolidation of enabling regulatory and institutional frameworks was essential towards enabling the full achievement of key outcomes and the project objective. This was partially achieved through the approval of mandatory energy efficiency labelling for lighting products (with efficiency ratings and color coding), and the adoption of LED lighting specifications for the public sector that will influence future procurements. Technical LED specifications could be lowered for rural public lighting systems by applying wattage equivalent to those of existing sodium vapor lamps, enhancing energy efficiency and cost savings. Minimum energy performance standards for lighting products that are consistent with EC standards were designed and are currently being reviewed by the Ministry of Energy and Mines; however, final approval by government decree requires clearance at different levels and could take an additional two or three years.

168. The project contributed to improvements in the institutional framework for ESL market transformation. Monitoring of compliance with energy efficiency labelling was assumed by the National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI), a government entity that promotes competitiveness and information transparency. However, interviewed distributors and retailers have noted that enforcement is directed at lighting product vendors, and not the importer or distributor which bears primary responsibility for compliance. Another project-related advance is the electrical residue disposal plans (RAE) that will be required for public enterprises and will be monitored by PRODUCE (Ministry of Production); however, institutional capacities are not in place to implement the RAEs, nor are there provisions for enforcement or non-compliance. Although the planned quality control and verification system was not implemented under the project's second component, one national laboratory has upgraded its facilities and is in process of receiving international accreditation for this purpose.

169. The project was less effective in establishing an operational system for lighting product verification and quality control, and was unable to develop CFL recycling and disposal mechanisms. There was less progress towards establishing a quality control and verification system for incoming light bulbs, which is fundamental to enforce energy efficiency standards given the high variance in performance between different brands and countries of manufacture. The government's decision to not authorize the participation of Customs in this initiative undermined the viability of the project's second component and outcome. The present situation does not enable the enforcement of minimum energy performance standards that are presently in process of review and approved.

170. More concerning is the lack of an organized system for CFL recollection, recycling and disposal. In retrospect, the third project component and outcome were not feasible (and less so given short timelines) due to the lack of technical capacity – there is no CFL recycling and collection is limited to five urban enterprises that dispose used bulbs in underground landfills designated for electric waste. This raises potential environmental and health risks associated with the inadequate disposal of CFLs as they are increasingly replaced and discarded, particularly in the smaller municipalities and rural areas that are not served by collection services.

171. The project objective is in process of being achieved, and the continued transformation of Peru's lighting market is highly likely. Lighting transformation is driven by global lighting technology and market tendencies that directly influence the national market, as demonstrated over the past decade by the influx of compact fluorescent lamps (CFLs) in replacement of incandescent lighting, followed by the sustained growth of LED imports and sales over CFLs and incandescent lighting (IL), which are in process of being phased out. Indeed, the national lighting market has been highly receptive to ESL technology and consumers are generally informed and responsive. While consumer awareness of ESL is likely to be higher in urban areas that have greater access to information, the ongoing transformation process is likely to decrease the availability of CFLs on a national scale.

172. The project's has played a supportive role by catalyzing regulatory improvements and raising consumer awareness through energy efficiency labeling, technical specifications for LED lighting, and promotional campaigns. The combined effect of these initiatives has clearly enhanced conditions for accelerated market transformation. However, full achievement of the project objective and goal require (i) the approval of minimum energy performance standards for lighting products and (ii) implementation of a national quality control and verification system for incoming lighting products.

173. Negative environmental impacts are likely to the extent that national stocks of CFLs are replaced and discarded without adequate collection or disposal facilities. A potentially negative impact of Peru's ongoing lighting market transformation are the environmental and health risks that are associated with mercury residues contained in CFL bulbs. For this reason, the project devoted one of its components to the development of recycling/disposal mechanisms and facilities. The failure to advance in this direction is a significant shortcoming that could lead to environmentally hazardous situations as national stocks of CFLs are expended over the next three to five years, particularly in the smaller municipalities and rural areas that are outside the urban grid. This is a significant risk that requires attention on the part of the Ministry of Energy and Mines, the General Directorate for Energy Efficiency and the Ministry of Environment in particular.

174. The summary evaluation performance assessment and ratings are presented in the following table, applying the evaluation criteria that are presented in the Terms of Reference:

Figure 14: Summary of Evaluation Assessment and Ratings

Evaluation Criteria	Rating	Score	Weight	Weighted Score
Strategic Relevance (the ratings for sub-categories)	Satisfactory	5	6	0.3
Alignment to MTS and POW	Satisfactory	5	1	
Alignment to UNEP/GEF/Donor strategic priorities	Satisfactory	5	1	
Relevance to regional, sub-regional and national issues and needs	Satisfactory	5	2	
Complementarity with existing interventions	Highly Satisfactory	6	2	
Quality of Project Design	Moderately Satisfactory	4	4	0.2
Nature of External Context	Moderately Unfavourable			
Effectiveness (the ratings for sub-categories)	Satisfactory	5	45	2.0
Delivery of outputs	Moderately Satisfactory	4	5	
Achievement of direct outcomes	Moderately Satisfactory	4	30	
Likelihood of impact	Highly Likely	6	10	
Financial Management (the ratings for sub-categories)	Satisfactory	5	5	0.3
Completeness of project financial information	Satisfactory	5		
Communication between finance and project management staff	Satisfactory	5		
Efficiency	Moderately Satisfactory	4	10	0.4
Monitoring and Reporting (the ratings for sub-categories)	Moderately Unsatisfactory	3	5	0.2
Monitoring design and budgeting	Satisfactory	5		
Monitoring of project implementation	Moderately Unsatisfactory	3		
Project reporting	Unsatisfactory	2		
Sustainability (the ratings for sub-categories)	Unlikely	2	20	0.4
Socio-political sustainability	Highly Likely	6		
Financial sustainability	Likely	5		
Institutional sustainability	Unlikely	2		
Environmental sustainability	Moderately Unlikely	3		
Factors Affecting Performance (the ratings for sub-categories)	Moderately Satisfactory	4	5	0.2
Preparation and readiness	Moderately Unsatisfactory	3		
Quality of project management and supervision	Moderately Unsatisfactory	3		
Stakeholder participation and cooperation	Moderately Satisfactory	4		
Responsiveness to human rights and gender equity	Satisfactory	5		
Country ownership and driven-ness	Moderately Satisfactory	4		
Communication and public awareness	Moderately Satisfactory	4		
			100	3.89
				Moderately Satisfactory

Rating Criteria: Highly Satisfactory/Likely (HS/HL): 6, Satisfactory/Likely (S/L): 5, Moderately Satisfactory/Likely (MS/ML): 4, Moderately Unsatisfactory/Unlikely (MU): 3, Unsatisfactory/Unlikely (U): 2, Highly Unsatisfactory/Unlikely (HU): 1.

7.2 Lessons Learned

175. Project performance was conditioned by a difficult operating environment. Despite benefitting from a favorable lighting market context, the project was implemented in a challenging environment that was affected by institutional changes and high staff turnover. The project period coincided with national presidential and congressional elections, accompanied by institutional changes and high levels of staff turnover within the project team, national executing agency and government partners. The project's implementation involved successive changes of National Project Director and National Project Coordinator that disrupted continuity. Several focal points from partner government had been recently appointed and had limited knowledge of project activities. As a result, the levels of preparation and readiness that were needed to ensure effective inception and implementation were often not in place. Institutional memory is weak and the continued engagement of institutions that served on the Project Steering Committee is unlikely under the present circumstances.

176. Outcomes and key deliverables were overly ambitious in relation to the timelines that were allocated for their achievement. The project's duration was conditioned by GEF guidelines, and the four-year timeframe was eventually extended to compensate for initial delays. Yet delivery expectations were sometimes unrealistic in relation to the timeframes that were given, based on empirical experience. The development of an institutional and regulatory framework supporting ESL by the second or third year was unlikely to happen in a country facing national and parliamentary elections; nor was full compliance with mandatory energy labelling (output 1.4) viable by the second year – in reality, mandatory labeling only entered into effect in April 2018.

177. The combination of short timelines and slow implementation generated delivery pressures that encouraged the simultaneous implementation of outputs that were situated at different stages of the project's causal pathways.²⁷ This enabled the project team to achieve higher budget expenditure levels (exceeding 50% of the programmed annual budget in 2016) yet led to missed opportunities for synergy and linkages between components that ultimately limited the scale of impact. The enabling ESL regulatory and institutional frameworks are only partially developed: Minimum energy performance standards – one of the project's main deliverables – are still under review and planned approval is likely to take another two or three years. Likewise, energy efficiency standards cannot be enforced without a national quality control and verification system for incoming lightbulbs, which is not in place. Mechanisms and facilities for the collection and disposal of CFLs should have been established at an early stage to mitigate environmental risks associated with mercury residues, in advance of the replacement campaigns and lighting market's acceleration. The evaluators recognize that these shortcomings were perhaps inevitable given the project's four-year duration that was approved.

178. Projects that propose revised regulatory or legal frameworks require more realistic, medium-term timelines that are aligned to governance and policy cycles. This underscores a broader lesson that is recurrent in project evaluations: When projects aim to modify existing institutional, policy or legal frameworks, the allocated timeframes almost always fall short of the

²⁷ This is described in greater detail in the Theory of Change analysis (Section 5).

actual timelines that are needed to implement policy or institutional change processes. This suggests the need to consider different approaches – for example, devoting an initial project phase to develop the enabling institutional and regulatory framework (with support for policy advocacy and lobbying), followed by a “main” project phase devoted to the framework’s implementation. The combined 8 or 10-year period of applying a two-phase approach would be better aligned with governance cycles and the dynamics of policy and legislative change; and therefore more likely to reach the expected outcomes.

7.3 Recommendations

Recommendations for consideration by UN Environment:

179. Project design and appraisal should consider more realistic timelines that are based on an assessment of the project context, including governance cycles and political junctures. Projects that attempt to transform national legal, policy or regulatory frameworks are particularly vulnerable to externalities that are outside their attributions or influence. While GEF guidelines on projects durations are unlikely to change in the foreseeable future, the design of projects and their expected outcomes need to be based on more realistic, longer-term strategic visions - and successive project phases programmed in advance with intermediate impact benchmarks to measure progress – to ensure continuity and eventual impact.

180. Project design and appraisal processes need to consider governance cycles, national elections or other structural/political factors that can undermine the effectiveness and efficiency of implementation. Project design and pre-approval appraisals need to be better informed of the national or sector contexts that these projects are intended to influence, as such insight is generally not captured – or is outdated – in the project document. This gap needs to be addressed by the proposing UN Environment branch that is expected to implement the project, either at the design stage or through briefings during appraisal exercises. In this regard, the scheduling of project implementation periods that cross over national elections or other events that are potentially disruptive should be avoided, unless there is a specific reason not to do so. During project design and appraisal, national elections should be captured as risks and actions anticipated to reduce disruptions considered well in advance.

To be shared in a meeting between the Project and concerned Ministries- Recommendations for consideration by the Ministry of Energy & Mines and the Directorate for Energy Efficiency:

181. The most immediate recommendation centers on the need to ensure that a collection and disposal system is in place for replaced or discarded CFLs. Curiously, the accelerated transformation of Peru’s lighting market towards LED and ESL technologies raises potential environmental risks associated with the disposal of CFL bulbs that contain mercury residues. One of the project components was devoted to this issue yet there has not been progress beyond the issuance of a proposal that was not considered viable. While current regulations mandate the underground disposal of toxic electrical waste and there are several enterprises that collect used CFL bulbs in the Lima metropolitan area, a more comprehensive system is needed to safely dispose the national stock of CFLs as these are replaced or discarded over the next years. The

environmental risks of inadequate CFL disposal are likely to be higher in smaller municipalities and rural areas that lack such services or facilities. This issue should be followed up on by General Directorate of Energy Efficiency, and by the Ministry of Environment that has the mandate to oversee the disposal of electrical waste.

182. The Ministry of Energy and Mines and General Directorate for Energy Efficiency should provide continued support to ensure the approval and enforcement of minimum energy performance standards which are essential to accelerate and sustain the lighting market's transformation towards ESL technologies. Although Peru's lighting market and consumers have been receptive to new ESL technologies over the years (particularly for residential use), project-contracted studies indicate high variances in energy performance between equivalent bulbs of different brands and countries of manufacture; a high share of the tested samples failed to meet the proposed energy performance standards that are presently under review. The timely approval of these standards and the activation of a quality control and verification system with the participation of Customs and national laboratories are therefore essential to enforce energy performance and efficiency standards for incoming lighting products. Their approval and operationalization will require continued commitment and follow-up on the part of national executing agency during the next two to three years, as well as the ability to effectively lobby for their approval at congressional and senior government decision-making levels.

183. Technical LED specifications for the public sector should be adjusted for rural public lighting to maximize energy savings and lower the costs of shifting to LED fixtures. This process should be driven by the Ministry of Energy and Mines through the General Directorate for Energy Efficiency, in consultation with ADINELSA (the national authority responsible for rural electrification and grid systems). Mandatory LED specifications for public lighting systems are presently based on urban standards, which are higher than those applied to rural areas where less intensive illumination is needed. The required wattage for rural LED lighting should be lowered in relation to urban specifications, applying the LED equivalent (25-30W) to the replacement of existing 50W sodium vapor lamps.

184. Formalized and more permanent institutional arrangements should be established to ensure the implementation of these recommendations, and to enable continued responsiveness and adaptive management to emerging ESL technologies. There will be periodic need to update lighting performance and efficiency standards over time as ESL technologies evolve. Consistent institutional engagement and coordination among the key institutional partners is essential to assure the approval of minimum energy performance standards, mitigate the environmental risks associated with CFL disposal, and adjust energy performance standards and specifications to improvements in ESL technologies over time. This will not be possible under the project Steering Committee, which is no longer functional, or the Technical Working Group that was foreseen yet never formalized. Likewise, the recurrent institutional changes and high turnover of institutional focal points that were experienced by the project are likely to continue in the future. These factors indicate that *ad hoc* or project-driven institutional coordination arrangements are inadequate to sustain momentum over time, and that formal, longer-term arrangements are needed to ensure stakeholder coordination and responsiveness to emergent issues. To this end, it is recommended that the Ministry of Energy and Mines consider the option of expanding the project Steering Committee to include the academic, scientific and non-governmental actors that were expected to conform the Technical Working Group, and seek the formal creation an Inter-sectoral Working Group (*Grupo de Trabajo Inter-sectorial or GTI*) for Energy Efficiency that could be focused on the national lighting market or a broader range of electrical products. The GTI is a recognized legally structure that brings together the key stakeholders for the purpose of policy development and

oversight. with mandatory provisions for institutional participation through periodic meetings.²⁸ The establishment of a permanent working group on energy efficiency will provide an opportunity to incorporate key actors that were not involved in the project such as the Peru's National Consumer Association (ASPEC), which is strategically positioned to support consumer awareness on a national scale.

APPENDICES:

Appendix A: List of Documents Consulted

Appendix B: Stakeholder Comments and how they have been addressed

Appendix C: Agenda of Meetings and Individuals Consulted

Appendix D: Evaluation Matrix

Appendix E: Summary of project expenditures

Appendix F: Theory of Change at Inception

Appendix G: Terminal Evaluation Terms of Reference

Appendix H: Report Quality Assessment

Appendix A: List of Documents Consulted

- **Terms of Reference: Terminal Evaluation of "Lighting Market Transformation in Peru" (2018)**
- **"Lighting Market Transformation in Peru": Project document and Results Framework (2013)**
- **"Lighting Market Transformation in Peru": Project Implementation Review (PIR) reports, 2014-2017**
- **"Lighting Market Transformation in Peru": Semi-Annual Progress Report, 2017**
- **"Lighting Market Transformation in Peru": Draft Final Project Report (2018)**
- **Resumen Campaña de Eficiencia Energética (2016)**
- **Estudio de Mercado de Iluminación en el Perú: Informe Final (2016)**
- **Informe sobre la Campaña de Redes Sociales (2017)**
- **Informe Final: Campaña Publicitaria (2017)**
- **Resumen Ejecutivo BTL: "Transformación del mercado de Iluminación en el Perú a tecnologías eficientes" (2017)**
- **Project: Lighting Market Transformation in Peru: Plan Referencial Marco de Resultados - Actualización de los Indicadores (2016)**
- **RM N° 108-2017-MEM/DM**
- **RM N° 143-2017-MEM/DM**
- **RM N° 152-2017-MEM/DM**

²⁸ At present, there is an operating GTI that supports national biosafety policies and the implementation of a moratorium on the entry of genetically-modified organisms (GMOs).

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- RM N° 223-2017-MEM/DM
- RM N° 494-2017-MEM/DM
- RM N° 042-2018-MEM/DM
- Costos de Proyecto de Sustitución 1.5 millones lámparas
- Análisis de Impacto Regulatorio: Para la propuesta de estándares mínimos de eficiencia energética que forma parte de la estrategia de iluminación eficiente en el Perú – Informe Final (2017).
- “Servicio de Consultoría para Elaborar el Mecanismo de Sustitución de 1.5 Millones de Lámparas de Baja Eficiencia por Lámparas Altamente Eficientes en el Sector Residencial”. Entregable N° 05 Reformulado, (2017)
- RM N° 200-2015-MINAM, (2015)
- «Guía de Iluminación Eficiente en Edificaciones Nuevas y Reequipamientos»: Proyecto - Transformación del mercado de iluminación en el Perú, (Abril 2018)
- Análisis de los resultados obtenidos en los tres laboratorios nacionales
- Informe Final respecto a la “supervisión y seguimiento” de los procesos de ensayo de lámparas en laboratorios Nacionales e Internacional (Enero, 2018).
- Informe N° 012-2016-MEM/DGEE/TMIP (Febrero 2017)
- Determinación de la muestra de Lámparas - Ensayos de Laboratorio
- Modificación del Reglamento de la Ley N° 29852. Aprobado mediante DS N° 021-2012-EM
- DS N° 021-2012-EM. (Junio 2012)
- DS N° 012-2016-EM. (Junio 2016)
- Programa de las Naciones Unidas para el Desarrollo País Perú. Documento del Proyecto1: Acciones Nacionales Apropriadas de Mitigación (NAMA) en los sectores de generación de energía y su uso final en el Perú.
- “Estudio sobre el Marco Regulatorio Nacional y comparado para el establecimiento de MEPS para lámparas de uso doméstico y usos similares para iluminación general”: Informe Final.
- Proyecto GFL/5070-2720-4C68-GEF-PNUMA-MEM “Elaboración de la propuesta de Reglamento Técnico de Estándares Mínimos de Eficiencia Energética (MEPS, por sus siglas en inglés) para lámparas de uso doméstico y usos similares para iluminación general” - TERCER ENTREGABLE.
- Proyecto de Fichas de Homologación de luminarias de Alumbrado Público.

Appendix B: Stakeholder Comments and how they have been addressed

<i>Paragraph / section (as in the commented report version)</i>	<i>Stakeholder comments:</i> <i>UN Environment Evaluation Office</i>	<i>UN Environment Evaluation Office (EO) responses to the comments</i>	<i>Consultant responses/ actions</i>
<i>Executive Summary</i>	Please clarify if expenditure vs budget: 819,742.46 USD/ US \$ 1,636,000= 50% spent	Consultants to address	This figure did not reflect a portion of the budget that was assigned separately to @enlighten, and did not go to the NEA: The total expenditure was introduced, with a higher expenditure rate.

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Introduction	Section is concise. Stating clearly the intended audience of the report will make the section		Audience of the evaluation has been specified
Methodology	Describing the approach to capture eg gender issues will be appreciated. Suggest include the strategic questions – mentioning those ones which the evaluation responded to.		Gender was not an issue in the project’s design and not directly relevant to the lighting market, where gender trends are not detected in selecting lighting technologies. Gender participation in the project has been mentioned.. The strategic questions are identified (and answered in relevant sections as well as under Conclusions).
Theory of Change	There seems to be some confusion between intermediate state and outcomes. Adding a table to visualize the changes suggested by the evaluation to the ToC at design.		The design issues are appropriately addressed in the ToC analysis and have been reiterated. The evaluator does not necessarily agree with this reasoning, but has agreed to exclude Outcome 1 as an intermediate state (re “confusion” comment). It would be interesting to discuss if an outcome can have effects in both directions of an impact pathway (why not?).
Strategic Relevance	A link to the SDGs may be appreciated by many. Suggest state the sub ratings per aspect so it’s easier for reader to follow along to the final rating for this section.		Both have been introduced.
	To what extent are the strengths and weaknesses of the project design effectively <u>summarized</u> ?		The main design issues are adequately identified and analyzed. They are few in number yet substantive, and do not merit being put into a summary format.
Nature of External Context	The section appears necessary to stress the impacts of political processes, specially elections leading to changes in government in the implementation of a project - that should be factored as a risk –and a plan to keep potential impacts under control.		Indeed, the political factors and associated institutional changes and staff turnover have had a major effect on project performance. This is mentioned in several other sections as well.

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Likelihood of Impact	Using the ToC to inform the analysis will be appreciated e.g the excel tool developed by the EO 'likelihood of impact decision tree'		The decision tree analysis is not relevant for the analysis of performance or impact in this particular case. Project performance was less a matter of strategies or decisions, and was much more influenced by slow delivery, government/institutional changes and high turnover.
Financial Analysis	Section is concise. A table combining the figures provided in Figure 2 to visualize the planed against its execution.		Done.
Monitoring and Evaluation	An indication on how decisions were made may lead to a stronger section		This section has been developed further, although monitoring, as it was applied, has not been a decisive factor or led to major decisions.
Factors affecting Performance	Addressing the quality of supervision and responsiveness to human rights and gender equity will be appreciated.		None of these issues were mentioned in the project document or implementation strategy, and have limited relevance to this type of project. However additional text was added to address this concern.
Conclusions	The section is well written. It will be stronger with a summary response to the key strategic questions.		Done. The section was expanded to address the specific questions.
Financial Management, Efficiency	Our only outstanding comment is that evaluators only considered the expenditures of the Ministry leaving out of the picture the expenditures realized through the targeted technical support internal project -en.lighten. The percentages of expenditures changed significantly (from less than half to more than 70% at the end of 2017, and from 57% to more than 80% at the end of the project). We will appreciate if the evaluators can reconsider these actual figures for their ratings of Efficiency which is now ranked		There was an oversight in the expenditure information received by the evaluators, which did not include a portion of the budget that was earmarked for @enlightgen and was not part of the NEAs budget. The calculation of total expenditure has been revised based on the aggregated budget, with a higher delivery rate that exceeded 80% by the end of the project. As a result, the "efficiency rating" was upgraded from Moderately Unsatisfactory to Moderately Satisfactory, with a higher overall project score.

	<p>Unsatisfactory especially due to this low expenditure rate.</p>		
<p>Effectiveness</p>	<p>Regarding the assessment of adaptative management, I would like to mention three decisions from the PMU that maybe some could be highlighted somewhere in the Evaluation.</p> <p>a. The PMU decided to request en.lighten support to help the project progress by providing international advice and thus overcome some of the initial delays.</p> <p>b. The PMU took the decision of adapting the vendors training from a standard format in a conference room that very few attended to a 360° glasses very short training video that was done in the stores and reached a significant larger public and was very appreciated by the vendors.</p> <p>c. The Vice-Minister decided to carry out a Regulatory Impact Assessment in order to be able to support the MEPS with strong analysis and justification, especially with the aim to convince the MEF.</p>		<p>Points are appreciated but they do not change the evaluation findings,</p>
<p>N/A</p>	<p>I saw only one brief mention to the website in the Evaluation itself, could it be worth it to discuss this with more detail or include the website link ? http://iluminacioneficiente.minem.gob.pe/ It will be</p>		<p>The website is an important output, has was given additional mention in the Executive Summary, Effectiveness and Sustainability sections.</p>

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	important to capture this, since this is key for the sustainability aspect of the project.		
Effectiveness	Nevertheless, regarding the effectivity of Outcome 2, I would like to highlight some important progress made thanks to the project: the trainings realized in China at the GELC laboratory (November 2016), as well as in Lima for a larger public at INACAL (June and August 2017), the first tests of lamps realized by the project (46 lamps tested in 2016) which provided a good understanding and concrete data of the quality of the lamps entering the market and thus informed the decision making process, in addition to the investments of the laboratory to improve their testing capacity and get the certification as you pointed out in your summary		The training activities are mentioned, with a positive assessment, as is their contribution to the expected certification of a national laboratory for energy efficiency testing.
	Evaluation Office		All comments addressed

APPENDIX C: Individuals Consulted²⁹

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Global Environment Facility (GEF) Climate Mitigation Unit,
United Nations Environment,
Economy Division,
Energy and Climate Branch, Paris

Tania Daccarrett,

²⁹ The evaluators also held personal and skype interviews with Leena Darlington, the UN Environment Fund Manger, Ruth de Couto, UN Environment Task Manager, and Tania Dacarett, UN Environment programme officer.

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Economy Division,
Energy and Climate Branch, Paris**

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APPENDIX D: Evaluation Framework – Guiding Questions, Focus Groups and Data Source

EVALUATION QUESTIONS	Project Management Unit	MINEM	Project Steering	Private sector	UN Environment	UNDP CO Focal Point	Laboratories	NGOs, Consumer Representatives	Regional/Demonstration Stakeholders	Data Source
A. Strategic Relevance										
1. To what extent were project objectives and implementation strategies consistent with national and sub-regional energy sector priorities?										Interviews, Project document, final report
2. To what extent were project objectives and implementation approaches consistent with the strategic priorities of the UN Environment Medium Term Strategy and GEF Focal Areas?										Project document, interview with Task Manager, UNEP MTS and GEF V documents.
3. Was there complementarity with parallel interventions?										Project document, Interviews PIRs and Final Report
B. Quality of Project Design (see annexed ratings)										Desk review of project document, ToC analysis, Interviews
C. Nature of External Context (see rating table)										Interviews, PIRs, Final Report
D. Effectiveness										
1. To what extent were the outputs achieved?										Interviews, PIRs, Final Report
2. To what extent were the project's direct outcomes reached?										Interviews, PIRs, Final Report
2. What is the likelihood of impact?										Interviews, Final Report,
3. Is there a likelihood of unintended or negative effects?										Interviews, PIRs, Final Report, training curricula
E. Financial Planning & Management										

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1. Were sufficient financial resources made available and disbursed in a timely manner to the project and its partners?										PIRs, budget revisions, financial reports, audits
2. Were administrative processes such as staff recruitment, procurement of goods and services (including consultants), and preparation/negotiation of cooperation agreements conducted efficiently and in a timely manner?										Same as above
3. Were co-financing commitments met as programmed and made available in a timely manner? Were additional resources leveraged (cash or in-kind)?										Same as above
4. Were financial reports submitted by the project team in a timely and satisfactory manner?									.	Same as above.
5. Were there irregularities in procurement, use of financial resources and human resource management, and the measures taken to correct/prevent such irregularities?										Interviews, PIRs, Final Report, audits
E. Efficiency										
1. Did the project apply any time or cost-saving mechanisms in order to achieve results within the approved timeframe and budget?										Same as above
2. Did the project face any obstacles (financial, administrative, managerial) and to what extent has this affected its efficiency?										Same as above, expenditure reports
3. Were outputs delivered on schedule? To what extent have delays in implementation or disbursements affected the delivery of the project outputs and achievement of outcomes?									,	Interviews, PIRs, semi-annual progress reports Project expenditure and delivery trends,

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<p>4. Did the project teams to make use of/build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects?</p>	■				■	■				<p>Interviews, PIRs, semi-annual progress reports, Final Report</p>
<p>G. Monitoring and Reporting</p>										
<p>1. Did the project’s design include a viable M&E plan based on outcomes and includes indicators?</p>	■				■					<p>Project document</p>
<p>2. Did the project’s design include an adequate monitoring budget?</p>	■				■					<p>Project document.</p>
<p>3. Have monitoring findings influenced adaptive management and contributed to resolving implementation problems?</p>	■	■	■		■					<p>Interviews, monitoring reports</p>
<p>4. Were there specific indicators for the project objective and outcomes? Are indicators measurable, attainable (realistic) and relevant to the objectives? Are the indicators time- bound?</p>	■				■					<p>Project document</p>
<p>5. Have the responsibilities for M&E activities been clearly defined? Were the data sources and data collection instruments appropriate? Was the frequency of various monitoring activities specified and adequate? In how far were project users involved in monitoring?</p>	■				■					<p>Interviews, monitoring reports.</p>
<p>6. How were time lags and turnover of project staff addressed?</p>	■	■	■							<p>Interviews, Final Report</p>
<p>H. Sustainability</p>										
<p>1. Socio-political: To what extent do social or political factors support the continuation and further development of project direct outcomes? How do consumer perceptions affect sustainability and upscaling of project results?</p>	■	■	■					■	■	<p>Interviews, PIRs, Final Report. Evaluation of consumer awareness campaigns?</p>

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<p>2. Financial: To what extent is the continuity of project results and their impact dependent on continued financial support? Will adequate financial resources be made available to ensure the continuity of programmes, plans, agreements, monitoring systems etc. that were prepared and agreed upon under the project?</p>									<p>Same as above, MINEM/energy sector budgets</p>
<p>3. Institutional: To what extent is the sustenance of the results and progress towards impact dependent on national institutional frameworks and governance? To what extent are institutional governance structures and capacities in place to sustain processes, policies, agreements and legal/regulatory aspects that were supported by the project?</p>									<p>Same as above, MINEM/energy sector plans</p>
<p>4. Catalytic Role & Replication: Has the project had a catalytic role in promoting institutional change, changes in behavior, policy changes, new opportunities or follow-up support?</p>									<p>PIRs, Final Report</p>
<p>1. Factors affecting Project Performance</p>									
<p>Preparation and Readiness: 1. Were appropriate measures taken to address weaknesses in project design or respond to changes that took place between project approval, securing of funds and project activation?</p>									<p>Interviews, PIRs, Final Report</p>
<p>2. To what extent were the NEA and main partners prepared to assume project execution? What factors have influenced the levels of preparation and readiness?</p>									<p>Interviews, PIRs, Final Report</p>
<p>3. Were adequate project execution and management arrangements in place? Were the partnership arrangements properly identified and the roles</p>									<p>Same as above.</p>

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and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff) available?									
Quality of Project Management and Implementation: 1. To what extent were the project implementation mechanisms outlined in the project document effective in delivering project outputs and outcomes? Were adaptations made to the approaches originally proposed?							.	.	Same as above.
2. How effective and efficient was project management by the project team and national executing agency? How well has the project team adjusted project execution to changes during the project lifetime?									Same as above.
3. To what extent did the Steering Committee and Technical Working Group provide guidance and contribute to effective project implementation?									Same as above.
4. Identify any operational and political / institutional problems and constraints that influenced implementation, and how the project partners tried to overcome these problems.									Interviews, PIRs, Final Report
Stakeholder Cooperation and Participation: 1. What approaches were used to identify and engage stakeholders in project design and implementation?								,	Interviews, PIRs, Public Awareness Campaign reports,, Final Report
2. To what extent have project partners and stakeholders collaborated/interacted effectively during project design and implementation?									Same as above, minutes Steering Committee meetings
3. Were mechanisms for awareness raising and public participation designed and are they functional?									Same as above, project document

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<p>Human rights and gender equity: 1. To what extent and in what ways has the project applied the UN Common Understanding of the Human Rights –based approach, the Declaration of Rights of Indigenous People, and UN Environment’s Policy and Strategy for Gender Equality and the Environment?</p>									<p>PIRs, financial reports</p>
<p>Country Ownership and Drivenness 1. To what degree has MINEM assumed responsibility for the project and provided adequate support to project execution, including the cooperation received from the various public institutions involved and timeliness of counter-part funding?</p>									<p>Interviews, PIRs, Final Report</p>
<p>2. To what extent have the national partners facilitated project performance?</p>									<p>Same as above, minutes of PSC and TWG meetings.</p>
<p>3. Were additional resources – financial, in-kind – leveraged by the project, beyond those that were already committed prior to the project’s approval?</p>									<p>Same as above.</p>
<p>Communications and Public Awareness 1. How effective was the project in a) the communication of learning and experience sharing between project partners and interested groups and b) public awareness activities that were undertaken during the implementation of the project to influence attitudes or shape behavior among wider communities and civil society at large.</p>									<p>Same as above, Final Report, evaluations of awareness raising campaigns.</p>
<p>2. How effective have the project’s communications and public awareness activities</p>									<p>Interviews, PIRs, Final Report</p>

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<p>been in institutionalizing public participation?</p>										
<p>3. Has the project made arrangements for feedback mechanisms with stakeholders including gender and marginalized groups, and is there a platform for knowledge sharing?</p>										<p>Respondent perceptions, PIRs, Final Report, websites and agreements reached.</p>

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APPENDIX E: Project Expenditures

		Budget	Expenditure	Balance
		2013	2013	
PERSONNEL				
1100	Project personnel			
1101	Project director			-
1102	Project manager	31,625	24,775	6,850
1103	Technical expert, EE policy and standards	7,069		7,069
1104	Technical expert, EE laboratories and recycling	7,231		7,231
1105	Technical expert, EE lighting demand	8,450		8,450
1106	Secretariat and account	7,893	3,352	4,541
1201	Int'l market surveying and data research	4,000		4,000
1202	Int'l advisor, monitoring and impact assessment	12,000	12,200	(200)
1203	Int'l EE policy and efficient lighting	12,000		12,000
1204	Int'l EE standards and labeling			-
1205	Int'l compliance, verification and enforcement			-
1206	Int'l testing and accreditation			-
1207	Int'l disposal, recycling and mercury waste management			-
1208	Int'l marketing, promotion and ESL awareness	12,000		12,000
1209	Int'l consumer attitudes and surveys	4,000		4,000
1210	Int'l application of ESLs and luminaires for lighting	6,000		6,000
1211	Nat'l market research definition and design	3,000		3,000
1212	Nat'l monitoring and database development	3,600		3,600
1213	Nat'l EE lighting policy instruments and incentives	8,000		8,000
1214	Nat'l EE formulation standards and labels	2,400		2,400
1217	Nat'l Inspection, verification and enforcement	1,800		1,800
1218	Nat'l testing and lab equipment			-
1219	Nat'l disposal, recycle and waste management	1,200		1,200
1220	Nat'l sales, marketing and promotion	3,000		3,000
1221	Nat'l lighting applications in built environment	4,000		4,000
1222	Nat'l consumer attitudes and EE surveys	6,000		6,000
1601	Travel consultants	16,000	3,424	12,576
1602	Travel project personnel	5,688		5,688
				-
SUBCONTRACTS				
2101	Market survey and research	40,000		40,000
2102	Database development	10,000		10,000
2103	TA support for capacity enhancement of laboratories			-
2104	TA support for CFL recycling facilities			-
2105	TA on efficient lighting in buildings			-
2106	Materials for EE lighting campaign	45,000		45,000
2107	Campaign and publicity			-
				-
TRAINING				
3301	Meetings/workshops (Component 1)	20,000	2,721	17,279
3302	Meetings/workshops (Component 2)	20,000		20,000
3303	Meetings/workshops (Component 3)	5,000		5,000
3304	Meetings/workshops (Component 4)	10,000		10,000
3305	Meetings/workshops (Component 5)			-
				-
EQUIPMENT AND PREMISES				
4101	Expendable equipment; office supplies	7,000	2,752	4,248
4202	Non-expendable equipment; office equipment	12,160	8,054	4,106
				-
MISCELLANEOUS COMPONENT				
5201	Publications & communications	4,500		4,500
5202	Audit	4,000		4,000
5203	UNDP charges, courier etc		1,308	(1,308)
EVALUATION				
5501	Monitoring and evaluation	7,500		7,500
5581	Mid-term evaluation			-
5582	Final evaluation			-
				-
GRAND TOTAL		352,116	58,586	293,530

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		Budget	Expenditure	Balance
		Year 2	Year 2	
		2014	2014	
PERSONNEL				
1100	Project personnel			
1101	Project director			
1102	Project manager	31,625	30,451	1,174
1103	Technical expert, EE policy and standards	7,069		7,069
1104	Technical expert, EE laboratories and recycling	7,231		7,231
1105	Technical expert, EE lighting demand	8,450		8,450
1106	Secretariat and account	7,893	7,968	-75
1200	Consultants			0
1201	Int'l market surveying and data research	0		0
1202	Int'l advisor, monitoring and impact assessment			0
1203	Int'l EE policy and efficient lighting	12,000		12,000
1204	Int'l EE standards and labeling	6,000		6,000
1205	Int'l compliance, verification and enforcement	6,000		6,000
1206	Int'l testing and accreditation	6,000		6,000
1207	Int'l disposal, recycling and mercury waste management	10,000		10,000
1208	Int'l marketing, promotion and SL awareness raising	12,000		12,000
1209	Int'l consumer attitudes and surveys			0
1210	Int'l application of EE SLs and luminaires for lighting in buildings	6,000		6,000
1211	Nat'l market research definition and design			0
1212	Nat'l monitoring and database development			0
1213	Nat'l EE lighting policy instruments and incentives	4,000		4,000
1214	Nat'l EE formulation standards and labels	5,000		5,000
1217	Nat'l inspection, verification and enforcement	3,000		3,000
1218	Nat'l testing and lab equipment	3,000		3,000
1219	Nat'l disposal, recycle and waste management	8,000		8,000
1220	Nat'l sales, marketing and promotion	3,000		3,000
1221	Nat'l lighting applications in built environment	4,000		4,000
1222	Nat'l consumer attitudes and EE surveys			0
1601	Travel consultants	16,000		16,000
1602	Travel project personnel	5,688		5,688
				0
SUBCONTRACTS				
2101	Market survey and research	15,000	4,916	10,084
2102	Database development			0
2103	TA support for capacity enhancement of laboratories			0
2104	TA support for CFL recycling facilities			0
2105	TA on efficient lighting in buildings	8,310		8,310
2106	Materials for EE lighting campaign			0
2107	Campaign and publicity	70,000		70,000
				0
TRAINING				
3301	Meetings/workshops (Component 1)	20,000	485	19,515
3302	Meetings/workshops (Component 2)	20,000		20,000
3303	Meetings/workshops (Component 3)	10,000		10,000
3304	Meetings/workshops (Component 4)	15,666		15,666
3305	Meetings/workshops (Component 5)	10,000		10,000
				0
EQUIPMENT AND PREMISES				
4101	Expendable equipment; office supplies	5,000		5,000
4202	Non-expendable equipment; office equipment	12,000		12,000
				0
MISCELLANEOUS COMPONENT				
5201	Publications and communications	5,000		5,000
5202	Audit	4,000	1,252	2,748
5203	misc and postage, courier, etc		1,165	-1,165
EVALUATION				
5501	Monitoring and evaluation	2,500		2,500
5581	Mid-term evaluation	22,500		22,500
5582	Final evaluation			0
				0
GRAND TOTAL		391,932	46,237	345,695

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		Budget	Expenditure	Balance
		2015	2015	
		Year	Year	
PERSONNEL				
1100	Project Personnel			
1102	Project Manager	43,000	47,265	-4,265
1103	Technical Expert, EE	24,344	5,055	19,289
1104	Technical Expert, EE Laboratories, Buildings and Recycling			0
1105	Technical Expert, EE Lighting Supply and Demand	0		0
1106	Secretariat and Account, Technical Support	10,126	11,816	-1,690
1200	Consultants			0
1201	Int'l Consultant, Monitoring, Work Planning and Impact Assessment	12,200	6,100	6,100
1202	Int'l Advisor, Monitoring and Impact Assessment			0
1203	Int'l Consultants, Lighting Applications in Buildings			0
1204	Int'l Consultant, MEPS, Labeling and MVE	7,044		7,044
1205	Int'l Consultants			0
1210	Nat. Consultant, MEPS and Labeling, MVE	15,000		15,000
1212	Nat. Consultant, Collection of CFLs and Removal Incandescents	5,300		5,300
1213	Nat. Consultants, Advertisement, Sales and Promotion	53,053		53,053
1218	Nat. Testing and Lab Equipment	7,500		7,500
1600	Travels			0
1601	International Travel	43,188		43,188
1602	National Travel	20,614		20,614
				0
SUBCONTRACTS				
2101	Analysis of Supply and Demand in the Lighting Market; Database	95,084	54,773	40,311
2102	End-of-project analysis of lighting market	0		0
2104	International TA Support, Components 1, 2, 3			0
2105	International TA Support, Testing Capacity and Accreditation			0
2106	International TA Support, CFL Recycling Facilities			0
2107	Guidebook, Assess and Training on Lighting Applications in Buildings			0
2108	Support to ESL Campaign in Public Buildings			0
2109	TA Support in Promotional Campaign	30,000		30,000
2110	TA Support in MINEM Campaigns (LEDs, Street Lighting)			0
TRAINING				
3200	Group Training			0
3301	General project workshops (output 1.2, Inception Workshop)	663	1,865	-1,202
3302	Meetings/workshops (Component 1)	18,000	1,941	16,059
3303	Workshops and Training (Component 2)	30,910	1,894	29,016
3304	Meetings/workshops (Component 3)	8,085	1,603	6,482
3305	Workshops and Training (Component 4)	20,500	3,721	16,779
3306	Meetings/workshops (Component 5)			0
				0
EQUIPMENT AND PREMISES COMPONENT				
4101	Expendable equipment; Office Supplies	0		0
4202	Non-expendable equipment; Office Equipment	0		0
				0
5201	Printing, Publications & Communications	15,374	1,464	13,910
5202	Audits	4,000		4,000
5203	Miscellaneous Petty Cash, Courier, PNUD's Fee	4,881	2,663	2,218
5500	Evaluation			0
5502	Monitoring and Evaluation			0
5581	Mid-term Evaluation	22,500		22,500
5582	Final Evaluation	0		0
	GRAND TOTAL	491,367	140,160	351,207

Lighting Market Transformation in Peru

		Budget	Expenditure	Balance
		2016	2016	
		Year	Year	
PERSONNEL				
1100	Project personnel			
1102	Project manager	28,274	17,117	11,157
1103	Technical expert, EE	19,606	28,075	-8,469
1104	Technical expert, EE Laboratories, Buildings and Recycling			0
1105	Technical expert, EE Lighting Supply and Demand	30,000	18,430	11,570
1106	Secretariat and account, Technical Support	10,126	8,887	1,239
1107	Support		5,621	-5,621
1200	Consultants			0
1201	Int'l consultant, monitoring, work planning and impact assessment		6,100	-6,100
1202	Int'l advisor, monitoring and impact assessment			0
1203	Int'l consultants, lighting applications in buildings			0
1204	Int'l consultant, MEPS, labeling and MVE	13,000	8,700	4,300
1205	Int'l consultants			0
1210	Nat. consultant, MEPS and labeling, MVE	4,000		4,000
1212	Nat. consultant, collection CFLs and removal incandescents	6,000		6,000
1213	Nat. consultants, advertisement, sales and promotion	16,500	3,889	12,611
1218	Nat. testing and lab equipment		2,118	-2,118
1600	Travels			0
1601	International travel	33,282		33,282
1602	National travel	5,161		5,161
				0
SUBCONTRACTS				0
2101	Analysis of supply and demand in the lighting market; Database		27,670	-27,670
2102	End-of-project analysis of lighting market	90,000		90,000
2104	International TA support, Components 1, 2, 3			0
2105	International TA support, testing capacity and accreditation			0
2106	International TA support, CFL recycling facilities			0
2107	Guidebook, assess and training on lighting applications in buildings			0
2108	Support to E-SL campaign in public buildings			0
2109	TA support in promotional campaign	264,500	110,828	153,672
2110	TA support in MINEM campaigns (LEDs, Street lighting)			0
TRAINING				0
3200	Group training			0
3301	General project workshops (output 1.2, inception workshop)	663	296	367
3302	Meetings/workshops (Component 1)	9,500	2,167	7,333
3303	Workshops and training (Component 2)	13,500	224	13,276
3304	Meetings/workshops (Component 3)	5,000	984	4,016
3305	Workshops and training (Component 4)	26,011		26,011
3306	Meetings/workshops (Component 5)			0
				0
EQUIPMENT AND PREMISES COMPONENT				0
4101	Expendable equipment, office supplies			0
4202	Non-expendable equipment, office equipment			0
				0
5201	Printing, publications & communications	14,607	179	14,428
5202	Audits	6,000		6,000
5203	Miscellaneous (Petty cash, Courier, PNUD's fee)	4,080	4,398	-318
5500	Evaluation			0
5502	Monitoring and evaluation			0
5581	Mid-term evaluation			0
5582	Final evaluation	22,500		22,500
	GRAND TOTAL	622,310	245,683	376,627

Lighting Market Transformation in Peru

		Budget	Expenditures	Balance
		2017	2017	
PERSONNEL				
1100	Project personnel			
1102	Project manager	778	15,387	-14,609
1103	Technical expert, EE	19,820	19,017	803
1105	Technical expert, EE lighting supply and demand	31,570	21,424	10,146
1106	Secretariat and account, technical support	9,049		9,049
1107	Support	2,676		2,676
1200	Consultants			0
1201	Int'l consultant, monitoring, work planning and impact assessment	0		0
1204	Int'l consultant, MEPS, labeling and MVE	9,444	3,480	5,964
1210	Nat. consultant, MEPS and labelling; MVE	18,000	13,560	4,440
1212	Nat. consultant, collection of FIs and removal incandescents	9,400	13,560	-4,160
1213	Nat. consultant, advertisement, sales and promotion	14,111	24,703	-10,592
1215	Nat. consultant, technical support, promotion and SL awareness raising	24,753	19,979	4,774
1216	Nat. consultant, technical support IA		12,445	-12,445
1217	Nat'l inspection, verification and enforcement	9,100		9,100
1218	Nat. testing and lab equipment	5,382	1,469	3,913
1222	Nat consultant validation with stakeholders of NELS proposal		9,600	-9,600
				0
1301	Secretariat support		9,203	-9,203
1302	Coordination support		2,761	-2,761
				0
				0
				0
1600	Travels			0
1601	International travel	11,287		11,287
1602	National travel	13,175		13,175
				0
SUBCONTRACTS				
2101	Analysis of supply and demand in the lighting market; database	27,141	17,156	9,985
2102	End-of-project analysis of lighting market	100,000	18,675	81,325
2108	Regulatory impact assessment of the strategy	30,000	22,400	7,600
2109	TA support in promotional campaigns	183,672	186,162	-2,490
2110	TA support in MINEM campaigns (LEDs, street lighting)			0
				0
TRAINING				
3300	Meeting/Conferences			0
3301	General project workshops (output 1.2; inception workshop)	1,165		1,165
3302	Meetings/workshops (Component 1)	9,187	900	8,287
3303	Workshops and training (Component 2)	53,987	2,768	51,219
3304	Meetings/workshops (Component 3)	38,293	1,345	36,948
3305	Workshops and training (Component 4)	30,585	1,016	29,569
3306	Meetings/workshops (Component 5)			0
				0
EQUIPMENT AND PREMISES COMPONENT				
4101	Expendable equipment; office supplies	0		0
4202	Non-expendable equipment; office equipment	0		0
				0
MISCELLANEOUS COMPONENT				
5200				0
5201	Printing, publications and communications	39,133	7,843	31,290
5202	Audits	10,000	10,000	0
5203	Miscellaneous (Petty cash, courier, PNUD's fee)	11,127	803	10,324
5500	Evaluation			0
5502	Monitoring and evaluation			0
5581	Mid-term evaluation	22,500		22,500
5582	Final evaluation	22,500		22,500
TOTAL GLOBAL		757,835	435,656	322,179

Expenditure for the internally executed portion of the budget_ as below

2015-63,846.32

2016-218,216.24

2017-94,323.38

Lighting Market Transformation in Peru

Sponsored Program Class	Fiscal Year	Released Budget	Total Budget	Obligations/Commit.	Actuals	Total Committed	Available Released	Available Total Bud.
i1-CONTRACT-SERVICE	2015	1,610.99	1,610.99	0.00	1,610.99	1,610.99	0.00	0.00
i1-IP-DIRECT		0.00	0.00	0.00	0.00	0.00	0.00	0.00
i1-OPER-OTHER-COSTS		48.86	48.86	0.00	48.86	48.86	0.00	0.00
i1-STAFF-PERSONNEL		59,726.78	59,726.78	33,370.39	26,356.39	59,726.78	0.00	0.00
i1-TRAVEL		2,459.69	2,459.69	0.00	2,459.69	2,459.69	0.00	0.00
	2015	63,846.32	63,846.32	33,370.39	30,475.93	63,846.32	0.00	0.00
i1-CONTRACT-SERVICE	2016	2,000.00	2,000.00	69.03	19.50	88.53	1,911.47	1,911.47
i1-IP-DIRECT		166,309.00	166,309.00	0.00	166,309.00	166,309.00	0.00	0.00
i1-OPER-OTHER-COSTS		7,757.67	7,757.67	0.24	7,757.43	7,757.67	0.00	0.00
i1-STAFF-PERSONNEL		104,313.00	104,313.00	1,798.39	36,285.90	34,487.51	69,825.49	69,825.49
i1-TRAVEL		23,000.00	23,000.00	0.00	9,573.53	9,573.53	13,426.47	13,426.47
	2016	303,379.67	303,379.67	1,729.12	219,945.36	218,216.24	85,163.43	85,163.43
i1-CONTRACT-SERVICE	2017	0.00	0.00	9.82	1,004.39	1,014.21	1,014.21	1,014.21
i1-STAFF-PERSONNEL		20,074.01	20,074.01	23,611.00	115,979.44	92,368.44	72,294.43	72,294.43
i1-TRAVEL		0.00	0.00	0.00	940.73	940.73	940.73	940.73
	2017	20,074.01	20,074.01	23,601.18	117,924.56	94,323.38	74,249.37	74,249.37
CONTRACT-SERVICE	2018	0.00	0.00	78.85	50.16	28.69	28.69	28.69
OPER-OTHER-COSTS		0.00	0.00	0.24	0.00	0.24	0.24	0.24
STAFF-PERSONNEL		2,200.00	2,200.00	7,961.00	19,574.08	11,613.08	9,413.08	9,413.08
TRAVEL		0.00	0.00	0.00	1,268.00	1,268.00	1,268.00	1,268.00
	2018	2,200.00	2,200.00	8,040.09	18,356.24	10,316.15	8,116.15	8,116.15
		389,500.00	389,500.00	0.00	386,702.09	386,702.09	2,797.91	2,797.91

Appendix F: Theory of Change at Inception

24. As applied to project evaluations, the Theory of Change (ToC) model analyzes the sequence of desired changes (referred to as “causal” or “impact” pathways) to which the project is expected to contribute. It shows the causal linkages that connect changes at different results levels and shows how these connections influence project performance and impact. The causal pathways connect successive outputs to their outcomes and the higher “intermediate states” that precede impact and must be place to attain the project’s objective. Causal pathways show the most direct routes to the expected outcomes, indicating the strategic sequence of deliverables that should be followed to maximize their cumulative impact. The ToC methodology also identifies “impact drivers” that move implementation processes forward, as well as “external assumptions” that influence project design and affect performance yet are outside the project’s control. The insight provided by the ToC is useful both to guide project implementation strategies and work plans, and to assess the quality of evaluation of the project’s design and implementation approach as in this case.

25. The project objective was to “accelerate transformation of the lighting market in Peru through enhanced promotion and implementation of the utilization of energy saving lamps (ESLs) and the phasing-out of incandescent lamp (ILs) imports and sales.” This would feed into the stated goal of “...removing barriers to energy efficient lighting by creating an institutional, legal, financial, technical environment conducive to energy- efficient lighting, through the promotion of high-performance and environmentally sustainable new technologies such as CFLs and the phase-out of inefficient ILs.”

26. The project’s causal or impact pathways are illustrated in Figure 4. They show a good articulation between the five outcomes, and between outputs and their respective outcome within each component. Many outputs feed into others that are on the same pathway, providing inputs and sometimes enabling their realization. There are examples of cross-component linkages between outputs that influence on each other. The articulation of outputs and outcomes across the five project components indicates an integrated and inclusive design approach. This is a positive finding that underscores the interdependency of different project

elements and the need to consider their implementation sequence.

27. A main pathway emerges from the analysis. The point of departure is the “improved institutional and regulatory framework” (outcome 1) that is expected to result from the agreed market transformation strategy, compulsory minimum energy performance standards (MEPS), and required labeling for lighting products. This is the only outcome that has direct links to the other four: The institutional-regulatory framework and agreed market transformation strategy are likely to have influence on the determination of energy performance standards (outcome 2), recycling and disposal mechanisms (outcome 3), and replacement of IL bulbs with ESLs over time (outcome 2). The updated regulations and institutional responsibilities would also be reflected in public awareness campaigns and training initiatives (outcome 4), and enable significant increases in ESL sales and replacement of IL bulbs over time (outcome 5). For these reasons the first outcome is essential to enable the project’s full implementation and enhance conditions for other outcomes to take hold. It also represents one of the Intermediate States that precede impact and must be in place to achieve the project objective.

28. Based on this analysis, the project’s main causal pathway connects the outcomes according to the following sequence: (i) Outcome 1 > outcomes 2, 3, 4 and 5; (ii) outcome 3 > 2; (iii) outcomes 2 and 4 > outcome 5; (iii) outcome 5 > project objective. The relevant finding is that although the project’s integrated design facilitates the simultaneous execution of its components, the proposed institutional and regulatory frameworks need to be in place at an early stage to enable the achievement of successive outcomes that are on the same pathway and enhance conditions for project impact. This has been difficult to do within a 4-year project period: Proposed regulations for MEPS are currently under review and their approval is expected to require 2-3 more years beyond the project’s termination.

29. In terms of strategic sequence, the third outcome – implemented recycling mechanisms and facility –should precede the second outcome, under which all traded lighting products must meet environmental, quality and energy standards, and are subject to quality control. In practice this did not happen, and the 50,000 substituted bulbs (with mercury emissions) were disposed at underground locations (in accordance with MINAM regulations at that time).

30. The output pathways are well-articulated and lead directly to the respective outcomes. There is a logical progression in the sequence of outputs for each of the project’s components:

- **Component 1:** Output 1.1 (ESL and market research) > outputs 1.2 (raised decision-maker awareness) > 1.3 (agreed market transformation strategy) > 1.4 (compulsory MEPS and labeling) > outputs 1.3 and 1.4 > outcome 1 (improved institutional and regulatory framework). The proposed regulatory changes are under review and their approval is delayed; as a result, the first outcome has not yet been achieved. This has direct influence on the recycling mechanisms and facilities contemplated under the second outcome, the scale of bulb replacement (third outcome), and improved ESL sales and IL substitution across all regions (fifth outcome), limiting the project’s potential impact.
- **Component 2:** Output 2.1 (ESL training courses) > outputs 2.3 (raised laboratory capacity) and 2.2 (quality control and verification system) > outcome 2 (all traded lighting products meet environmental, quality and energy performance standards). In this case, the absence of an operational regulatory framework for ESL lighting fixtures could undermine the implementation of recycling mechanisms and establishment of performance/certification standards (outcome 2). It could also limit the scale of traded lighting products (outcome 3)

- and increased ESL sales and IL substitutions in all regions (outcome 4).
- **Component 3:** Output 3.2 (assessment of firms with recycling capacity) > output 3.3 (recycling mechanism designed) > output 3.4 (recycling facility implemented) > outcome 3 (recycling options). Recycling options were proposed but not implemented in time for the demonstration activities or thereafter, in part because the planned institutional and regulatory frameworks (outcome 1) weren't in place. Nor were the technical know-how and financing in place to support this outcome. The lack of recycling mechanisms and facilities is likely to have affected the disposal of IL bulbs (outcome 3) and could have environmental consequences with the disposal of CFL bulbs (which carry mercury residue) as LED market sales increase (outcome 5). The lack of involvement of the national consumer association ASPEC may also have influenced the project's ability to reach a broader scale of the public.
 - **Component 4:** Output 4.2 (guidebook on IL alternatives and retrofitting) > outputs 4.1 (trained importers and distributors)³⁰ and 4.4 (public sector demonstration program) > outcome 4 (improved knowledge of importers, retailers and utility companies on ESL). Outputs 4.1, 4.3 and 4.4 connect directly to the fourth outcome. In addition, output 3.1 (implemented recycling facility) also feeds into the fourth outcome (increased installation of efficient lighting in public buildings). There are two cross-component pathways that converge on outcome 4: Output 1.4 "compulsory energy performance standards and labeling" feeds into this outcome by establishing the standards that will influence the design of the training courses, and guide the demonstrations of efficient lighting. In addition, the mechanisms and structure for recycling phased-out bulbs (outputs 3.1 and 3.3) support the planned demonstration initiatives and training curricula.
 - **Component 5:** Output 5.1 (public awareness materials and marketing campaign) > output 5.2 national awareness and marketing campaigns) > output 5.3 (replacement of ILs with ESL products) > outcome 5 (consumer awareness and significant improvement of ESL sales with reduced IL sales of IL in all regions). Once again there are cross-component linkages that need to be activated to fully achieve this outcome. The lack of an appropriate institutional-regulatory framework (outcome 1) could limit the scale and impact of the fifth outcome, which is one of the Intermediate States preceding the objective. The determination of quality and performance standards (outcome 2) and establishment of a national quality control/verification system for ESL products (output 2.2) are likewise needed to increase ESL sales and phase-out ILs on a greater scale over time. Finally, there are links with outputs 3.1 and 3.3 (recycling mechanisms and structure) that also influence the extent to which IL bulbs can be disposed of and replaced in an environmentally sound manner.

³⁰ The training is focused on disseminating recently-approved Minimum Energy Performance Standards (MEPS) and recently-approved labeling for lighting, achieved with the support of this project and the GEF Energy Efficiency and Labeling project. Initial conversations with the NPC indicate that there is an increasing energy efficiency portfolio among Peru's banking sector, with support from the IDB and other regional banks. This is supported by the natural market tendency towards ESLs, as reflected in import and sales trends over the past years. MINEM has plans to replace light bulbs among low income families with the national social investment fund. One of Peru's main « success story » banks, COFIDE, has provided co-financing to the project under its energy portfolio.

Lighting Market Transformation in Peru

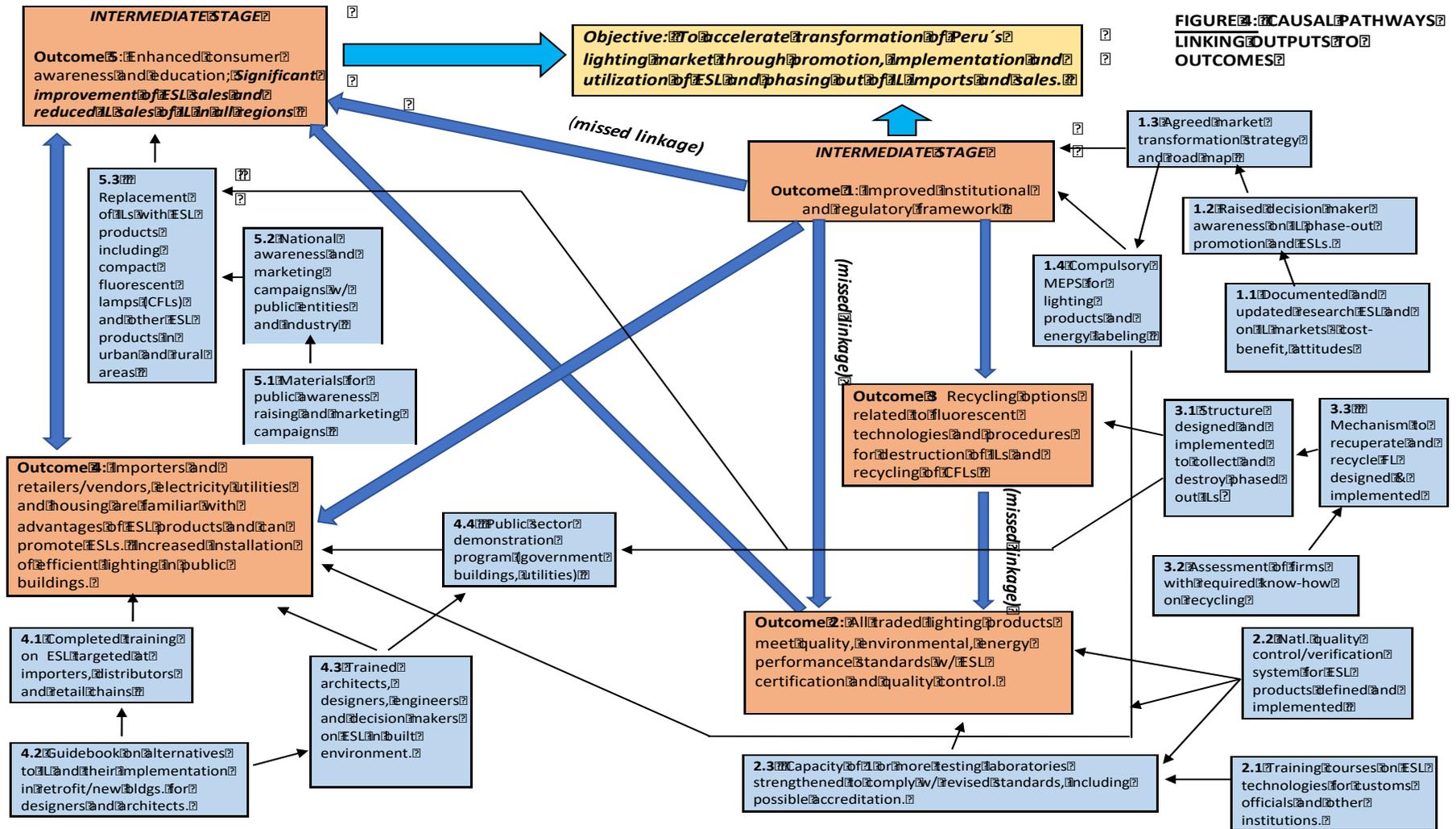


FIGURE 1. CAUSAL PATHWAYS LINKING OUTPUTS TO OUTCOMES

31. The analysis suggests that different clusters of outputs and outcomes need to be implemented sequentially to maximize their effect and establish enabling conditions for achieving the project objective. As noted, this is a challenging task within a four-year period. The general intent of projects is to advance simultaneously on as many components as possible (a tendency that is reinforced by delivery pressures). This may indeed accelerate financial delivery and budget expenditure, yet will not generate the cumulative impact of a sequenced implementation approach that follows the causal pathways and is better aligned with national cycles. Programming implementation on the basis of progressive output and outcome linkages would improve the quality and relevance of project deliverables, without overriding the absorptive capacity of national partners. The down side is that an incremental process of this type is likely to require a longer (and more realistic) implementation period.

32. Project design (and possibly its performance) was also influenced by drivers of impact that moved the implementation process forward, and by “external assumptions” that were outside the project’s control:

33. *Impact Drivers:*

- The national government’s commitment to energy efficiency policies national energy policies, and in particular the 2009-2018 Referential Plan on Efficient Use of Energy.
- Demonstrated cost and energy-savings from ESLs that benefit consumers.
- Natural market tendencies towards energy efficient lighting, as reflected in reduced IL in favor of CLF and, more recently, LED lighting.
- Evolving ESL technologies that require continued engagement and adaptive management on the part of MINEM, importers/retailers and key stakeholders to ensure energy efficiency.
- Planned coordination and collaboration with UNDP-GEF project “Energy Efficiency Standards and Labeling in Peru” (GEF ID 3791) that is also executed by MINEM.

33. *External Assumptions:*

- There is political will and commitment to approve the enabling institutional, legal and regulatory revisions that are needed to transform the national lighting market and promote ESLs.
- Participating government institutions, lighting fixture importers/retailers and other stakeholders demonstrate adequate commitment and have the capacity to participate fully in the project.
- External producers and suppliers of IL bulbs (i.e. Phillips) are willing and able to actively support recycling on the scale envisioned.
- There is low staff turnover within the NEA and Project Implementation Unit, ensuring continuity and timely implementation.

Appendix G: Evaluation Terms of Reference

Terminal Evaluation of the UN Environment/Global Environment Facility project
Section 1: PROJECT BACKGROUND AND OVERVIEW

1. Project General Information

Table 1. Project summary

Executing Agency:	Peruvian Ministry of Energy and Mines (MINEM) and UN Environment
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Lighting Market Transformation in Peru

Sub-programme:	Climate Change	Expected Accomplishment(s):	Not listed in prodoc
UN Environment approval date:	12 Feb. 2013	Programme of Work Output(s):	Programme of Work (POW) 2010/11
GEF project ID:	4173	Project type:	FSP
GEF Operational Programme #:	4	Focal Area(s):	Climate Change
GEF approval date:	12 Sep 2012	GEF Strategic Priority:	SP-1: Promoting Energy Efficiency in Residential and Commercial Buildings
<i>Expected start date:</i>	12 Nov 2012 (prodoc)	Actual start date:	16 May 2013
<i>Planned completion date:</i>	Nov 2018	Actual completion date:	April 2018
<i>Planned project budget at approval:</i>	US \$ 14,562,530	Actual total expenditures reported as of [date]:	US \$ 1,411,016.67 reported on 30 June 2015 for May 2013 to June 2018)
GEF grant allocation:	US \$ 1,636,000	GEF grant expenditures reported as of [30.05.2017]:	US\$ 1,024,314.58 implementing partner- MINEM US \$ 386,702.09 : UNEP DTIE (internal execution = total US\$ 1,411,016.67
Project Preparation Grant - GEF financing:	Budget-US \$25,000 Actual- US \$20,000	Project Preparation Grant - co-financing:	US \$ 25,000

Lighting Market Transformation in Peru

Expected Medium-Size Project/Full-Size Project co-financing:	Full size project co-financing: US\$12,926,530	Secured Medium-Size Project/Full-Size Project co-financing:	Full size project co-financing: US\$,12,938,382.71	
First disbursement:	1 March 2013	Date of financial closure:	April 2019	
No. of revisions:	3	Date of last revision:	27 December 2017	
No. of Steering Committee meetings:	6	Date of last/next Steering Committee meeting:	Last: June 2015	Next:
Mid-term Review/ Evaluation (planned date):	Nov. 2015	Mid-term Review/ Evaluation (actual date):	Nov. 2015	
Terminal Evaluation (planned date):	July 2017	Terminal Evaluation (actual date):	May – July 2018	
Coverage - Country(ies):	Peru	Coverage - Region(s):	Latin America	
Dates of previous project phases:	N/A	Status of future project phases:	N/A	

1. Project rationale

1. Lighting is responsible for close to 15% of annual electricity consumption in the country. According to the Deputy Minister of Energy "lamp replacement by more efficient technologies will not only help mitigating climate change, but it will also mean considerable financial savings for Peruvian families". H. E. Raúl Pérez-Reyes, Deputy Minister of Energy, opened the event stating the need to promote a sustainable market for efficient lighting products in Peru, taking advantage of the huge energy savings to be achieved and the decrease in cost of the highly efficient LED technology.
2. Participants at the event expressed concern about the low quality and performance of some efficient technologies available on the market, which could undermine consumer confidence in LEDs. Hence the standardization and market surveillance that this project is to institute will be fundamental in ensuring a sustainable market lighting market transformation in Peru.
3. The Lighting Market Transformation in Peru project was also introduced in 2013 with UNEP/GEF cooperation in order to accelerate the transformation of the lighting market in the economy through enhanced promotion and implementation of energy saving lamps (ESLs) and the phasing-out of incandescent lamp (ILs) imports and sales, thus reducing greenhouse gases emissions. to: (1) strengthening the national regulatory framework promoting a sustainable efficient lighting market, (2) establishing an effective verification and quality control system for lighting products, (3) establishing a framework for the environmentally sound

management of used lighting products, and (4) enhancing stakeholders' awareness on the benefits of advanced lighting.

4. **Linkages:** Recently, GEF endorsed the UNDP/GEF project "Energy Efficiency Standards and Labeling in Peru" (GEF ID 3791) with MINEM as local executing party. This project can be regarded as a sister project of the proposed UNEP/GEF project as it focuses on market transformation towards more energy efficient appliances (such as refrigerators and freezers), water heaters, air conditioners) and electric motors. The Project intended to work closely with this initiative in the areas of formulation of mandatory standards and labeling, capacity building for key public and private entities, capacity strengthening of laboratories as well as of entities involved in verification and enforcement (MINEM, INDECOPI, Customs), market assessment and consumer awareness campaigns. To coordinate joint activities well it has been suggested that the PMUs of both projects (both under MINEM) be located physically at the same location.

3. Project objectives and components

5. **The Project Objective is "To accelerate transformation of the lighting market in Peru through enhanced promotion and implementation of the utilization of energy saving lamps (ESLs) and the phasing-out of incandescent lamp (ILs) imports and sales".** The Goal is to remove barriers (mentioned in Section 2) to energy efficient lighting by creating an institutional/legal/financial/technical environment in Peru that is in favor of energy efficient lighting through the promotion of high-performance and environmentally sustainable new technologies such as CFLs and the phase-out of inefficient ILs. The Project intended to work in close partnership with the public and private key stakeholders involved in the dissemination of ESLs at national level, and provide a platform for exchange and communication in between all the stakeholders at national level, but also provide linkages at regional level. The main purpose of the project is to reduce greenhouse gas emissions through the accelerated transformation of the lighting market in Peru through enhanced promotion and implementation of the utilization of energy saving lamps (ESLs) and the phasing-out of incandescent lamp (ILs) imports and sales. To achieve this main objective the project is structured around five components:

ESL Policy and Institutional Support Program

Verification & enforcement and customs enhancement program

Improved ESL Recycling Practices and Facilities

ESL market actors development

Consumer awareness and improved ESL sales.

The activities were carried out under the Project aim to create an enabling framework to facilitate the increased utilization of energy efficient lamps and phase-out of inefficient lighting products.

Project outcomes and expected results

Outcomes: 1) Reduced the peak demand of up to 484 MW in the best-case-scenario, which saved up to USD 600 million in investments toward new power plants. 2)

Enhanced the sales of energy-saving lamps by 3.5 million for CFLs and 1.2 million for linear fluorescents. The use of energy-saving bulbs and LED lamps has resulted in the

reduction of 282.8 ktCO2.

http://aperc.ieej.or.jp/file/2016/4/28/Peru_Compendum_2015-Final.pdf

Outcome 1

Improved institutional and regulatory framework to promote a sustainable market for compact fluorescent lamps (CFLs) and phase-out of incandescent lamps (ILs)

Outputs	Description
<p>1.1 Documented results and updates of market research on the status of the ESL and IL markets in Peru, costs and benefits, attitudes of importers, retailers, and vendors and end-consumers</p>	<p>Activities will include a detailed market study for CFLs and ILs, which will update present studies and will include a) generation of accurate data on lighting products and pricing based info provided by Customs as well as retail outlet and consumer surveys; b) analysis of current distributor/retailer networks and their annual sales and stocks; c) household surveys, regarding lamp usage, lamp preferences, perceptions and attitudes; d) workshops on policy and regulatory issues resulting from the market analysis; e) systematic assessment of gaps from the perspective of different stakeholders in the market; e) The study will be repeated at the end of the project to quantitatively and qualitatively measure the impacts of the project's intervention. In fact, it should be noted that market analysis is not a one-time activity at the beginning, but a recurrent activity over time to measure the impact of S&L and to adjust the energy consumption levels for the energy labels (output 1.4) accordingly.</p> <p>The study will determine impacts of lighting market transformation (national economic benefits, environmental impacts, benefits for customers). Regarding c), a survey will provide an assessment of perception and satisfaction of (prospective) ESL customers vis-à-vis their use of CFLs, knowledge of lighting products, availability and pricing. The survey will in particular focus on poorer households and households in rural areas (surveys in the past have often focused on the main urban areas, such as Lima, Trujillo, Arequipa).</p> <p>An international consultant will be hired to monitor and suggest a plan for monitoring and quantification of the outcome and output indicators of the logical framework (see Appendix 3) and ensure consistency with APR-PIR (progress report) reporting and that market studies provide adequate info for quantification. A database will be established with energy consumption data in</p>

	<p>the residential and commercial sectors and on main end-use technologies per type of energy category in the labeling system A-G (see Box 2). Rather than inventing the wheel, cooperation will be sought with other countries in the region that have a functioning energy efficiency database, such as the one at Colombia's UPME and data available at OLADE (Latin American Energy organization).</p>
<p>1.2 Awareness-raised among key decision makers on the phase-out of ILs and promotion of ESLs in Peru.</p>	<p>Activities include awareness raising and facilitate discussions with and amongst management and decision-makers of key market parties (government, consultants, manufacturers, importers, distributors) to develop and effectively implement ESL policy instruments (such as standards and labels) , economic and environmental aspects (energy savings, greenhouse gas reduction, mercury recovery) as well as facilitating access to authorities to international information on best practices and lessons learnt on definition, enactment, implementation and compliance checking and enforcement of appliance EE standards and labels in other countries, in the Andean region as well as in Latin America. Support from policy decision-makers in the Government as well as from the private sector is critical in moving the existing voluntary S&L scheme to mandatory status and establish a clear political legitimacy with support from the society (see output 1.4)</p> <p>Another activity is information facilitation to the public at large by means of a dedicated project website, hosted by MINEM linked with its energy efficiency web pages and that of MINEM's UNDP/GEF project on standards and labeling (of domestic electric appliances) that it is currently implementing.³¹</p>
<p>1.3 Agreed detailed market transformation strategy and road map; including agreed institutional structure (identifying role of government agencies), and financing sources and possible new regulations supporting ESL market transformation and phase-out of ILs</p>	<p>This output will be based on analysis of 1.1 and the consensus building workshops of output 1.2. The result will be a set of recommended possible scenarios with strategies combined in a roadmap for the phasing-out of ILs and more aggressive marketing of ESLs with benchmarks that are based on international best practices. The roadmap will include a selection of the preferred scenario and will be accompanied by recommendations for improved regulations and incentives for energy efficient lighting, including financial support mechanisms and a description of verification and certification schemes (see output 2.2). The market transformation road map aims at mandatory S&L (that eliminates low-</p>

³¹ GEF ID: 3791/UNEP ID:4128 - Energy Efficiency Standards and Labels in Peru

	<p>quality CFLs from the market (through MEPS) and induce consumer awareness and choice in ESL equipment (CFLs, LEDs,) along with defining and promoting the good and best products on the market.</p>
<p>1.4 Minimum energy performance standards (MEPS) for lighting products and energy labeling are made compulsory in line with Peruvian market conditions and with regional and international best practices in coordination with UNEP/GEF Global Lighting Market Transformation Initiative (en.lighten project)</p>	<p>A background analysis and workshop will discuss and propose possible activities to ensure the mandatory compliance with the planned national CFLs directive for compliance with harmonized minimum CFL standards, based on the 2010 guidelines. With regards to energy labels, it is important that the energy categories A-G are defined according to the actual market situation of lighting products in Peru (based on output 1.1); The Committee on Standardization CTN-UREEE39, headed by INDECOPI, will be convened to discuss present Regulations and will revise (with the help of international experts but in the context of a locally facilitated discussion) with the goal of driving to consensus. This will be followed by the revision of the current Technical Regulations on mandatory S&L to be endorsed by the Government.</p>

Outcome 2

All traded lighting products meet quality, environmental and energy performance standards and an effective verification and quality control system is established.

Outputs	Description
<p>2.1 Completed training courses on ESL technologies targeted at customs (and officials of other institutions)</p>	<p>To achieve the outputs, the project will provide training to inspectors and management at Customs and other public authorities in charge of implementing the adopted verification and enforcement plan (see output 2.2)</p>
<p>2.2 National quality control and verification system for ESL products is defined and implemented</p>	<p>Both a well-thought-out and well-implemented verification regime (to determine whether the declared energy performance of lighting equipment available on the market is accurate) and compliance regime (to ensure that market actors abide by the requirements of the program) are needed. Thus, verification and enforcement of energy declarations and of label presence in shops are essential for credible implementation appliance of standards and labels. The project seeks to develop a verification and enforcement plan, including the organization of surveys of imported and local products (random samples at retail outlets, in cooperation with existing consumer protection programs and identification of products requiring specific attention, and</p>

	<p>follow-up with penalties for products that are in non-compliance.</p> <p>In Perú, the Consumer Protection Commission (CPC, Comisión de Protección al Consumidor) is the government agency (under INDECOPI) that is in charge of ensuring that consumer products offered are in compliance. Since all lighting products are imported the role of Customs is important in terms of inspection of goods at point of entry. In Perú, Customs is part of the National Superintendence of Tax Administration (SUNAT, Superintendencia Nacional de Administración Tributaria).</p> <p>Capacity building for Customs officials on verification and compliance will be organized in cooperation with SUNAT’s Tax and Customs Administration Institute (IATA, Instituto de Administración Tributaria y Aduanera).</p> <p>The government officials responsible for labels or standards will be trained to assess the potential effectiveness of self-certification and other certification processes; establish certification and compliance monitoring procedures; and train personnel in certification procedures, compliance monitoring, and enforcement programs. The Project will work closely together with the UNDP/GEF project “Energy Efficiency Standards and Labels in Peru”, in training of government (SUNAT, INDECOPI) and customs officials.</p>
<p>2.3 Capacity of one or more testing laboratory is strengthened to ensure compliance with revised standards including possible accreditation</p>	<p>Uniform product-testing procedure for each ESL product is a vital precursor to the compliance regime of the label or standard for that product. The project will provide technical assistance to entities and support strengthening of existing test laboratories, e.g. at government, universities and private sector (also with the objective that these labs can have a regional function). Testing by manufacturers and private laboratories must be accredited by the appropriate accreditation body, in this case the National Accreditation Service of INDECOPI. The project will to promote an efficient cooperation between agencies in the region (test facilities, protocols, certification, accreditation and compliance regimes that provides inter-laboratory cooperation, training of experts and know-how transfer and as well as mutual recognition agreements).</p>

Outcome 3

Identification of recycling options related to fluorescent technologies and procedures defined for

destruction of ILs and recycling of CFLs

Outputs	Description
3.1 A structure designed and implemented to collect and destroy phased-out ILs	The first output concerns the collection and destruction of the ILs (incandescent lamps), especially in the government-sponsored replacement programs (see output 5.4). It is crucial for CFL market transformation that the replaced ILs are not used again. The destruction method is yet to be developed but the destruction process will be monitored by a local organization.
3.2 Assessment of existing firms having the required know-how within Peru or outside on recycling.	The second and third outputs concern the disposal and recycling of discarded CFLs (including CFLs that have come to the end of their operational life). Appropriate management and handling of the mercury content in discarded CFLs is important as it will mitigate the environmental impact that may arise from the mercury that is present in CFLs. The project will commission a study on issues and options in CFL recycling and make recommendations regarding the industrial processing and disposal of the collected hazardous waste (mercury) of fluorescent lamps. Existing firms in Peru that have the required know-how will be identified and technology transfer to introduce suitable recycling technologies will be promoted.
3.3 Feasible mechanism for recuperation and recycling fluorescent lamps (including financial costing) designed and implemented	

Outcome 4

Importers and retailers/vendors, electricity utilities as well as housing developers (to facilitate

the integration of CFLs into new housing developments) are familiar with the advantages of

ESL products and are able to promote ESLs; Increased installation of efficient lighting in public buildings

Outputs	Description
4.1 Completed training courses on ESL techniques and technologies targeted at importers, distributors and retail chains	In-store information and prominent positioning of EE products on the shelf has a big impact on consumer decisions, meaning that it is important that consumers are presented with energy performance information (via labels) and that sales staff are able to clearly explain energy efficiency and environmental aspects (including CFL recycling) and promote efficient products. In this respect, specific training is sought to be organized for the sales personnel in co-operation with the equipment

	manufacturers, distributors, retail chains and their associations.
4.2 Guidebook on the alternatives to IL and their implementation in retrofit and new buildings for designers and architects.	The output will be a guidebook on energy efficient lighting applications in buildings, including lamps, luminaires and lighting needs combined with building design. The opportunity to introduce ESL in commercial or industrial buildings will be studied and recommendations for ESL criteria will be made.
4.3 Trained architects, designers, engineers and decision makers on ESL in built environment	This activity will involve a number of training sessions to enhance the capacity of the energy service firms, designers, architects and market partners to install efficient and effective lighting in buildings.
4.4 Public sector demonstration program (government buildings, utilities)	While promoting ESL standards and labels is one line of action (output 1.4), another is the promotion of energy efficiency through specific regulations and guidelines for lighting products and design for buildings in the public sector. The project will promote demonstration of ESL in selected public buildings, such as municipality buildings and schools, by means of a pilot project involving latest EE lighting technologies together with architects, engineers (aiming to at least place 200,000 CFLs and 300,000 TLs efficient (tube fluorescents with more effective luminaire application).

Outcomes 5

Enhanced consumers' awareness and education;

Significant improvement of ESL products sales and reduction in the sales of IL in all regions

Outputs	Description
5.1 Materials for public awareness raising and marketing campaigns are developed or adapted into Peruvian conditions.	Placement of labels is only one step in attempting to influence the consumers' purchase decision. This project component includes the communication activities such as the awareness raising and marketing campaigns that will be undertaken by MINEM and private companies with the objective to raise awareness and educate consumers who are not so familiar with the economic and environmental benefits of (high-quality) CFLs in comparison with ILs. The campaign will inform the consumers about the label features through mass media (e.g., radio/TV, newspapers) and the importance and potential impact of selecting efficient products for their household. The consumer awareness program will urge the consumers
5.2 Nation-wide awareness raising and marketing campaigns with relevant public entities and effective participation by industry (importers and suppliers, distributors and retail chains)	

	<p>to consider the performance and lifecycle cost of owning an electric product, and not just its initial cost.</p> <p>The campaign will in particular focus on poorer and rural households where the use of incandescent lamps is still commonest. This component will be based on the public opinion surveys on energy use (output 1.1), which are essential tools for monitoring the effectiveness and possible adjustment of the communication activities. Another important activity will be the incorporation of ESL issues and options in the curricula of school children. The aim is that at least 70% of the total population is informed about the economic and environmental qualities of modern ESLs. Design of the campaign will cost about USD 145,600 (supported with GEF funds), while the campaign itself will be about USD 2.22 million (TV and radio commercials; newspaper and magazine ads), borne by public and private co-financing. For broader public awareness raising campaigns, the project will collaborate with and seek cost-sharing also from other parties such as consumer organizations (e.g., ASPEC), public media and broadcasting channels etc, after which the project's communication strategy and the messages to be delivered will be fine-tuned for the information channels available. Similarly, the project will work with the Ministry of Education to include educational curricula on EE lighting for school children. The project will cooperate closely with the recently approved GEF/UNDP project on Standards and Labeling (for selected household appliances and electric motors).</p>
<p>5.3 Replacements of ILs with ESL products including with quality compact fluorescent lamps (CFLs) and other ESL products in urban areas and rural areas.</p>	<p>Consumers may need encouragement to change their behavior. In principle, the higher investment cost of efficient appliances will be borne by the direct beneficiary, the customer, which is reasonable in view of the general short payback periods. In cases where lower-income groups will shun higher initial investments due to their limited purchasing power, government financing is considered. One such scheme has been implemented with FONAFE in 2009-2010 focusing on the provinces, in which households were offered CFLs to replace incandescent bulbs they had. This scheme will be continued aiming at the replacement of another 1.5 million incandescent bulbs (the associated purchasing CFLs at c.i.f price would be USD 2.83million, taken as cash co-financing in the project's budget). Another proposed scheme is the continuation of the FONAFEMINEM activity to replace HPS street lamps with more efficient LED and induction lamps (starting with the replacement of 500</p>

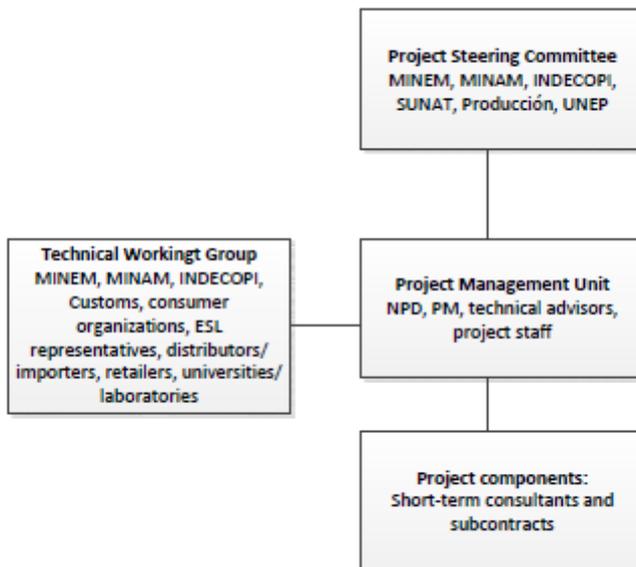
	<p>lamps, valued at USD 372,800, and proposed in this proposal to be followed by another 1,000 lamps and luminaries valued at USD 0.64 million over the period after 2013). The credit line 'Green Home' of the development bank COFIDE makes finance available for energy efficiency and other environmental improvements in houses, including efficient lighting, such as LEDs and CFLs</p>
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4. Executing Arrangements

7. The project is co-financed with funding from the Global Environment Facility (GEF) with the United Nations Environment Programme (UNEP) acting as the GEF Executing Agency in charge of the financial administration and responsible for obtaining the envisaged project outcomes and for ensuring consistency with GEF and UNEP policies and procedures. MINEM is responsible for coordinating the implementation of the Project and will enter into an agreement with UNEP for the overall management of the Project.

The project implementation arrangements comprise the following:

- National Project Director (NPD)**
- Project Steering Committee (PSC)**
- Project Implementation Unit (PMU)**
- Technical Working Group**
- National Project Director (NPD)**



8. Within MINEM, responsibility will be with a high-ranking official, either the Vice Minister for Energy or the Director General for Energy Efficiency, who will act as National Project Director and thus assumes responsibility for the Project on behalf of the national Government.

Project Steering Committee (PSC)

9. The PSC is the highest decision-making authority of this project. The main role of the PSC is (i) to guide and oversee the technical progress and performance of the Project, and (ii) to enhance and optimize the contributions of various partner organizations through coordination of all activities and inputs. The PSC meetings will be formally called by the National Project Director (as Chairperson of the PSC) at least twice a year to discuss the

project performance and provide future guidance. Extraordinary meetings will be held if deemed necessary by one of the PSC members.

10. The PSC will include high level representatives from MINEM, MINAM (Environment Ministry), INDECOPI, Ministry of Production, SUNAT (Customs) and UNEP. Other stakeholders can be invited to attend meetings.

Technical Working Group (TWG)

11. To interact with stakeholders at the institutional level, it is foreseen that Ad-Hoc Committees will be formed on a subject-by-subject level with other government entities, private sector as well as consumer organizations and NGOs. The TWG Project Management Unit (PMU)

12. The PMU will be formally headed by the National project Director (in-kind contribution of MINEM) and further consist of (i) the Project Manager (paid for with GEF funds) assisted by (ii) technical advisors (partly funded by GEF) that will be provide advice and guidance in selected 120 project areas⁶² and financial support staff as well as (iii) professional and support staff fully financed by MINEM. An international consultant acting as the technical advisor (TA) will not be a permanent staff but will be recruited from time to time to assure the quality of the outputs over the project lifetime and provide guidance on impact monitoring. The PMU will be physically placed at MINEM or as a small unit at other premises.

13. The PM was allocated responsibility for the day-to-day project operations, financial accounts, periodic reporting to UNEP and the PSC and for allocation of the GEF grant according to the quarterly and annual work plans and budgets in coordination with UNEP and MINEM. The PM will also act as secretary of the PSC. The PM will prepare the Project Inception report and, at the end of the project, the project Terminal Report.

5. Project Cost and Financing

Budget at Project Design - GEF and Co-Financing		CO-FINANCING	
	Total GEF	Co- Financing	Total (USD)
Budget Source	GEF	Government	
		in-kind)	
Project Component 1: ESL Policy and Institutional Support	384,000	1,033,126	1,417,126
<i>Total Component 1</i>	<i>384,000</i>	<i>1,033,126</i>	<i>1,417,126</i>
Project Component 2: Verification and Enforcement strengthened	215,000	800,000.00	1,015,000
<i>Total Component 2</i>	<i>215,000</i>	<i>800,000</i>	<i>1,015,000</i>
Project Component 3: ESL recycling practices and facilities	216,000	980,000	1,196,000
<i>Total Component 3</i>	<i>216,000</i>	<i>980,000</i>	<i>1,196,000</i>
Project Component 4: ESL Market Actors Development	190,000	700,000	890,000

Lighting Market Transformation in Peru

Demonstration in public buildings	50,000	764,358	814,358
<i>Total Component 4</i>	240,000	1,464,358	814,358
Project Component 5: Consumer Awareness	279,400	850,000	1,129,400
Increased ESL Sales	145,600	6,765,046	6,910,646
<i>Total Component 5</i>	425,000	7,615,046	6,910,646
Project Management	156,000	1,034,000	1,190,000
<i>Total</i>	1,636,000	12,926,530	14,562,530

<i>Co-financing - Cash and In kind Budget Breakdown</i>	Cash		In-kind	
	Government	Private/ NGO	Government	Private/ NGO
Project Component 1: ESL Policy and Institutional Support			1,033,126	
Project Component 2: Verification and Enforcement strengthened			800,000	
Project Component 3: ESL recycling practices and facilities			980,000	
Project Component 4: ESL Market Actors Development			700,000	
Project Component 4: Demonstration in public buildings	614,358		150,000	
Project Component 5: Consumer Awareness,			850,000	
Project Component 5: Increased ESL Sales	6,225,046	400,000	140,000	

Lighting Market Transformation in Peru

Sources	USD
Cost to the GEF Fund	1,636,000.00
Co-financing	
MINEM (cash and in-kind)	4,300,000.00
COFIDE (cash and in-kind)	5,900,000.00
MVCS (in-kind)	1,509,434.00
FONAM (in-kind)	512,340.00
MINAM(in-kind)	304,756.00
Philips (cash)	400,000.00
	12,926,530.00

6. Implementation Issues

14. There is an overall delay of about 8 months in project implementation due mainly to high turnover of project managers and project director, and changes of leadership in the Ministry of Energy and Mines.
15. Stakeholder involvement: TM: Stakeholder involvement remains challenging for this project where Ministry of Finance is not fully supportive of the standards work even though MINEM is. The need to define a mechanism to more actively involve project partners which have key roles in order for the project to achieve its ultimate goals remained till the last PIR.
16. A substantial part of pledged co-financing did not materialize (PIR)

Section 2. OBJECTIVE AND SCOPE OF THE EVALUATION

1. Key Evaluation principles

17. Evaluation findings and judgments should be based on sound evidence and analysis, clearly documented in the evaluation report. Information will be triangulated (i.e. verified from different sources) as far as possible, and when verification is not possible, the single source will be mentioned (whilst anonymity is still protected). Analysis leading to evaluative judgments should always be clearly spelled out.

The "Why?" Question.

18. As this is a terminal evaluation and a follow-up project is likely [or similar interventions are envisaged for the future], particular attention should be given to learning from the experience. Therefore, the “*Why?*” question should be at the front of the consultants’ minds all through the evaluation exercise and is supported by the use of a theory of change approach. This means that the consultants need to go beyond the assessment of “*what*” the project performance was, and make a serious effort to provide a deeper understanding of “*why*” the performance was as it was. This should provide the basis for the lessons that can be drawn from the project.

Baselines and counterfactuals.

19. In attempting to attribute any outcomes and impacts to the project intervention, the evaluators should consider the difference between *what has happened with, and what would have happened without, the project*. This implies that there should be consideration of the baseline conditions, trends and counterfactuals in relation to the intended project outcomes and impacts. It also means that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project. Sometimes, adequate information on baseline conditions, trends or counterfactuals is lacking. In such cases this should be clearly highlighted by the evaluators, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgments about project performance.

Communicating evaluation results.

20. A key aim of the evaluation is to encourage reflection and learning by UN Environment staff and key project stakeholders. The consultant should consider how reflection and learning can be promoted, both through the evaluation process and in the communication of evaluation findings and key lessons. Clear and concise writing is required on all evaluation deliverables. Draft and final versions of the main evaluation report will be shared with key stakeholders by the Evaluation Office. There may, however, be several intended audiences, each with different interests and needs regarding the report. The Evaluation Manager will plan with the consultant(s) which audiences to target and the easiest and clearest way to communicate the key evaluation findings and lessons to them. This may include some or all of the following; a webinar, conference calls with relevant stakeholders, the preparation of an evaluation brief or interactive presentation.

Objective of the Evaluation

21. In line with the UN Environment Evaluation Policy³² and the UN Environment Programme Manual³³, the Terminal Evaluation (TE) is undertaken at completion of the project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability

³² <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationPolicy/tabid/3050/language/en-US/Default.aspx>

³³ http://www.unep.org/QAS/Documents/UNEP_Programme_Manual_May_2013.pdf . This manual is under revision.

requirements, and (ii) to promote operational improvement, learning and knowledge sharing through results and lessons learned among UN Environment and MINEM, customs, and other project partners. Therefore, the evaluation will identify lessons of operational relevance for future project formulation and implementation.

22. Key Strategic Questions

In addition to the evaluation criteria outlined in Section 10 below, the evaluation will address the strategic questions listed below. These are questions of interest to UN Environment and to which the project is believed to be able to make a substantive contribution:

- a) To what extent were all the appropriate bottlenecks identified? (was there an access to finance gap and how has this been addressed? E.g. lack of access to available trade, working and growth capital upstream/ low affordability of products downstream for consumers esp. rural-PIR mentions high initial costs to end users as an issue) *(typically these translate into providing business and market development activities for manufacturers, distributors, retailers, financial institutions as well as connecting them to each other as appropriate-Lighting Africa by IFC program)*
- b) To what extent have the interventions have been appropriate to address bottlenecks/ problems to lighting transformation in Peru (enabling environment/ policy gap, product quality gap, consumer awareness gap)?
- c) ? Incremental cost of ESLs: How would the project overcome the risk of additional cost involved in shifting to ESLs especially for the poor rural households?(STAP)
- d) How has this project addressed or influenced the issue of Financial and organizational difficulties to implement the CFL recycling and disposal arrangements (under investment by private sector in CFL recycling plants identified as a challenge in meeting key indicator - the number of CFLs recycled- PIR 2015)
- e) How unique is this project vis a vis other prior and existing national, regional and global projects in lighting market transformation-how does this build on prior projects eg. GEF and WB financed Multi- country Energy Efficient Lighting Initiative (ELI) (ended in 2000)

23. Evaluation Criteria

All evaluation criteria will be rated on a six-point scale. Sections A-I below, outline the scope of the criteria and a link to a table for recording the ratings is provided in Annex 1). A weightings table will be provided in excel format (link provided in Annex 1) to support the determination of an overall project rating. The set of evaluation criteria are grouped in nine categories: (A) Strategic Relevance; (B) Quality of Project Design; (C) Nature of External Context; (D) Effectiveness, which comprises assessments of the achievement of outputs, achievement of outcomes and likelihood of impact; (E) Financial Management; (F) Efficiency; (G) Monitoring and Reporting; (H) Sustainability; and (I) Factors Affecting Project Performance. The evaluation consultants can propose other evaluation criteria as

deemed appropriate.

A. Strategic Relevance

The evaluation will assess, in line with the OECD/DAC definition of relevance, *'the extent to which the activity is suited to the priorities and policies of the target group, recipient and donor'*. The evaluation will include an assessment of the project's relevance in relation to UN Environment's mandate and its alignment with UN Environment's policies and strategies at the time of project approval. Under strategic relevance an assessment of the complementarity of the project with other interventions addressing the needs of the same target groups will be made. This criterion comprises four elements:

i. *Alignment to the UN Environment Medium Term Strategy³⁴ (MTS) and Programme of Work (POW)*

The evaluation should assess the project's alignment with the MTS and POW under which the project was approved and include reflections on the scale and scope of any contributions made to the planned results reflected in the relevant MTS and POW.

ii. *Alignment to UN Environment /GEF/Donor Strategic Priorities*

Donor, including GEF, strategic priorities will vary across interventions. UN Environment strategic priorities include the Bali Strategic Plan for Technology Support and Capacity Building³⁵ (BSP) and South-South Cooperation (S-SC). The BSP relates to the capacity of governments to: comply with international agreements and obligations at the national level; promote, facilitate and finance environmentally sound technologies and to strengthen frameworks for developing coherent international environmental policies. S-SC is regarded as the exchange of resources, technology and knowledge between developing countries. GEF priorities are specified in published programming priorities and focal area strategies.

iii. *Relevance to Regional, Sub-regional and National Environmental Priorities*

The evaluation will assess the extent to which the intervention is suited, or responding to, the stated environmental concerns and needs of the countries, sub-regions or regions where it is being implemented. Examples may include: national or sub-national development plans, poverty reduction strategies or Nationally Appropriate Mitigation Action (NAMA) plans or regional agreements etc.

iv. *Complementarity with Existing Interventions*

An assessment will be made of how well the project, either at design stage or during the project mobilization, took account of ongoing and planned initiatives (under the same sub-programme, other UN Environment sub-programmes, or being implemented by other agencies) that address similar needs of the same target groups. The evaluation will consider if the project team, in collaboration with Regional Offices and Sub-Programme Coordinators, made efforts to ensure their own intervention was complementary to other interventions, optimized any synergies and avoided duplication of effort. Examples may include UNDAFs or One UN programming. Linkages with other interventions should be described and instances where UN Environment's comparative advantage has been particularly well applied should be highlighted.

³⁴ UN Environment's Medium Term Strategy (MTS) is a document that guides UN Environment's programme planning over a four-year period. It identifies UN Environment's thematic priorities, known as Sub-programmes (SP), and sets out the desired outcomes, known as Expected Accomplishments (EAs), of the Sub-programmes.

³⁵ <http://www.unep.org/GC/GC23/documents/GC23-6-add-1.pdf>

Factors affecting this criterion may include: stakeholders' participation and cooperation; responsiveness to human rights and gender equity and country ownership and driven-ness.

? Stakeholder engagement has been pointed out as an issue in the PIR- how has the project ensured that relevant stakeholders have been selected and engaged across all project components ?

B. Quality of Project Design

The quality of project design is assessed using an agreed template during the evaluation inception phase, ratings are attributed to identified criteria and an overall Project Design Quality rating is established. This overall Project Design Quality rating is entered in the final evaluation ratings table as item B. In the Main Evaluation Report a summary of the project's strengths and weaknesses at design stage is included.

Factors affecting this criterion may include (at the design stage): stakeholders participation and cooperation and responsiveness to human rights and gender equity, including the extent to which relevant actions are adequately budgeted for.

C. Nature of External Context

At evaluation inception stage a rating is established for the project's external operating context (considering the prevalence of conflict, natural disasters and political upheaval). This rating is entered in the final evaluation ratings table as item C. Where a project has been rated as facing either an Unfavourable or Highly Unfavourable external operating context, the overall rating for Effectiveness may be increased at the discretion of the Evaluation Consultant and Evaluation Manager together. A justification for such an increase must be given.

D. Effectiveness (prodoc annex 3 p. 57 contains results framework- logical framework analysis)

The evaluation will assess effectiveness across three dimensions: achievement of outputs, achievement of direct outcomes and likelihood of impact.

i. Achievement of Outputs

The evaluation will assess the project's success in producing the programmed outputs (products and services delivered by the project itself) and achieving milestones as per the project design document (ProDoc). Any *formal* modifications/revisions made during project implementation will be considered part of the project design. Where the project outputs are inappropriately or inaccurately stated in the ProDoc, a table should, for transparency, be provided showing the original formulation and the amended version. The achievement of outputs will be assessed in terms of both quantity and quality, and the assessment will consider their usefulness and the timeliness of their delivery. The evaluation will briefly explain the reasons behind the success or shortcomings of the project in delivering its programmed outputs and meeting expected quality standards.

Factors affecting this criterion may include: preparation and readiness and quality of

project management and supervision³⁶.

ii. Achievement of Direct Outcomes

The achievement of direct outcomes is assessed as performance against the direct outcomes as defined in the reconstructed³⁷ Theory of Change (TOC). These are the first-level outcomes expected to be achieved as an immediate result of project outputs. As in 1, above, a table can be used where substantive amendments to the formulation of direct outcomes as necessary. The evaluation should report evidence of attribution between UN Environment's intervention and the direct outcomes. In cases of normative work or where several actors are collaborating to achieve common outcomes, evidence of the nature and magnitude of UN Environment's contribution should be included.

Factors affecting this criterion may include: quality of project management and supervision; stakeholders' participation and cooperation; responsiveness to human rights and gender equity and communication and public awareness.

iii. Likelihood of Impact

Based on the articulation of longer term effects in the reconstructed TOC (i.e. from direct outcomes, via intermediate states, to impact), the evaluation will assess the likelihood of the intended, positive impacts becoming a reality. Project objectives or goals should be incorporated in the TOC, possibly as intermediate states or long term impacts. The Evaluation Office's approach to the use of TOC in project evaluations is outlined in a guidance note available on the EOU website, web.unep.org/evaluation and is supported by an excel-based flow chart called, Likelihood of Impact Assessment (see Annex 1). Essentially the approach follows a 'likelihood tree' from direct outcomes to impacts, taking account of whether the assumptions and drivers identified in the reconstructed TOC held. Any unintended positive effects should also be identified and their causal linkages to the intended impact described.

The evaluation will also consider the likelihood that the intervention may lead, or contribute to, unintended negative effects. Some of these potential negative effects may have been identified in the project design as risks or as part of the analysis of Environmental, Social and Economic Safeguards.³⁸

The evaluation will consider the extent to which the project has played a catalytic role or has promoted scaling up and/or replication as part of its Theory of Change and as factors that are likely to contribute to longer term impact. Ultimately UN Environment and all its partners aim to bring about benefits to the environment and human well-being. Few projects are likely to have impact statements that reflect such long-term or broad-based changes. However, the evaluation will assess the likelihood of the project to make a substantive contribution to the high level changes represented by UN Environment's Expected Accomplishments, the Sustainable Development Goals³⁹ and/or the high level

³⁶ In some cases 'project management and supervision' will refer to the supervision and guidance provided by UN Environment to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UN Environment.

³⁷ UN Environment staff are currently required to submit a Theory of Change with all submitted project designs. The level of 'reconstruction' needed during an evaluation will depend on the quality of this initial TOC, the time that has lapsed between project design and implementation (which may be related to securing and disbursing funds) and the level of any changes made to the project design. In the case of projects pre-dating 2013 the intervention logic is often represented in a logical framework and a TOC will need to be constructed in the inception stage of the evaluation.

³⁸ Further information on Environmental, Social and Economic Safeguards (ESES) can be found at <http://www.unep.org/about/eses/>

³⁹ A list of relevant SDGs is available on the EO website www.unep.org/evaluation

results prioritised by the funding partner.

Factors affecting this criterion may include: quality of project management and supervision, including adaptive project management; stakeholders participation and cooperation; responsiveness to human rights and gender equity; country ownership and driven-ness and communication and public awareness.

**** Commitment of government entities to agree to certification and quality control scheme and to support on-the-ground Implementation?**

- Uptake of regulations for the collection and destruction of ILs and recycling of non functional/ discarded CFLs

E. Financial Management

Financial management will be assessed under three broad themes: completeness of financial information, communication between financial and project management staff and compliance with relevant UN financial management standards and procedures. The evaluation will establish the actual spend across the life of the project of funds secured from all donors. This expenditure will be reported, where possible, at output level and will be compared with the approved budget. The evaluation will assess the level of communication between the Task Manager and the Fund Management Officer as it relates to the effective delivery of the planned project and the needs of a responsive, adaptive management approach. The evaluation will verify the application of proper financial management standards and adherence to UN Environment's financial management policies. Any financial management issues that have affected the timely delivery of the project or the quality of its performance will be highlighted.

Factors affecting this criterion may include: preparation and readiness and quality of project management and supervision.

F. Efficiency

In keeping with the OECD/DAC definition of efficiency, the evaluation will assess the cost-effectiveness and timeliness of project execution. Focussing on the translation of inputs into outputs, cost-effectiveness is the extent to which an intervention has achieved, or is expected to achieve, its results at the lowest possible cost. Timeliness refers to whether planned activities were delivered according to expected timeframes as well as whether events were sequenced efficiently. The evaluation will also assess to what extent any project extension could have been avoided through stronger project management and identify any negative impacts caused by project delays or extensions. The evaluation will describe any cost or time-saving measures put in place to maximise results within the secured budget and agreed project timeframe and consider whether the project was implemented in the most efficient way compared to alternative interventions or approaches.

The evaluation will give special attention to efforts by the project teams to make use of/build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency. The evaluation will also consider the extent to which the management of the project minimised UN Environment's environmental footprint.

Factors affecting this criterion may include: preparation and readiness (e.g. timeliness); quality of project management and supervision and stakeholders participation and

cooperation.

- Why has there been frequent project manager turnover?
- How is the procurement system functioning?
- How have the time lags been addressed?

G. Monitoring and Reporting

The evaluation will assess monitoring and reporting across three sub-categories: monitoring design and budgeting, monitoring of project implementation and project reporting.

i. Monitoring Design and Budgeting

Each project should be supported by a sound monitoring plan that is designed to track progress against SMART⁴⁰ indicators towards the achievement of the projects outputs and direct outcomes, including at a level disaggregated by gender or groups with low representation. The evaluation will assess the quality of the design of the monitoring plan as well as the funds allocated for its implementation. The adequacy of resources for mid-term and terminal evaluation/review should be discussed if applicable.

ii. Monitoring of Project Implementation

The evaluation will assess whether the monitoring system was operational and facilitated the timely tracking of results and progress towards projects objectives throughout the project implementation period. It will also consider how information generated by the monitoring system during project implementation was used to adapt and improve project execution, achievement of outcomes and ensure sustainability. The evaluation should confirm that funds allocated for monitoring were used to support this activity.

iii. Project Reporting

UN Environment has a centralised Project Information Management System (PIMS) in which project managers upload six-monthly status reports against agreed project milestones. This information will be provided to the Evaluation Consultant(s) by the Evaluation Manager. Projects funded by GEF have specific evaluation requirements with regard to verifying documentation and reporting (i.e. the Project Implementation Reviews, Tracking Tool and CEO Endorsement template⁴¹), which will be made available by the Task Manager. The evaluation will assess the extent to which both UN Environment and donor reporting commitments have been fulfilled.

Factors affecting this criterion may include: quality of project management and supervision and responsiveness to human rights and gender equity (e.g. disaggregated indicators and data).

H. Sustainability

Sustainability is understood as the probability of direct outcomes being maintained and developed after the close of the intervention. The evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of achieved direct outcomes. Some factors of sustainability may be embedded in the project design and implementation approaches while others may be contextual circumstances or conditions that evolve over the life of the intervention. Where applicable an assessment of bio-physical factors that may affect the sustainability of direct outcomes may also be

⁴⁰ SMART refers to indicators that are specific, measurable, assignable, realistic and time-specific.

⁴¹ The Evaluation Consultant(s) should verify that the annual Project Implementation Reviews have been submitted, that the Tracking Tool is being kept up-to-date and that in the CEO Endorsement template Table A and Section E have been completed.

included.

- “Sustainability will largely be dependent on the customers’ perception whether the use of energy efficient lighting is cost efficient and reliable”. How have consumer perceptions changed if at all?
- To what extent do MINEM and other partners institutionalized the capacity to measure ghg avoided / energy saved beyond the PMU using the project- instituted information system?

i. Socio-political Sustainability

The evaluation will assess the extent to which social or political factors support the continuation and further development of project direct outcomes. It will consider the level of ownership, interest and commitment among government and other stakeholders to take the project achievements forwards. In particular the evaluation will consider whether individual capacity development efforts are likely to be sustained.

ii. Financial Sustainability

Some direct outcomes, once achieved, do not require further financial inputs, e.g. the adoption of a revised policy. However, in order to derive a benefit from this outcome further management action may still be needed e.g. to undertake actions to enforce the policy. Other direct outcomes may be dependent on a continuous flow of action that needs to be resourced for them to be maintained, e.g. continuation of a new resource management approach. The evaluation will assess the extent to which project outcomes are dependent on future funding for the benefits they bring to be sustained. Secured future funding is only relevant to financial sustainability where the direct outcomes of a project have been extended into a future project phase. The question still remains as to whether the future project outcomes will be financially sustainable.

- For the share of poor quality CFPS to be limited to 30-50% beyond the life of the project, have MEPS , INDECOPI, Customs and other relevant stakeholders included controlling/ testing the quality of CFLs into their policies, procedures, and work plans as well as budgeted financial and human resources for this? (? Similarly with the other project outcomes?)
- How is the project working with importers and exporters to overcome high investment costs of improved/ modified cfls (eg incentives to banks to finance them, tax breaks, etc.) eg directly/ in complementarity with other projects?

iii. Institutional Sustainability

The evaluation will assess the extent to which the sustainability of project outcomes is dependent on issues relating to institutional frameworks and governance. It will consider whether institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. are robust enough to continue delivering the benefits associated with the project outcomes after project closure.

Factors affecting this criterion may include: stakeholders participation and cooperation; responsiveness to human rights and gender equity (e.g. where interventions are not inclusive, their sustainability may be undermined); communication and public awareness and country ownership and driven-ness.

I. Factors and Processes Affecting Project Performance

These factors are rated in the ratings table, but are discussed as cross-cutting themes as *appropriate under the other evaluation criteria, above.*

i. Preparation and Readiness

This criterion focuses on the inception or mobilisation stage of the project. The evaluation will assess whether appropriate measures were taken to either address weaknesses in the project design or respond to changes that took place between project approval, the securing of funds and project mobilisation. In particular the evaluation will consider the nature and quality of engagement with stakeholder groups by the project team, the confirmation of partner capacity and development of partnership agreements as well as initial staffing and financing arrangements. (Project preparation is covered in the template for the assessment of Project Design Quality).

ii. Quality of Project Implementation and Execution

Specifically for GEF funded projects, this factor refers separately to the performance of the executing agency and the technical backstopping and supervision provided by UN Environment, as the implementing agency.

The evaluation will assess the effectiveness of project management with regard to: providing leadership towards achieving the planned outcomes; managing team structures; maintaining productive partner relationships (including Steering Groups etc.); communication and collaboration with UN Environment colleagues; risk management; use of problem-solving; project adaptation and overall project execution. Evidence of adaptive project management should be highlighted.

iii. Stakeholder Participation and Cooperation

Here the term 'stakeholder' should be considered in a broad sense, encompassing all project partners, duty bearers with a role in delivering project outputs and target users of project outputs and any other collaborating agents external to UN Environment. The assessment will consider the quality and effectiveness of all forms of communication and consultation with stakeholders throughout the project life and the support given to maximise collaboration and coherence between various stakeholders, including sharing plans, pooling resources and exchanging learning and expertise. The inclusion and participation of all differentiated groups, including gender groups, should be considered.

iv. Responsiveness to Human Rights and Gender Equity

The evaluation will ascertain to what extent the project has applied the UN Common Understanding on the human rights based approach (HRBA) and the UN Declaration on the Rights of Indigenous People. Within this human rights context the evaluation will assess to what extent the intervention adheres to UN Environment's Policy and Strategy for Gender Equality and the Environment.

The report should present the extent to which the intervention, following an adequate gender analysis at design stage, has implemented the identified actions and/or applied adaptive management to ensure that Gender Equity and Human Rights are adequately taken into account. In particular, the evaluation will consider to what extent project design

(section B), the implementation that underpins effectiveness (section D), and monitoring (section G) have taken into consideration: (i) possible gender inequalities in access to and the control over natural resources; (ii) specific vulnerabilities of women and children to environmental degradation or disasters; (iii) the role of women in mitigating or adapting to environmental changes and engaging in environmental protection and rehabilitation.

v. Country Ownership and Driven-ness

The evaluation will assess the quality and degree of engagement of government / public sector agencies in the project. The evaluation will consider the involvement not only of those directly involved in project execution and those participating in technical or leadership groups, but also those official representatives whose cooperation is needed for change to be embedded in their respective institutions and offices. This factor is concerned with the level of ownership generated by the project over outputs and outcomes and that is necessary for long term impact to be realised. This ownership should adequately represent the needs and interests of all gender and marginalised groups.

vi. Communication and Public Awareness

The evaluation will assess the effectiveness of: a) communication of learning and experience sharing between project partners and interested groups arising from the project during its life and b) public awareness activities that were undertaken during the implementation of the project to influence attitudes or shape behaviour among wider communities and civil society at large. The evaluation should consider whether existing communication channels and networks were used effectively, including meeting the differentiated needs of gender and marginalised groups, and whether any feedback channels were established. Where knowledge sharing platforms have been established under a project the evaluation will comment on the sustainability of the communication channel under either socio-political, institutional or financial sustainability, as appropriate.

Section 3. EVALUATION APPROACH, METHODS AND DELIVERABLES

The Terminal Evaluation will be an in-depth evaluation using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used as appropriate to determine project achievements against the expected outputs, outcomes and impacts. It is highly recommended that the consultant(s) maintains close communication with the project team and promotes information exchange throughout the evaluation implementation phase in order to increase their (and other stakeholder) ownership of the evaluation findings. Where applicable, the consultant(s) should provide a geo-referenced map that demarcates the area covered by the project and, where possible, provide geo-reference photographs of key intervention sites (e.g. sites of habitat rehabilitation and protection, pollution treatment infrastructure, etc.)

The findings of the evaluation will be based on the following:

- (a) A desk review of:
 - Relevant background documentation, inter alia [list];
 - Project design documents (including minutes of the project design review meeting at approval); Annual Work Plans and Budgets or equivalent, revisions

to the project (Project Document Supplement), the logical framework and its budget;

- Project reports such as six-monthly progress and financial reports, progress reports from collaborating partners, meeting minutes, relevant correspondence and including the Project Implementation Reviews and Tracking Tool etc.;
- Project outputs: [list];
- Mid-Term Review or Mid-Term Evaluation of the project;
- Evaluations/reviews of similar projects.

(b) Interviews (individual or in group) with:

- UN Environment Task Manager (TM);
- Project management team;
- UN Environment Fund Management Officer (FMO);
- Sub-Programme Coordinator;
- Project partners, including [list];
- Relevant resource persons.
-

(c) Surveys [provide details]

(d) Field visits [provide details]

(e) Other data collection tools [provide details]

24. Evaluation Deliverables and Review Procedures

The evaluation team will prepare:

- Inception Report: (see Annex 1 for links to all templates, tables and guidance notes) containing an assessment of project design quality, a draft reconstructed Theory of Change of the project, project stakeholder analysis, evaluation framework and a tentative evaluation schedule.
- Preliminary Findings Note: typically in the form of a powerpoint presentation, the sharing of preliminary findings is intended to support the participation of the project team, act as a means to ensure all information sources have been accessed and provide an opportunity to verify emerging findings. In the case of highly strategic project/portfolio evaluations or evaluations with an Evaluation Reference Group, the preliminary findings may be presented as a word document for review and comment.
- Draft and Final Evaluation Report: (see links in Annex 1) containing an executive summary that can act as a stand alone document; detailed analysis of the evaluation findings organised by evaluation criteria and supported with evidence; lessons learned and recommendations and an annotated ratings table.
- Evaluation Bulletin: a 2-page summary of key evaluation findings for wider dissemination through the EOU website.

Review of the draft evaluation report. The evaluation team will submit a draft report to the Evaluation Manager and revise the draft in response to their comments and suggestions. Once a draft of adequate quality has been peer-reviewed and accepted, the Evaluation Manager will share the cleared draft report with the Project Manager, who will alert the Evaluation Manager in case the report contains any blatant factual errors. The Evaluation Manager will then forward revised draft report (corrected by the evaluation team where

necessary) to other project stakeholders, for their review and comments. Stakeholders may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions as well as providing feedback on the proposed recommendations and lessons. Any comments or responses to draft reports will be sent to the Evaluation Manager for consolidation. The Evaluation Manager will provide all comments to the evaluation team for consideration in preparing the final report, along with guidance on areas of contradiction or issues requiring an institutional response.

Based on a careful review of the evidence collated by the evaluation consultants and the internal consistency of the report, the Evaluation Manager will provide an assessment of the ratings in the final evaluation report. Where there are differences of opinion between the evaluator and the Evaluation Manager on project ratings, both viewpoints will be clearly presented in the final report. The Evaluation Office ratings will be considered the final ratings for the project.

The Evaluation Manager will prepare a quality assessment of the first and final drafts of the main evaluation report, which acts as a tool for providing structured feedback to the evaluation consultants. The quality of the report will be assessed and rated against the criteria specified in template listed in Annex 1 and this assessment will be appended to the Final Evaluation Report.

At the end of the evaluation process, the Evaluation Office will prepare a Recommendations Implementation Plan in the format of a table, to be completed and updated at regular intervals by the Task Manager. The Evaluation Office will track compliance against this plan on a six monthly basis.

25. The Consultants' Team

For this evaluation, the evaluation team will consist of a Team Leader and one Supporting Consultant who will work under the overall responsibility of the Evaluation Office represented by an Evaluation Manager Zahra Hassanali, in consultation with the UN Environment Task Manager Ruth Coutto, Fund Management Officer Leena Darlington and the consultant of the Climate Mitigation Unit, Tania Daccarett. The consultants will liaise with the Evaluation Manager on any procedural and methodological matters related to the evaluation. It is, however, the consultants' individual responsibility to arrange for their visas and immunizations as well as to plan meetings with stakeholders, organize online surveys, obtain documentary evidence and any other logistical matters related to the assignment. The UN Environment Task Manager and project team will, where possible, provide logistical support (introductions, meetings etc.) allowing the consultants to conduct the evaluation as efficiently and independently as possible.

The **Team Leader** will be hired for 4-5 months spread over the period – mid July 2017 to Jan 2018 and should have: an advanced university degree in environmental sciences, international development or other relevant political or social sciences area; a minimum of 10/15 years of technical / evaluation experience, including of evaluating large, regional or global programmes and using a Theory of Change approach; a broad understanding of renewable energy and climate change; along with excellent writing skills in English and Spanish; team leadership experience and, where possible, knowledge of the UN system, specifically of the work of UN Environment. The Supporting Consultant will be hired for 4-5 months spread over the period mid July 2017 to Jan 2018 and should have: an undergraduate university degree in environmental sciences, international development or other relevant political or social sciences area; a minimum of X years of technical/monitoring/evaluation experience; a broad understanding of [add technical experience required]; proficiency in evaluation along with excellent writing skills in English and, where possible, knowledge of the UN system, specifically of the work of UN

Environment. Experience in managing partnerships, knowledge management and communication is desirable for all evaluation consultants.

The Supporting Consultant will be responsible, in close consultation with the Evaluation Office of UN Environment, for overall management of the evaluation and timely delivery of its outputs, described above in Section 11 Evaluation Deliverables, above. The Supporting Consultant will make substantive and high quality contributions to the evaluation process and outputs. Both consultants will ensure together that all evaluation criteria and questions are adequately covered.

Details of Evaluation Consultants' Team Roles can be found on the Evaluation Office of UN Environment website: www.unep.org/evaluation.

26. Schedule of the evaluation

The table below presents the tentative schedule for the evaluation.

Table 3. Tentative schedule for the evaluation

The support consultant will provide inputs to the team leader into the methodology, inception and draft reports through meetings and written comments as necessary per schedule determined by the Team Leader and Support Consultant.

Milestone	Deadline
Inception Report	17 May 2018
Evaluation Mission – 7 days Peru- Team leader	20-26 May 2018
Skype/ Telephone and in person interviews, surveys etc.	1 May – 30 August 2018
Powerpoint/presentation on preliminary findings and recommendations	7 August 2018
Draft report to Evaluation Manager (and Peer Reviewer)	15 August 2018
Draft Report shared with UN Environment Project Manager and team	30 August 2018
Draft Report shared with wider group of stakeholders	7 September 2018
Final Report	15 September 2018
Final Report shared with all respondents	30 September 2018

Contractual Arrangements

Evaluation Consultants will be selected and recruited by the Evaluation Office of UN Environment under an individual Special Service Agreement (SSA) on a “fees only” basis (see below). By signing the service contract with UN Environment/, the consultant(s) certify that they have not been associated with the design and implementation of the project in any way which may jeopardize their independence and impartiality towards project achievements and project partner performance. In addition, they will not have any future interests (within six months after completion of the contract) with the project’s executing or implementing units. All consultants are required to sign the Code of Conduct Agreement Form.

Fees will be paid on an instalment basis, paid on acceptance by the Evaluation Office of expected key deliverables. The schedule of payment is as follows:

Schedule of Payment for the [Consultant/Team Leader:

Deliverable	Percentage Payment
Approved Inception Report (as per annex document 7)	30%
Approved Draft Main Evaluation Report (as per annex document 13)	30%
Approved Final Main Evaluation Report	40%

Schedule of Payment for the Supporting Consultant:

Deliverable	Percentage Payment
Approved Inception Report (as per annex document 7)	30%
Approved Draft Main Evaluation Report (as per annex document 13)	30%
Approved Final Main Evaluation Report	40%

Fees only contracts: Air tickets will be purchased by UN Environment and 75% of the Daily Subsistence Allowance for each authorised travel mission will be paid up front. Local in-country travel will only be reimbursed where agreed in advance with the Evaluation Office and on the production of acceptable receipts. Terminal expenses and residual DSA entitlements (25%) will be paid after mission completion.

The consultants may be provided with access to UN Environment’s Programme Information Management System (PIMS) and if such access is granted, the consultants agree not to disclose information from that system to third parties beyond information required for, and included in, the evaluation report.

In case the consultants are not able to provide the deliverables in accordance with these guidelines, and in line with the expected quality standards by the UN Environment Evaluation Office, payment may be withheld at the discretion of the Director of the Evaluation Office until the consultants have improved the deliverables to meet UN Environment’s quality standards.

If the consultant(s) fail to submit a satisfactory final product to UN Environment in a timely manner, i.e. before the end date of their contract, the Evaluation Office reserves the right to employ additional human resources to finalize the report, and to reduce the consultants’ fees by an amount equal to the additional costs borne by the Evaluation Office to bring the report up to standard.

Appendix H: Report Quality Assessment

Quality Assessment of the Evaluation Report

Evaluation Title:

Lighting Market Transformation in Peru

All UN Environment evaluations are subject to a quality assessment by the Evaluation Office. This is an assessment of the quality of the evaluation product (i.e. evaluation report) and is dependent on more than just the consultant's efforts and skills. Nevertheless, the quality assessment is used as a tool for providing structured feedback to evaluation consultants, especially at draft report stage. This guidance is provided to support consistency in assessment across different Evaluation Managers and to make the assessment process as transparent as possible.

	UN Environment Evaluation Office Comments	Final Report Rating
Substantive Report Quality Criteria		
<p>Quality of the Executive Summary:</p> <p>The Summary should be able to stand alone as an accurate summary of the main evaluation product. It should include a concise overview of the evaluation object; clear summary of the evaluation objectives and scope; overall evaluation rating of the project and key features of performance (strengths and weaknesses) against exceptional criteria (plus reference to where the evaluation ratings table can be found within the report); summary of the main findings of the exercise, including a synthesis of main conclusions (which include a summary response to key strategic evaluation questions), lessons learned and recommendations.</p>	<p>Draft report: (Exec Summaries are not always provided at draft stage)</p> <p>The introduction is complete and well written. Including a summary response to the key strategic question would be appreciated. May need to be updated to capture comments eventually made.</p>	6
<p>I. Introduction</p> <p>A brief introduction should be given identifying, where possible and relevant, the following: institutional context of the project (sub-programme, Division, regions/countries where implemented) and coverage of the evaluation; date of PRC approval and project document signature); results frameworks to which it contributes (e.g. Expected Accomplishment in POW); project duration and start/end dates; number of project phases (where appropriate); implementing partners; total secured budget and whether the project has been evaluated in the past</p>	<p>Draft report:</p> <p>Section is concise. Stating clearly the intended audience of the report will make the section stronger.</p>	5

<p>(e.g. mid-term, part of a synthesis evaluation, evaluated by another agency etc.)</p> <p>Consider the extent to which the introduction includes a concise statement of the purpose of the evaluation and the key intended audience for the findings?</p>			
<p>II. Evaluation Methods</p> <p>This section should include a description of how the <i>TOC at Evaluation</i>⁴² was designed (who was involved etc.) and applied to the context of the project?</p> <p>A data collection section should include: a description of evaluation methods and information sources used, including the number and type of respondents; justification for methods used (e.g. qualitative/ quantitative; electronic/face-to-face); any selection criteria used to identify respondents, case studies or sites/countries visited; strategies used to increase stakeholder engagement and consultation; details of how data were verified (e.g. triangulation, review by stakeholders etc.).</p> <p>Methods to ensure that potentially excluded groups (excluded by gender, vulnerability or marginalisation) are reached and their experiences captured effectively, should be made explicit in this section.</p> <p>The methods used to analyse data (e.g. scoring; coding; thematic analysis etc.) should be described.</p> <p>It should also address evaluation limitations such as: low or imbalanced response rates across different groups; gaps in documentation; extent to which findings can be either generalised to wider evaluation questions or constraints on aggregation/disaggregation; any potential or apparent biases; language barriers and ways they were overcome.</p> <p>Ethics and human rights issues should be highlighted including: how anonymity and confidentiality were protected and strategies used to include the views of marginalised or</p>	<p>Draft report:</p> <p>Section is well written. Describing the approach to capture eg gender issues will be appreciated. The section may be stronger if the limitations are addressed.</p>	<p>Final report:</p>	<p>6</p>

⁴² During the Inception Phase of the evaluation process a *TOC at Design* is created based on the information contained in the approved project documents (these may include either logical framework or a TOC or narrative descriptions). During the evaluation process this TOC is revised based on changes made during project intervention and becomes the *TOC at Evaluation*.

<p>potentially disadvantaged groups and/or divergent views.</p>			
<p>III. The Project This section should include:</p> <ul style="list-style-type: none"> • Context: Overview of the main issue that the project is trying to address, its root causes and consequences on the environment and human well-being (i.e. synopsis of the problem and situational analyses). • Objectives and components: Summary of the project's results hierarchy as stated in the ProDoc (or as officially revised) • Stakeholders: Description of groups of targeted stakeholders organised according to relevant common characteristics • Project implementation structure and partners: A description of the implementation structure with diagram and a list of key project partners • Changes in design during implementation: Any key events that affected the project's scope or parameters should be described in brief in chronological order • Project financing: Completed tables of: (a) budget at design and expenditure by components (b) planned and actual sources of funding/co-financing 	<p>Draft report:</p> <p>Section is concise and well written</p>	<p>Final report:</p>	5
<p>IV. Theory of Change The TOC at Evaluation should be presented clearly in both diagrammatic and narrative forms. Clear articulation of each major causal pathway is expected, (starting from outputs to long term impact), including explanations of all drivers and assumptions as well as the expected roles of key actors. Where the project results as stated in the project design documents (or formal revisions of the project design) are not an accurate reflection of the project's intentions or do not follow OECD/DAC definitions of different results levels, project results may</p>	<p>Draft report:</p> <p>There seems to be some confusion between intermediate state and outcomes. Adding a table to visualize the changes suggested by the evaluation to the ToC at design will be appreciated, .The section will benefit if</p>	<p>Final report:</p>	5

<p>need to be re-phrased or reformulated. In such cases, a summary of the project's results hierarchy should be presented for: a) the results as stated in the approved/revised Prodoc logframe/TOC and b) as formulated in the TOC at Evaluation. <i>The two results hierarchies should be presented as a two column table to show clearly that, although wording and placement may have changed, the results 'goal posts' have not been 'moved'.</i></p>	<p>the wording in the diagram matches the narrative.</p>		
<p>V. Key Findings</p> <p>A. Strategic relevance: This section should include an assessment of the project's relevance in relation to UN Environment's mandate and its alignment with UN Environment's policies and strategies at the time of project approval. An assessment of the complementarity of the project with other interventions addressing the needs of the same target groups should be included. Consider the extent to which all four elements have been addressed:</p> <ul style="list-style-type: none"> i. Alignment to the UN Environment Medium Term Strategy (MTS) and Programme of Work (POW) ii. Alignment to UN Environment/ Donor/GEF Strategic Priorities iii. Relevance to Regional, Sub-regional and National Environmental Priorities iv. Complementarity with Existing Interventions 	<p>Draft report:</p> <p>The section appears concise and well written. A link to the SDGs may be appreciated by many.</p>	<p>Final report:</p>	<p>5.5</p>
<p>B. Quality of Project Design To what extent are the strength and weaknesses of the project design effectively summarized?</p>	<p>Draft report:</p> <p>Section is concise</p>	<p>Final report:</p>	<p>5</p>
<p>C. Nature of the External Context For projects where this is appropriate, key <u>external</u> features of the project's implementing context that limited the project's performance (e.g. conflict, natural disaster, political upheaval), and how they affected performance, should be described.</p>	<p>The section appears necessary to stress the impacts of political processes, specially elections leading to changes in government in the implementation of a project -that should be factored as a risk - -and a plan to keep potential impacts under control.</p>	<p>Final report:</p>	

<p>D. Effectiveness</p> <p>(i) Outputs and Direct Outcomes: How well does the report present a well-reasoned, complete and evidence-based assessment of the a) delivery of outputs, and b) achievement of direct outcomes? How convincing is the discussion of attribution and contribution, as well as the constraints to attributing effects to the intervention.</p> <p>The effects of the intervention on differentiated groups, including those with specific needs due to gender, vulnerability or marginalisation, should be discussed explicitly.</p>	<p>Draft report:</p> <p>The section is concise. Consistency with the outcomes regarded as intermediate states in the ToC section described here as outcomes is required.</p>	<p>Final report:</p>	<p>5.5</p>
<p>(ii) Likelihood of Impact: How well does the report present an integrated analysis, guided by the causal pathways represented by the TOC, of all evidence relating to likelihood of impact? How well are change processes explained and the roles of key actors, as well as drivers and assumptions, explicitly discussed? Any unintended negative effects of the project should be discussed under Effectiveness, especially negative effects on disadvantaged groups.</p>	<p>Draft report:</p> <p>Using the ToC to inform the analysis will be appreciated e.g the excel tool developed by the EO 'likelihood of impact decision tree'</p>	<p>Final report:</p>	<p>5.5</p>
<p>E. Financial Management</p> <p>This section should contain an integrated analysis of all dimensions evaluated under financial management and include a completed 'financial management' table. Consider how well the report addresses the following:</p> <ul style="list-style-type: none"> • completeness of financial information, including the actual project costs (total and per activity) and actual co-financing used • communication between financial and project management staff • 	<p>Draft report:</p> <p>Section is concise. A table combining the figures provided in Figure 2 to visualize the planed against its execution.</p>	<p>Final report:</p> <p><i>(if this section is rated poorly as a result of limited financial information from the project, this is not a reflection on the consultant per se, but will affect the quality of the evaluation report)</i></p>	<p>5.5</p>
<p>F. Efficiency</p> <p>To what extent, and how well, does the report present a well-reasoned, complete and evidence-based assessment of efficiency under the primary categories of cost-effectiveness and timeliness including:</p> <ul style="list-style-type: none"> • Implications of delays and no cost extensions 	<p>Draft report:</p> <p>Section is concise</p>	<p>Final report:</p>	<p>5</p>

<ul style="list-style-type: none"> • Time-saving measures put in place to maximise results within the secured budget and agreed project timeframe • Discussion of making use of/building on pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. • The extent to which the management of the project minimised UN Environment's environmental footprint. 			
<p>G. Monitoring and Reporting How well does the report assess:</p> <ul style="list-style-type: none"> • Monitoring design and budgeting (including SMART indicators, resources for MTE/R etc.) • Monitoring of project implementation (including use of monitoring data for adaptive management) • Project reporting (e.g. PIMS and donor report) 	<p>Draft report: Section is concise. An indication on how decision were made may lead to a stronger section.</p>	<p>Final report:</p>	<p>5</p>
<p>H. Sustainability How well does the evaluation identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of achieved direct outcomes including:</p> <ul style="list-style-type: none"> • Socio-political Sustainability • Financial Sustainability • Institutional Sustainability 	<p>Draft report: The section will benefit from reviewing the overall rating and a link with the ToC..</p>	<p>Final report:</p>	<p>6</p>
<p>I. Factors Affecting Performance These factors are <u>not</u> discussed in stand-alone sections but are integrated in criteria A-H as appropriate. Note that these are described in the Evaluation Criteria Ratings Matrix. To what extent, and how well, does the evaluation report cover the following cross-cutting themes:</p> <ul style="list-style-type: none"> • Preparation and readiness • Quality of project management and supervision⁴³ • Stakeholder participation and co-operation 	<p>Addressing the quality of supervision and responsiveness to human rights and gender equity will be appreciated.</p>		<p>5</p>

⁴³ In some cases 'project management and supervision' will refer to the supervision and guidance provided by UN Environment to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UN Environment.

<ul style="list-style-type: none"> • Responsiveness to human rights and gender equity • Country ownership and driven-ness • Communication and public awareness 			
<p>VI. Conclusions and Recommendations</p> <p>i. Quality of the conclusions: The key strategic questions should be clearly and succinctly addressed within the conclusions section. It is expected that the conclusions will highlight the main strengths and weaknesses of the project, and connect them in a compelling story line. Human rights and gender dimensions of the intervention (e.g. how these dimensions were considered, addressed or impacted on) should be discussed explicitly. Conclusions, as well as lessons and recommendations, should be consistent with the evidence presented in the main body of the report.</p>	<p>Draft report:</p> <p>The section is well written. It will be stronger with a summary response to the key strategic questions.</p>	<p>Final report:</p>	<p>6</p>
<p>ii) Quality and utility of the lessons: Both positive and negative lessons are expected and duplication with recommendations should be avoided. Based on explicit evaluation findings, lessons should be rooted in real project experiences or derived from problems encountered and mistakes made that should be avoided in the future. Lessons must have the potential for wider application and use and should briefly describe the context from which they are derived and those contexts in which they may be useful.</p>	<p>Draft report:</p> <p>Most lessons are useful and all based in evaluation findings.</p>	<p>Final report:</p>	<p>6</p>
<p>iii) Quality and utility of the recommendations: To what extent are the recommendations proposals for specific action to be taken by identified people/position-holders to resolve concrete problems affecting the project or the sustainability of its results? They should be feasible to implement within the timeframe and resources available (including local capacities) and specific in terms of who would do what and when. At least one recommendation relating to strengthening the human rights and gender dimensions of UN Environment interventions, should be given.</p>	<p>Draft report:</p> <p>The section include a good number of feasible recommendations. Will benefit if an individual could be named to make the recommendation happen -and a timeline. At elast one recommendation to strengthen UN Environment</p>	<p>Final report:</p>	<p>6</p>

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<p>Recommendations should represent a measurable performance target in order that the Evaluation Office can monitor and assess compliance with the recommendations.</p>	<p>interventions regarding human rights and gender dimensions will be welcome.</p>		
<p>VII. Report Structure and Presentation Quality</p>			
<p>i) Structure and completeness of the report: To what extent does the report follow the Evaluation Office guidelines? Are all requested Annexes included and complete?</p>	<p>Draft report: The report is complete. ToR should be included</p>	<p>Final report:</p>	<p>6</p>
<p>ii) Quality of writing and formatting: Consider whether the report is well written (clear English language and grammar) with language that is adequate in quality and tone for an official document? Do visual aids, such as maps and graphs convey key information? Does the report follow Evaluation Office formatting guidelines?</p>	<p>Draft report: The report is well written and follows EO guidelines</p>	<p>Final report:</p>	<p>6</p>
<p>OVERALL REPORT QUALITY RATING</p>			<p>5.6/6</p>