

Terminal Evaluation of the UNEP/GEF Project
“Delivering the Transition to Energy Efficient Lighting”
GEF ID 5299 (2016-2024)



Evaluation Office of the United Nations Environment Programme

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Front cover: IBMETRO (LED Photometric Testing System)

Page 55: Mercury Lamps, Municipality of La Guardia

Page 64: Energy efficient street lighting, Municipality of La Guardia

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Delivering the transition to energy efficient lighting

GEF 5299

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The evaluator hopes that the findings, conclusions, and recommendations will contribute to the successful finalization of the current project, formulation of a next phase, and the continuous improvement of similar projects in other countries and regions.

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About the Evaluation

Joint Evaluation: No

Report Language(s): English, Spanish (*Executive Summary*).

Evaluation Type: Terminal Project Evaluation

Brief Description: This report presents the Terminal Evaluation of the UNEP/GEF project "Delivering the Transition to Energy Efficient," implemented between 2016 and 2024. The project aimed to accelerate Bolivia's shift to energy-efficient lighting technologies, such as LEDs, to reduce electricity demand, lower greenhouse gas emissions, and promote sustainable energy practices. The evaluation assesses the project's performance against key criteria, including strategic relevance, effectiveness, efficiency, and sustainability, while identifying achieved outcomes and potential long-term impacts. It serves dual purposes: (i) providing accountability for results and (ii) fostering organizational learning and knowledge sharing among UNEP, GEF, and Bolivian stakeholders to inform future energy efficiency initiatives.

Source(s) of Funding by Country: *Bolivia*

Source(s) of Funding by Institution Type: Ministry of Hydrocarbons and Energy (National Government), Ministry of Environment and Water (National Government), Autonomous Municipal Government of Patacamaya (Public sector), United Nations Environment Programme (International Agency).

Foundation/NGO	No
Private Sector	No
UN Body	Yes
Multilateral Fund	No
Environment Fund	No

Key words: LED Technology, National Efficient Lighting Strategy, Climate Change Mitigation, Mercury-containing waste, Minimum Energy Performance Standards (MEPS), Monitoring, verification and enforcement (MVE).

Primary data collection period: 22 November 2024 to 6 March 2025.

Field mission dates: 20 – 24 January 2025.

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List of Acronyms and Abbreviations

AETN	Electricity and Nuclear Technology Oversight Authority
ANB	National Customs of Bolivia
CCRT	Technical Regulation Compliance Certificate
CEO	Chief Executive Officer
CFL	Compact Fluorescent Lamps
CRTM	Technical Regulation Sample Certificate
CRSO	Collection and Recycling Services Organization
DGGIRS	General Directorate for Integrated Solid Waste Management
ECLAC	Economic Commission for Latin America and the Caribbean
EEE	Electrical and Electronic Equipment
EPR	Extended Producer Responsibility
GAP	Gender Action Plan
GEF	Global Environment Facility
GHG	Greenhouse Gas
IBMETRO	Bolivian Institute of Metrology
IBNORCA	Bolivian Institute of Standardization and Quality
IADB/IDB	Inter-American Development Bank
LED	Light-Emitting Diodes
LIA	Likelihood of Impact Assessment
MDPyEP	Ministry of Productive Development and Plural Economy
MEPS	Minimum Energy Performance Standards
MHE	Ministry of Hydrocarbons and Energy
MMaYA	Ministry of Environment and Water
MPD	Ministry of Development Planning
MTR	Mid-Term Review
MTS	Mid-Term Strategy
MVE	Monitoring, Verification and Enforcement
NB	Bolivian Standard
NELS	National Efficient Lighting Strategy
NGO	Non-Governmental Organization
NLTC	National Lighting Test Center, China
NPD	National Project Director
PCA	Project Cooperation Agreement
PDES	Bolivia's National Economic and Social Development Plan
PIF	Project Identification Form

PIR	Project Implementation Report
PM	Project Manager
PMU	Project Management Unit
PoW	Programme of Work
ProDoc	Project Document
PRONACOP	National Program for Persistent Organic Pollutants
PSC	Project Steering Committee
RToC	Reconstructed Theory of Change
SDG	Sustainable Development Goals
TE	Terminal Evaluation
TF	Trust Fund
ToC	Theory of Change
TOR	Terms of Reference
TWG	Technical Working Group
U4E	United for Efficiency
UNEP	United Nations Environment Programme
USD	United States Dollar
WEEE	Waste from Electrical and Electronic Equipment

Project Identification Table

Table 1: Project Identification Table

GEF Project ID	5299	SMA ID ¹ :	39234
Implementing Agency (UNEP Division/Branch/Unit):	UNEP, Economy and Industry Division, Energy and Climate Branch, Climate Mitigation Unit.	Executing Agency:	- Ministry of Hydrocarbons and Energy (MHE) - Ministry of Environment and Water (MMAyA) - United for Efficiency (U4E)
Sources of Funding (Co-finance):	Country ² (ies): Bolivia	Institution ³ Name/Type: Ministry of Hydrocarbons and Energy (National Government) Ministry of Environment and Water (National Government) Autonomous Municipal Government of Patacamaya (Public sector) United Nations Environment Programme (International Agency)	
Relevant SDG(s):	7, 12, 13.		
MTS (at approval):	MTS 2018-2021	UNEP approval date:	
POW Direct Outcome(s) number/reference (applicable for projects approved from 2022): OR POW Output(s) number/reference (applicable for projects approved pre-2022)	POW Output: Outcome 1B: Countries and stakeholders have increased capacity, finance and access to technologies to deliver on the adaptation and mitigation goals of the Paris Agreement. Indicators (i) Number of national, subnational and private sector actors that adopt climate change mitigation and/or adaptation and disaster risk reduction strategies and policies with UNEP support (ii) Amount provided and mobilized in \$ per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025 with UNEP support	MTS 2025 Outcome(s) number/reference (applicable for projects approved from 2022): OR POW Expected Accomplishment(s) number/reference (applicable for projects approved pre-2022):	POW Expected Accomplishment: 1.8 Societal choices have shifted towards lower-carbon products and services and sustainable lifestyles. 3.1 Regional and national integrated policy has shifted towards the sound management of chemicals and waste.
Sub-programme:	Climate Change Mitigation	Programme Coordination Project:	N/A
UNEP approval date:	13 December 2018	GEF approval date:	13 June 2016
GEF Operational Programme #:	GEF-5	GEF Strategic Priority:	CCM-1 Promote the demonstration, deployment, and transfer of

¹ SMA refers to the ID provided by the Integrated Planning, Management and Reporting Solution (IPMR) system, which was introduced by UNEP in July 2023.

² Where applicable, list countries who have provided project funds and/or co-finance.

³ Indicate where funding institutions are any/all of the following: Foundation/NGO; Private Sector; UN Body; Multilateral Fund; Environment Fund.

			innovative low carbon technologies CCM-2 Promote market transformation for energy efficiency in industry and the building sector CHEM-3 Pilot sound chemicals management and mercury reduction
Project type:	Full Sized Project (FSP)	Focal Area(s):	Climate Change Chemical
Expected start date:	30 April 2019	Actual start date:	March 2021
Planned completion date:	31 December 2021	Actual operational completion date:	31 January 2025
Planned total project budget at approval:	USD 3,059,361	Actual total expenditures reported as of [30 June 2024]:	USD 1,889,542
GEF grant allocation:	USD 3,059,361	GEF grant expenditures reported as of [30 June 2024]:	USD 1,889,542
Expected Medium-Size Project/Full-Size Project co-financing:	<i>In-kind:</i> USD 13,467,575	Secured Medium-Size Project/Full-Size Project co-financing:	<i>In-kind:</i> USD 16,995,547
No. of formal project revisions:	3	Date of last approved project revision:	8 July 2022
No. of Steering Committee meetings:	5	Date of Last Steering Committee meeting:	20 September 2023
Mid-term Review/ Evaluation (planned date):	30 July 2023	Mid-term Review/ Evaluation (actual date):	30 July 2023
Terminal Evaluation (planned date):	31 March 2024	Terminal Evaluation (actual date):	November 2024
Coverage - Country(ies):	Bolivia	Coverage - Region(s):	Latin America and the Caribbean
Dates of previous project phases:	N/A	Status of future project phases:	N/A

RESUMEN EJECUTIVO

Introducción

1. El presente resumen ejecutivo sintetiza los hallazgos, conclusiones y recomendaciones del informe final de evaluación del proyecto “Realizando la transición hacia la iluminación energéticamente eficiente”, implementado entre 2016 y 2024 bajo el liderazgo del Ministerio de Hidrocarburos y Energías (MHE) y con el apoyo del Programa de las Naciones Unidas para el Medio Ambiente (PNUMA) junto con la iniciativa United for Efficiency (U4E) y el financiamiento Fondo para el Medio Ambiente Mundial (GEF, por sus siglas en inglés).
2. El proyecto tuvo como objetivo principal reducir las emisiones de gases de efecto invernadero mediante la eliminación progresiva de tecnologías de iluminación ineficientes, promoviendo el uso de alternativas energéticamente eficientes como los focos LED. La iniciativa se diseñó para incidir en el entorno normativo, la oferta tecnológica, el comportamiento del consumidor y la creación de capacidades institucionales.
3. La evaluación terminal se realizó entre octubre de 2024 y agosto de 2025 con el propósito de analizar el desempeño general del proyecto en función de los criterios definidos por el PNUMA incluyendo relevancia estratégica, calidad del diseño del proyecto, naturaleza del contexto externo, eficacia, eficiencia, monitoreo y reporte, sostenibilidad y factores que afectan el proyecto. Asimismo, la evaluación tuvo como objetivo identificar lecciones aprendidas y formular recomendaciones para futuros esfuerzos en el ámbito de la eficiencia energética.
4. El proceso de evaluación combinó trabajo de oficina, entrevistas con actores clave, visitas de campo, revisión documental y análisis cuantitativo. Se aplicaron enfoques participativos y se incluyeron criterios de género y equidad en el análisis.

Metodología de Evaluación

5. La evaluación final del proyecto se desarrolló siguiendo los principios y criterios establecidos por la Oficina de Evaluación del PNUMA y por el GEF. Se aplicaron diversas metodologías cualitativas y cuantitativas para obtener una visión integral sobre el desempeño del proyecto, sus logros, las barreras encontradas y las lecciones aprendidas. La evaluación se basó en los siguientes criterios clave:
 - Relevancia Estratégica: se evaluó si el proyecto contribuyó a la estrategia nacional de energía de Bolivia y si las actividades y objetivos del proyecto respondieron adecuadamente a las prioridades del país en términos de reducción de emisiones, eficiencia energética y sostenibilidad. Además, se analizó la pertinencia del proyecto en el contexto global, teniendo en cuenta los compromisos internacionales de Bolivia con respecto al cambio climático y la energía sostenible.
 - Calidad del Diseño del Proyecto: se revisó si el marco lógico del proyecto establecía metas realistas y medibles, si las actividades estaban bien definidas y si las estrategias de implementación eran adecuadas para alcanzar los objetivos establecidos. También se examinó la relación entre los resultados esperados y las capacidades de implementación de las instituciones responsables, así como la viabilidad del plan de acción propuesto.
 - Naturaleza del Contexto Externo: se evaluó cómo factores como la inestabilidad política, la pandemia de COVID-19 y otros eventos externos afectaron la ejecución del proyecto, sus plazos y los resultados obtenidos. Además, se consideró cómo los

cambios en el contexto externo pudieron haber creado oportunidades u obstáculos para la implementación de las políticas públicas y las actividades relacionadas con la iluminación eficiente.

- **Eficacia:** se evaluó el grado en que el proyecto cumplió con las metas clave, tales como la reducción del consumo energético mediante el uso de lámparas LED, la implementación de normas de eficiencia energética y la capacitación de los actores locales. También se analizó el impacto real del proyecto en términos de los beneficios ambientales, económicos y sociales derivados de las intervenciones realizadas.
- **Gestión Financiera:** se revisaron los informes financieros y los presupuestos del proyecto, observando si los fondos fueron utilizados de manera eficiente para alcanzar los objetivos y si hubo desviaciones significativas de los costos planificados. Además, se evaluó si el proyecto cumplió con los requisitos de rendición de cuentas y si se gestionaron adecuadamente los fondos externos y las aportaciones de socios nacionales e internacionales.
- **Eficiencia:** se analizó si el proceso de implementación fue eficiente en cuanto a la utilización de recursos y si el proyecto alcanzó sus metas dentro de los plazos establecidos y sin desviaciones presupuestarias importantes. Se consideró también la optimización de los esfuerzos y la coordinación interinstitucional, y si hubo duplicación de esfuerzos o ineficiencias en la asignación de recursos.
- **Monitoreo y Reporte:** se evaluó si el proyecto implementó un sistema de monitoreo adecuado que permitiera hacer un seguimiento continuo de las actividades y resultados. También se analizó si los informes de progreso fueron claros, oportunos y transparentes, y si se tomaron medidas correctivas cuando se detectaron desviaciones de los objetivos originales.
- **Sostenibilidad:** se evaluó si las capacidades institucionales locales eran suficientes para continuar con la implementación de las políticas y tecnologías adoptadas. También se analizó la existencia de mecanismos de financiamiento sostenible para garantizar que las actividades de eficiencia energética y gestión de residuos continúen sin depender exclusivamente de la financiación externa.
- **Factores que Afectan el Desempeño y Temas Transversales:** se analizó cómo las condiciones sociales y las políticas de género fueron consideradas en la implementación del proyecto, y si las actividades del proyecto incluyeron consideraciones ambientales y sociales adecuadas. Además, se consideraron los factores externos que podrían haber influido en la implementación exitosa del proyecto, como los cambios en el entorno político o económico.

6. La metodología aplicada incluyó un enfoque mixto que combinó técnicas de recolección de datos primarios y secundarios:

- **Revisión documental:** se revisaron los reportes de implementación del proyecto (PIR, por sus siglas en inglés), el marco lógico, las memorias de evaluación intermedia, las actas de reuniones y otros documentos relevantes. Esto permitió obtener una visión clara del diseño del proyecto y su evolución.
- **Entrevistas con actores clave:** se realizaron entrevistas semiestructuradas con representantes de las instituciones ejecutoras y colaboradoras, organismos internacionales, autoridades gubernamentales y miembros de la sociedad civil. En

total, se entrevistaron a 22 personas clave, entre ellos funcionarios del MHE, MMAyA, IBNORCA, IBMETRO y municipios beneficiarios.

- Visitas de campo: se llevaron a cabo visitas a municipios que fueron beneficiarios directos de la instalación de luminarias LED, lo que permitió observar de primera mano los resultados de los proyectos piloto, así como las dificultades encontradas en su implementación.
- Análisis de datos cuantitativos: se revisaron indicadores de desempeño y resultados medibles, como el ahorro energético, las emisiones evitadas y el impacto en los costos de electricidad para los usuarios.

7. Si bien la evaluación proporcionó una visión amplia del proyecto, existieron algunas limitaciones. En primer lugar, las demoras en la implementación y la extensión del proyecto afectaron la recopilación de datos en algunos aspectos, como la evaluación de la sostenibilidad y el impacto a largo plazo.

Contexto del Proyecto

8. Bolivia, como muchos países de América Latina, enfrenta desafíos significativos en su sector energético. Aunque es productor de gas natural, su producción energética aún depende mayoritariamente de combustibles fósiles. En 2012, el 70% de la electricidad del país provenía de hidrocarburos, mientras que la energía hidroeléctrica representaba el 30%. Esta dependencia plantea riesgos para el abastecimiento futuro, especialmente con las crecientes demandas de electricidad debido al desarrollo urbano y la electrificación rural.

9. Uno de los principales problemas en Bolivia es la inequidad en el acceso a la energía. Mientras que en las áreas urbanas la tasa de electrificación supera el 90%, en las zonas rurales este porcentaje es considerablemente menor (alrededor del 51%). A pesar de los esfuerzos del gobierno, las políticas de eficiencia energética previas no lograron un impacto significativo en el cambio estructural del sector. Programas como el de reemplazo de lámparas incandescentes por lámparas fluorescentes compactas (CFL) entre 2008 y 2012 tuvieron un alcance considerable, pero las limitaciones en infraestructura de pruebas, supervisión y la falta de concienciación pública restringieron su sostenibilidad a largo plazo.

10. En este sentido, el proyecto se inscribe en un contexto de creciente necesidad de adoptar soluciones energéticas sostenibles. La eficiencia energética, particularmente en el sector de la iluminación, se identificó como una de las áreas más rentables y de mayor impacto en términos de reducción de la demanda energética y las emisiones de gases de efecto invernadero (GEI). Con la creciente adopción de lámparas LED, que ofrecen mayor eficiencia y durabilidad, se estimaba que el cambio podría reducir las emisiones de CO₂ en 145,000 toneladas anuales y disminuir el consumo de electricidad en 359 GWh, lo que representaría un ahorro anual cercano a los 26 millones de dólares.

11. El apoyo político para la transición energética fue clave, y el proyecto se diseñó en conjunto con los principales actores nacionales, como el MHE y el MMAyA. A pesar de los avances iniciales, los desafíos estructurales en la implementación, como la falta de coordinación interinstitucional y la escasa capacidad técnica de las autoridades locales para gestionar la infraestructura de iluminación y residuos, evidencian la complejidad del proceso de transformación hacia un sistema de iluminación eficiente y sostenible.

Descripción del Proyecto

12. El proyecto "Realizando la transición hacia la iluminación energéticamente eficiente" fue concebido para responder a la creciente necesidad de mejorar la eficiencia energética en un país que, si bien es productor de gas natural, enfrenta retos significativos relacionados con

la demanda de electricidad, el envejecimiento de su infraestructura energética y la dependencia de fuentes no renovables.

Componentes del Proyecto

13. El proyecto se estructuró en cuatro componentes principales, cada uno dirigido a abordar diferentes aspectos de la transición energética en el sector de la iluminación:

- i. Desarrollo de una Estrategia Nacional de Iluminación Eficiente: Este componente se centró en la creación de marcos regulatorios y políticas públicas, incluyendo la adopción de estándares mínimos de desempeño energético (MEPS), la implementación de sistemas de monitoreo, verificación y cumplimiento (MVE), y la promoción de los beneficios de la iluminación eficiente en la población y autoridades gubernamentales.
- ii. Fortalecimiento institucional y capacidades locales: Contempló la formación de capacidades tanto en el sector público como privado, con un enfoque en la implementación efectiva de los marcos regulatorios y la capacitación de autoridades nacionales, municipales y laboratorios para cumplir con los nuevos estándares.
- iii. Gestión ambiental de productos de iluminación en desuso: Este componente buscó establecer un sistema nacional de gestión de residuos de luminarias, particularmente aquellas que contienen mercurio, mediante la creación de una infraestructura de recolección, reciclaje y disposición segura.
- iv. Innovación en tecnología y demostración de proyectos de iluminación eficiente: A través de proyectos piloto en seis municipios, este componente buscó promover la adopción de tecnologías de iluminación LED y sistemas de control avanzados, mientras se integraba la perspectiva de género en el diseño y la implementación de las intervenciones.

Implementación y Socios Clave

14. El Ministerio de Hidrocarburos y Energía (MHE) lideró la ejecución del proyecto en coordinación con el Ministerio de Medio Ambiente y Agua (MMAyA) y recibió apoyos del Instituto Nacional de Normalización y Calidad (IBNORCA) y el Instituto Boliviano de Metrología (IBMETRO). La agencia implementadora fue el Programa de las Naciones Unidas para el Medio Ambiente (PNUMA), que también proporcionó apoyo técnico y financiero, junto con la iniciativa U4E, que facilitó la asistencia técnica en el desarrollo y aplicación de políticas y estándares regionales.

15. El proyecto, inicialmente planificado para finalizar en 2021, sufrió demoras significativas debido a la inestabilidad política de Bolivia en 2019, los constantes cambios en el personal de las instituciones y la pandemia de COVID-19, lo que resultó en una extensión del plazo de ejecución hasta 2023.

Hallazgos de la evaluación

16. El desempeño general del proyecto se calificó como moderadamente insatisfactorio, resultado que refleja brechas persistentes en eficacia, eficiencia y sostenibilidad, a pesar de la sólida alineación estratégica y una gestión financiera adecuada. Si bien el proyecto completó varios productos técnicos y movilizó un cofinanciamiento significativo, las debilidades en los mecanismos de aplicación, la coordinación institucional y la implementación de salvaguardas limitaron su capacidad para alcanzar los resultados

previstos. La tabla completa de calificaciones del proyecto se presenta en la Tabla 7. Resumen de hallazgos y calificaciones.

Criteria	Rating
Relevancia estratégica	HS
Calidad del diseño del proyecto	MS
Naturaleza del contexto externo	U
Eficacia	MU
Gestión financiera	HS
Eficiencia	MU
Monitoreo y reporte	S
Sostenibilidad	MU
Factores que afectan el desempeño	MS
Calificación general del desempeño del proyecto	MU

Nota: Las abreviaturas corresponden a calificaciones de evaluación: HS (Highly Satisfactory = Altamente satisfactorio), S (Satisfactory = Satisfactorio), MS (Moderately Satisfactory = Moderadamente satisfactorio), MU (Moderately Unsatisfactory = Moderadamente insatisfactorio), y U (Unsatisfactory = Insatisfactorio). En el caso de la Naturaleza del contexto externo, la categoría U se interpreta como Desfavorable.

17. La relevancia estratégica fue calificada como altamente satisfactoria, reflejando una sólida alineación con la Estrategia de Medio Plazo del PNUMA, las áreas focales de clima y productos químicos del GEF, y los objetivos de desarrollo nacional y compromisos ambientales de Bolivia. Los objetivos del proyecto también contribuyeron a los ODS, al Convenio de Minamata y a los pactos regionales en eficiencia energética. La calidad del diseño se evaluó como moderadamente satisfactoria, al reconocer que, si bien la lógica general del proyecto fue consistente, las evaluaciones de línea de base resultaron limitadas, los mandatos institucionales —en particular entre el MHE y el MDPyEP— no estaban plenamente clarificados respecto a las atribuciones establecer el cumplimiento de los MEPS y desarrollar sistemas de MVE, y las expectativas de su completa adopción durante la implementación fueron ambiciosas. La implementación de los proyectos piloto se pudo mejorar con una planificación más detallada, y los vínculos entre actividades, productos y resultados pudieron haberse fortalecido aún más.

18. El contexto externo presentó condiciones mixtas para la implementación del proyecto. En su fase de diseño, Bolivia no experimentaba conflictos sociales relevantes ni desastres naturales, por lo que no se anticiparon riesgos importantes en estas dimensiones. Sin embargo, la inestabilidad política que ocurrió en 2019 y la pandemia de COVID-19 en 2020 retrasaron la ejecución y provocaron el retiro de cofinanciamiento por parte de algunos actores relevantes como Philips y la municipalidad de La Paz. La alta rotación de personal en las instituciones ejecutoras interrumpió adicionalmente la implementación y debilitó la memoria institucional. Sin embargo, el equipo del PNUMA actuó de manera proactiva al informar a las nuevas autoridades y funcionarios que actuaban como contrapartes y gestionar las extensiones del proyecto con flexibilidad. En conjunto, la naturaleza del contexto externo fue calificada como desfavorable.

19. La eficacia del proyecto se vio limitada por la entrega parcial de algunos productos y el logro desigual de los resultados previstos. Algunos productos que fueron completados incluyen el borrador de la Estrategia Nacional de Iluminación Eficiente, la regulación MEPS para lámparas LED, la capacitación técnica de IBMETRO y los proyectos demostrativos en seis municipalidades. Otros, sin embargo, quedaron inconclusos, entre ellos la regulación MEPS para luminarias LED (aún en revisión), la operativización del sistema MVE por medio de las certificaciones que otorgaría IBMETRO y la plena operatividad de los sistemas de gestión de residuos, que solo alcanzaron avances parciales. Si bien los MEPS para lámparas LED fueron adoptados en marzo de 2024, su entrada en vigor fue diferida 240 días y la ausencia de disposiciones de cumplimiento limitó su aplicación inmediata. Por otra parte,

IBMETRO fortaleció parcialmente sus capacidades técnicas, pero no pudo certificar productos al carecer del equipamiento necesario para emitir el Certificado de Muestra de Regulación Técnica (CRTM) y el Certificado de Cumplimiento de Regulación Técnica (CCRT) de las tecnologías de iluminación del proyecto⁴. Esta limitación explica la falta de progresos significativos en la materia y afectó directamente el establecimiento de un sistema MVE efectivo en su impacto de transformación del mercado producto de limitar la capacidad nacional de verificar el desempeño de las tecnologías de iluminación comercializadas en el país. En conjunto, se alcanzaron cinco de los ocho indicadores de resultado, con calificaciones que oscilaron entre Satisfactorio (para los proyectos piloto en municipalidades) e Insatisfactorio (para el MVE y la gestión de residuos). La probabilidad de impacto fue calificada como Improbable, reflejando brechas persistentes en los mecanismos de cumplimiento, desafíos técnicos no resueltos —incluidas las fluctuaciones de voltaje que afectaron el desempeño de fotoceldas— y la limitada capacidad municipal para gestionar, de manera segura y sostenible, tanto la infraestructura de iluminación como los residuos peligrosos asociados.

20. La gestión financiera fue calificada como altamente satisfactoria. La supervisión ejercida por el PNUMA se mantuvo de manera constante, fue incluso incrementada cuando fue necesario y no se identificaron deficiencias relevantes en el seguimiento de los gastos. Todos los informes, auditorías e inventarios requeridos fueron presentados en tiempo y forma, sin observaciones. La comunicación frecuente entre los equipos financieros y de proyecto —particularmente durante los dos últimos años de ejecución— contribuyó a una implementación fluida, a pesar de los desafíos enfrentados por los equipos a cargo del proyecto.

21. La eficiencia del proyecto fue calificada como moderadamente insatisfactoria, reflejando una combinación de prácticas de gestión positivas y limitaciones estructurales. Factores externos, en particular la inestabilidad política y la pandemia de COVID-19, extendieron la implementación de 32 a 62 meses sin incrementos presupuestarios. A pesar de estas interrupciones, el equipo mantuvo coherencia con el marco de resultados, utilizó extensiones sin costo de manera efectiva y reforzó la coordinación mediante reuniones periódicas con la agencia ejecutora. La disciplina financiera se sostuvo en términos generales, con compromisos de cofinanciación que superaron en 126% los niveles previstos. Sin embargo, los retrasos en adquisiciones, la fragmentación de mandatos institucionales y la rotación frecuente de personal limitaron la eficiencia. La cancelación de equipos clave de laboratorio impidió a IBMETRO emitir los certificados CRTM y CCRT, restringiendo la aplicación de los MEPS y retrasando la operatividad del sistema MVE. En conjunto, las medidas correctivas ayudaron a sostener avances, pero las ineficiencias redujeron la relación costo-efectividad del proyecto.

22. El sistema de monitoreo y reporte fue calificado como satisfactorio. El seguimiento financiero se aplicó de forma constante, con informes de gastos, revisiones presupuestarias y actualizaciones de cofinanciación entregados puntualmente, lo que permitió mantener disciplina en el uso de recursos. Asimismo, la utilización estructurada de reuniones semanales entre UNEP y los ministerios líderes favoreció la alineación y la adopción de medidas correctivas ante urgencias. No obstante, el sistema careció de suficiente rigor metodológico: los indicadores dependieron en gran medida de datos auto reportados que carecieron de verificación independiente, la información de línea de base fue débil y no se elaboró un plan de monitoreo más allá del marco lógico. Como resultado, problemas como las fallas vinculadas al voltaje o el almacenamiento inseguro de lámparas con mercurio no

⁴ Los equipos no adquiridos incluyen un goniómetro para luminarias de alumbrado público, una esfera integradora para flujo luminoso, un banco de durabilidad para lámparas y un equipo de radiación para evaluar efectos fotobiológicos en las personas.

fueron detectados oportunamente, lo que limitó la contribución del sistema a la gestión adaptativa.

23. La sostenibilidad del proyecto fue calificada como moderadamente insatisfactoria, reflejando el equilibrio entre la fragilidad de los arreglos institucionales y financieros existentes y las oportunidades de continuidad de impacto que ofrecen nuevas inversiones del BID en alumbrado público. La sostenibilidad socio-política se vio limitada por el escaso respaldo político, la alta rotación de personal y los roles interministeriales aún no resueltos. En el ámbito financiero, la continuidad depende de apoyo externo, dada la ausencia de estrategias de salida o mecanismos de financiamiento dedicados para la fiscalización y la gestión de residuos. Sin embargo, el próximo programa del BID sobre alumbrado público eficiente —con una asignación de 35 millones de dólares— constituye una ventana relevante de oportunidad: se basa directamente en los resultados regulatorios del proyecto del GEF, refuerza las responsabilidades de certificación de IBMETRO bajo el Decreto Supremo 5121 y asigna recursos a la gestión de residuos peligrosos y al fortalecimiento de capacidades municipales. Si se logra una alineación efectiva, esta iniciativa podría subsanar vacíos no resueltos por el proyecto, en particular en materia de fiscalización, coordinación institucional y financiamiento de largo plazo, consolidando un impacto nacional sostenido.

24. Los factores que afectaron el desempeño y los temas transversales fueron calificados como satisfactorios. Esta calificación resulta de la combinación de la preparación y disposición inicial, la supervisión y gestión del proyecto, la participación y cooperación de las partes interesadas, así como otras dimensiones transversales, entre ellas género, salvaguardas, comunicación y apropiación nacional.

25. La preparación y disposición recibieron una calificación de moderadamente satisfactorias, reflejando el retraso de cinco años entre la aprobación y el inicio del proyecto, ocasionado por la inestabilidad política, las interrupciones de la pandemia y dificultades administrativas. Aun con estas limitaciones, las acciones preparatorias —que incluyeron la participación de actores clave, el trabajo técnico previo desarrollado a través de U4E y la movilización de más de 16,9 millones de dólares en cofinanciamiento— permitieron alcanzar un nivel aceptable de preparación para la implementación del proyecto, aunque la continuidad institucional se mantuvo frágil.

26. La supervisión y gestión del proyecto fueron calificadas en conjunto como satisfactorias, con la supervisión de UNEP evaluada como altamente satisfactoria y la de las agencias nacionales ejecutoras como moderadamente insatisfactoria. UNEP garantizó el cumplimiento de los requisitos, brindó apoyo técnico constante y mantuvo revisiones estructuradas. No obstante, la correcta gestión y supervisión local del proyecto se vio limitada por la alta rotación de personal, sistemas de adquisiciones débiles y brechas de coordinación. Estas restricciones ralentizaron la implementación, aunque no impidieron los avances regulatorios ni la participación de los municipios.

27. La participación y cooperación de los actores relevantes fue calificada como altamente satisfactoria. La amplia implicación de ministerios, municipios, empresas de servicios públicos y organismos de normalización consolidó la eficiencia en iluminación como una prioridad compartida de política pública. El proyecto superó sus compromisos de cofinanciación y generó un nivel visible de apropiación a escala municipal, aunque algunas contribuciones —como las previstas por el Municipio de La Paz— no llegaron a concretarse.

28. El resto de las áreas transversales recibieron evaluaciones mixtas. Por ejemplo, la integración de género y derechos humanos fue calificada como moderadamente satisfactoria; las salvaguardas ambientales, como moderadamente insatisfactorias; la comunicación, como moderadamente satisfactoria; y la apropiación nacional, como

satisfactoria. Aunque se logró una clara articulación con prioridades nacionales y un alcance comunicacional adecuado, persistieron vacíos en materia de salvaguardas para la gestión de residuos peligrosos y en la integración del enfoque de género dentro de los componentes técnicos. El próximo programa del BID, con una financiación de 35 millones de dólares, constituye una oportunidad estratégica para consolidar parte de estos aspectos, siempre que se fortalezcan la coordinación y el anclaje institucional.

Conclusiones

29. El proyecto realizó una contribución sustantiva al fortalecimiento del conocimiento técnico y marco regulatorio de Bolivia para la iluminación eficiente. Entre los logros más destacados se cuentan la elaboración de una NELs, la formulación y publicación de los MEPS mediante Decreto Supremo, y el diseño de un marco de MVE aún pendiente de implementación. La iniciativa U4E del PNUMA respaldó estos avances aportando conocimiento técnico, capacitación y campañas de sensibilización que alcanzaron tanto a públicos nacionales como municipales, con mensajes adaptados a televisión, radio, redes sociales y lenguas indígenas. Asimismo, se ejecutaron proyectos de demostración en varios municipios, lo que proporcionó experiencia práctica con tecnologías LED y reforzó las medidas normativas y regulatorias.

30. La implementación enfrentó desafíos institucionales, técnicos y de contexto local que limitaron los resultados. El diseño del proyecto resultó ambicioso en relación con el marco legal y operativo de Bolivia al momento del diseño, especialmente en lo referente a la aplicación de normas vinculantes de MEPS y a la institucionalización de nuevos mecanismos. Los riesgos políticos e institucionales fueron subestimados, y la falta de involucramiento temprano de actores clave, como el MDPyEP, retrasó la aplicación de los MEPS. Las responsabilidades de IBMETRO en el desarrollo del sistema de MVE se vio afectado por la carencia de equipos de ensayo esenciales, lo que le impidió la emisión de certificaciones obligatorias (CRTM y CCRT). Paralelamente, faltó una estrategia estructurada para la gestión de residuos de mercurio que fuera común para todas las municipalidades implementando proyectos político, dejando sin atender una dimensión crítica de salvaguardas.

31. Para evitar mayores impactos producto de la alta rotación de personal en el MHE y el MMAyA, el PNUMA realizó esfuerzos significativos para informar a las nuevas autoridades, mantener la coordinación y gestionar solicitudes de extensión a fin de cumplir con los compromisos del GEF. Sin embargo, estas medidas solo compensaron parcialmente los retrasos. Las dificultades en los procesos de adquisición también impidieron que IBMETRO obtuviera el equipamiento necesario para poner en marcha el sistema de certificación, lo que derivó en capacitaciones implementadas sin los medios para establecer plenamente las funciones de ensayo y verificación. Los productos incompletos, como el modelo propuesto de CRSO, evidenciaron la brecha entre las ambiciones de diseño y la capacidad operativa real.

32. A nivel municipal, los proyectos piloto permitieron identificar debilidades técnicas y operativas que comprometen su sostenibilidad en el largo plazo. Las fluctuaciones de voltaje provocaron fallas recurrentes en las fotoceldas que activan/desactivan el apagado automático de las luminarias, lo que redujo el desempeño de la iluminación LED y los ahorros energéticos previstos. Los municipios carecieron de planes que definieran roles sobre la responsabilidad del mantenimiento, dejando la infraestructura fuera de los planes rutinarios de servicio y dependiente de apoyos externos. La aplicación de salvaguardas ambientales fue insuficiente: en la municipalidad de La Guardia, las lámparas con contenido de mercurio fueron almacenadas sin medidas de protección, generando riesgos para la salud y el medio ambiente. La ausencia de sistemas operativos de recolección y disposición final reflejó la limitada incorporación de la gestión ambiental en el diseño y la ejecución del proyecto.

33. Si bien el proyecto avanzó en la formulación de políticas, consultas técnicas y actividades de sensibilización, la sostenibilidad a largo plazo tiene cierta incertidumbre. La NELS, los MEPS y el sistema de certificación CRTM/CCRT no fueron plenamente institucionalizados; el monitoreo y la evaluación no capturaron riesgos clave ni lecciones aprendidas en municipalidades participantes de los proyectos piloto; y las campañas de sensibilización pública carecieron de una evaluación sistemática de su impacto en el comportamiento de los consumidores. Aunque el proyecto contó con respaldo nacional y la participación de múltiples actores, la dependencia de asistencia técnica externa y su integración parcial en los marcos presupuestarios limitaron la apropiación institucional. Sin la adopción formal y la aplicación efectiva de los principales mecanismos regulatorios, la transformación del mercado de iluminación en Bolivia permanece inconclusa.

Lecciones aprendidas

34. El proyecto aportó lecciones relevantes para el fortalecimiento de las reformas regulatorias, la implementación técnica y la apropiación institucional en iniciativas de eficiencia energética. Las lecciones descritas brevemente a continuación subrayan la importancia de asegurar un involucramiento institucional temprano, la preparación adecuada de la infraestructura, el establecimiento de mecanismos estructurados de monitoreo, así como la integración de los enfoques de género y de salvaguardas ambientales como condiciones esenciales para garantizar resultados sostenibles.

Lección 1. Las instituciones con mandatos regulatorios deben involucrarse desde la fase inicial. La falta de participación temprana del MDPyEP retrasó la preparación y publicación de los MEPS y generó dificultades de coordinación.

Lección 2. La capacitación debe estar alineada con la preparación institucional e infraestructura disponible. Realizar entrenamientos sobre MEPS antes de que IBMETRO contara con el equipamiento necesario para las certificaciones del sistema MVE limitó su efectividad.

Lección 3. Los proyectos piloto requieren diagnósticos de base completos antes y después de la implementación. La debilidad de las evaluaciones ex ante y la ausencia de datos de consumo dificultaron la atribución de ahorros energéticos y expusieron riesgos técnicos como las fluctuaciones de voltaje.

Lección 4. La sostenibilidad del impacto institucional y su conocimiento sobre reformas regulatorias requieren personal permanente o con baja rotación. La dependencia de equipos contratados por proyectos erosionó la memoria institucional y obstaculizó la consolidación de mecanismos de cumplimiento en el largo plazo.

Lección 5. Las consideraciones de género deben integrarse en todos los componentes técnicos. Limitar el Plan de Acción de Género a la comunicación redujo las oportunidades de abordar las barreras de género en la implementación.

Lección 6. La gestión de residuos peligrosos debe contar con responsables claramente definidos antes del cierre del proyecto. Al no asignarse institucionalmente esta función, lámparas con mercurio fueron almacenadas sin medidas de seguridad en al menos un municipio y no se previeron recursos financieros para su disposición final.

Lección 7. Los sistemas de monitoreo deben incorporar elementos que les permitan capturar riesgos operativos. La debilidad de los mecanismos de retroalimentación retrasó la detección de problemas como fallas en fotoceldas y almacenamiento inseguro de lámparas.

Recomendaciones

35. La evaluación identificó acciones prioritarias para fortalecer los mandatos institucionales, la implementación técnica y la sostenibilidad de futuras iniciativas de eficiencia energética. Las recomendaciones se orientan a cerrar brechas persistentes en materia de salvaguardas ambientales, marcos regulatorios y capacidades institucionales.

Recomendación 1 (Prioridad: Crítica). Establecer un plan de contingencia para la disposición segura de lámparas con contenido de mercurio, comenzando con una evaluación sistemática de las condiciones de almacenamiento en todos los municipios. El plan debe identificar responsabilidades entre el MMAyA, la DGGIRS y los gobiernos municipales.

Recomendación 2 (Prioridad: Importante). Formalizar un mecanismo de coordinación entre el MHE y MDPyEP para la actualización y el desarrollo de nuevos MEPS para cualquier tecnología. Este mecanismo debe definir roles, responsabilidades y procedimientos de coordinación, asegurando la plena operatividad del rol técnico de IBMETRO en la emisión de los certificados CRTM y CCRT.

Recomendación 3 (Prioridad: Importante). Asegurar la adquisición inmediata del equipo fotométrico necesario para que IBMETRO pueda poner en funcionamiento el sistema de MVE. A pesar de que IBMETRO obtuvo vía Decreto Supremo la autorización para emitir certificados CRTM y CCRT para lámparas LED, la cancelación de la compra del equipo dejó a IBMETRO sin la capacidad técnica para sustentar dichos procesos.

Recomendación 4 (Prioridad: Oportunidad de mejora). Exigir que las intervenciones piloto presentes y futuras incluyan evaluaciones previas y posteriores a la instalación, abarcando consumo de energía, flujo lumínico, estabilidad de voltaje y condiciones de red. Los municipios deberán comprometerse a respaldar estos diagnósticos, lo que permitirá mejorar la transparencia, atribución de las intervenciones sobre ahorros de energía y generar evidencia para su replicación futura.

Recomendación 5 (Prioridad: Oportunidad de mejora). Institucionalizar el conocimiento del proyecto mediante el establecimiento de un sistema de información y un grupo de trabajo interministerial permanente que resguarde la memoria institucional. Esto permitirá mitigar los efectos de la rotación de personal, asegurar la continuidad de los instrumentos regulatorios y preservar los principales productos técnicos.

Recomendación 6 (Prioridad: Oportunidad de mejora). Incorporar la equidad de género en la implementación técnica y el monitoreo, definiendo indicadores medibles y desagregados por sexo, garantizando la participación de mujeres en funciones regulatorias, e incluyendo especialistas de género en los procesos de adquisiciones, capacitación y evaluación. Además, la incorporación de evaluaciones ex post permitirían capturar los resultados en base a evidencia objetiva.

Executive Summary

Introduction

36. This executive summary presents the key findings, conclusions, and recommendations of the terminal evaluation of the project “Delivering the Transition to Energy-Efficient Lighting”. The project was implemented between 2016 and 2024 under the leadership of the MHE, with support from the UNEP and U4E partnership, and financed by the Global Environment Facility (GEF).

37. The project’s overarching objective was to reduce greenhouse gas emissions by phasing out inefficient lighting technologies and promoting the adoption of energy-efficient alternatives, such as LED lamps. The intervention was designed to influence the regulatory framework, strengthen technology supply, shape consumer behaviour, and build institutional capacity.

38. The Terminal Evaluation, conducted between October 2024 and August 2025, assessed the overall performance of the project against UNEP’s evaluation criteria, including strategic relevance, project design quality, external context, effectiveness, efficiency, monitoring and reporting, sustainability, and factors affecting performance. In addition, the evaluation aimed to draw lessons learned and provide forward-looking recommendations for future efforts in energy efficiency.

39. The evaluation process combined desk research, interviews with key stakeholders, field visits, document review, and quantitative analysis. A participatory approach was applied, and considerations of gender and equity were integrated throughout the analysis.

Evaluation Methodology

40. The final evaluation of the project was conducted in line with the principles and criteria established by UNEP’s Evaluation Office and the GEF. A combination of qualitative and quantitative methods was applied to provide a comprehensive assessment of project performance, achievements, barriers, and lessons learned. A mixed-methods approach was adopted, combining primary and secondary data collection:

- Document Review: Examination of Project Implementation Reports (PIRs), logical framework documents, mid-term evaluation records, meeting minutes, and other relevant materials. This provided a clear understanding of the project’s design and evolution.
- Key Informant Interviews: Semi-structured interviews with 22 stakeholders, including representatives of implementing and partner institutions, international organizations, government authorities, and civil society. Among those consulted were officials from MHE, MMAyA, IBNORCA, IBMETRO, and beneficiary municipalities.
- Field Visits: Site visits to municipalities where LED luminaires had been installed, enabling direct observation of pilot project results and implementation challenges.
- Quantitative Data Analysis: Review of performance indicators and measurable outcomes, including energy savings, emissions reductions, and reductions in electricity costs for users.

41. While the evaluation provided a comprehensive view of the project, certain limitations were noted. Delays in implementation and extensions of the project cycle constrained data collection in specific areas, notably in assessing sustainability and long-term impacts.

Project Background

42. Bolivia's energy system is heavily reliant on fossil fuels, with natural gas supplying most of the electricity generation. In 2012, fossil fuels accounted for 70% of the power mix, while hydropower contributed 30% and variable renewables remained marginal. Despite being a producer of natural gas, Bolivia is a net importer of oil, and rural electrification continues to lag urban access. Without a strategic shift toward efficiency and renewable energy, the country faces increasing risks of unmet electricity demand and rising emissions.

43. A major challenge in Bolivia remains the inequitable access to energy. While electrification rates in urban areas exceed 90%, coverage in rural areas is substantially lower, at around 51%. Despite government efforts, earlier energy-efficiency policies did not achieve lasting structural change in the sector. Programmes such as the replacement of incandescent bulbs with compact fluorescent lamps (CFLs) between 2008 and 2012 reached considerable scale, yet their long-term sustainability was constrained by limited testing infrastructure, weak supervisory mechanisms, and insufficient public awareness.

44. Against this backdrop, the project was embedded in a growing need to adopt sustainable energy solutions. Energy efficiency—particularly in the lighting sector—was identified as one of the most cost-effective and high-impact avenues for reducing energy demand and greenhouse gas (GHG) emissions. With the increasing uptake of LED lamps, which combine higher efficiency with longer durability, it was estimated that the transition could cut annual CO₂ emissions by 145,000 tonnes and reduce electricity consumption by 359 GWh. This, in turn, would translate into yearly savings of approximately USD 26 million.

45. Political support for the energy transition was a critical enabling factor, with the project designed in collaboration with key national stakeholders, including MHE and MMAyA. While initial progress was achieved, structural challenges in implementation—such as limited inter-institutional coordination and insufficient technical capacity among local authorities to manage lighting infrastructure and waste—highlight the complexity of advancing towards an efficient and sustainable lighting system.

Project Description

46. The project “Delivering the Transition to Energy-Efficient Lighting” was conceived to address the growing need to enhance energy efficiency in a country that, while being a natural gas producer, faces significant challenges related to electricity demand, ageing energy infrastructure, and reliance on non-renewable sources.

47. The project was structured around four main components, each designed to tackle a distinct aspect of the energy transition in the lighting sector:

- i. **Development of a National Efficient Lighting Strategy:** Focused on establishing regulatory frameworks and public policies, including the adoption of Minimum Energy Performance Standards (MEPS), the implementation of Monitoring, Verification and Enforcement (MVE) systems, and the promotion of efficient lighting benefits among citizens and government authorities.
- ii. **Institutional Strengthening and Capacity-Building:** Targeted the enhancement of capacities across the public and private sectors, with emphasis on effective

enforcement of regulatory frameworks and training of national, municipal, and laboratory authorities to comply with new standards.

- iii. Environmental Management of End-of-Life Lighting Products: Aimed at establishing a national waste-management system for luminaires, particularly those containing mercury, through the creation of collection, recycling, and safe disposal infrastructure.
- iv. Technology Innovation and Demonstration of Efficient Lighting Projects: Promoted the adoption of LED lighting and advanced control systems through pilot projects in six municipalities, integrating gender perspectives into both the design and implementation of interventions.

Implementation and Key Partners

48. MHE led project execution in coordination with MMAyA, supported by the National Institute of Standardization and Quality (IBNORCA) and the Bolivian Institute of Metrology (IBMETRO). UNEP served as the implementing agency, providing technical and financial support, complemented by U4E initiative, which facilitated technical assistance in the development and application of regional policies and standards.

49. Originally scheduled for completion in 2021, the project experienced significant delays due to Bolivia's political instability in 2019, frequent staff turnover within implementing institutions, and the COVID-19 pandemic. As a result, the implementation period was extended until 2023.

Evaluation Findings

50. The project's overall performance rating is Moderately Unsatisfactory, reflecting persistent gaps in effectiveness, efficiency, and sustainability despite strong strategic alignment and sound financial management. While the project delivered several technical outputs and mobilized significant co-financing, weaknesses in enforcement mechanisms, institutional coordination, and safeguard application limited its ability to achieve intended outcomes. The full project ratings table is provided in [Table 7. Summary of project findings and ratings](#).

Criteria	Rating
Strategic Relevance	HS
Quality of Project Design	MS
Nature of External Context	U
Effectiveness	MU
Financial Management	HS
Efficiency	MU
Monitoring and Reporting	S
Sustainability	MU
Factors Affecting Performance	S
Overall Project Performance Rating	MU

51. Strategic relevance was rated Highly Satisfactory, reflecting strong alignment to UNEP's Medium-Term Strategy, GEF climate and chemicals focal areas, and Bolivia's national development goals and environmental commitments. The project's objectives also contributed to the SDGs, the Minamata Convention, and regional energy efficiency pacts. The design quality was rated Moderately Satisfactory, recognising that while the overall logic of the project was sound, baseline assessments were limited, institutional mandates (notably between MHE and MDPyEP) were not fully clarified regarding the attributions to establish MEPS and develop MVE systems, while expectations of their full enforcement during project

implementation were ambitious. Pilot projects would have benefited from more detailed planning, and the links between activities, outputs, and outcomes could have been further strengthened.

52. The external context presented mixed conditions for project implementation. At design, Bolivia faced no major conflicts or natural disasters, and such risks were not anticipated. Political instability in 2019 and the COVID-19 pandemic in 2020, however, delayed implementation and led to the withdrawal of co-financing from some relevant stakeholders such as Philips, and the municipality of La Paz. Frequent staff turnover in implementing institutions further disrupted execution and weakened institutional memory. Nevertheless, UNEP's team acted proactively by briefing new authorities and officers acting as counterparts and managing project's extensions with flexibility. Overall, the Nature of the External Context was rated Unfavourable.

53. The effectiveness of the project was constrained due to the partial delivery of several key outputs and uneven achievement of outcomes. While some outputs—such as the draft National Efficient Lighting Strategy, the MEPS regulation for LED lamps, technical training for IBMETRO, and LED demonstration programme in six municipalities—were completed, others remained unfinished. These include the MEPS regulation for LED luminaires (still under review), the establishment of a functional MVE framework, and full operationalization of waste management systems, which reached only partial completion. Although MEPS for LED lamps were adopted in March 2024, their entry into force was delayed by a 240-day grace period, and the lack of enforcement provisions limited immediate application. IBMETRO developed some technical capacities but remained unable to fully certify products due to the absence of required equipment to issue the Technical Regulation Sample Certificate (CRTM) and the Technical Regulation Compliance Certificate (CCRT)⁵. Without this equipment, the laboratory could not conduct the necessary tests to grant these certifications, which explains the lack of significant progress in this area. This directly affected the establishment of a functioning MVE system effective at transforming the market, limiting the national capacity to verify the energy performance of lighting technologies commercialized in the country. Overall, five of the eight outcome indicators were achieved, with ratings ranging from Satisfactory (for municipal demonstrations) to Unsatisfactory (for MVE and waste management outcomes). The likelihood of impact was rated Unlikely, reflecting persistent gaps in enforcement mechanisms, unresolved technical challenges (including voltage fluctuations affecting photocell performance), and limited municipal capacity to manage both lighting infrastructure and hazardous waste in a safe and sustainable manner.

54. Financial management was rated Highly Satisfactory. UNEP's financial oversight was consistent, it was even increased when needed, and no major issues were found in expenditure tracking. All required reports, audits, and inventories were submitted without deficiencies. Frequent communication between finance and project teams—especially in the final two years—helped ensure smooth implementation, despite challenges within project implementation teams.

55. The project's efficiency was rated Moderately Unsatisfactory, reflecting a combination of positive management practices and structural constraints. External shocks, notably political instability and the COVID-19 pandemic, extended implementation from 32 to 62 months without additional budget allocations. Despite these disruptions, the team maintained coherence with the results framework, used no-cost extensions effectively, and improved coordination through regular meetings with implementing ministries. Financial discipline was broadly upheld, with co-financing commitments exceeding expectations at 126% of planned

⁵ The equipment not procured includes a goniophotometer for street lighting luminaires, an integrating sphere for luminous flux, a durability test bench for lamps, and radiation measurement equipment for assessing photobiological effects on humans.

levels. However, procurement delays, fragmented institutional mandates, and repeated staff changes undermined efficiency. The cancellation of key laboratory equipment prevented IBMETRO from issuing the CRTM and CCRT certifications, constraining the enforcement of MEPS and delaying the operationalisation of the MVE system. Overall, corrective measures helped sustain progress, but inefficiencies reduced cost-effectiveness.

56. The monitoring and reporting system was rated Satisfactory. Financial monitoring was consistently applied, with expenditure reports, budget revisions, and co-financing updates submitted on time, helping maintain resource discipline. The structured use of weekly meetings between UNEP and lead ministries also supported alignment and corrective action when bottlenecks arose. However, the system lacked sufficient methodological depth: indicators often relied on self-reported data without independent verification, baseline information was weak, and no monitoring plan was developed beyond the logical framework. As a result, issues such as voltage-related failures and unsafe storage of mercury lamps went undetected, limiting the system's contribution to adaptive management.

57. The project's sustainability is rated Moderately Unlikely, balancing fragile institutional and financial arrangements against the opportunities offered by new IDB investment in streetlights. Socio-political sustainability was constrained by weak policy endorsement, frequent turnover, and unresolved inter-ministerial roles, while financial sustainability remains dependent on external support given the absence of exit strategies or dedicated funding mechanisms for enforcement and waste management. Yet the forthcoming USD 35 million IDB-financed program on energy-efficient public lighting marks an important window of opportunity: it directly builds on the GEF project's regulatory outputs, supports IBMETRO's certification responsibilities under Supreme Decree 5121, and allocates resources for hazardous waste management and municipal capacity building. If effectively aligned, this initiative could address gaps left unresolved by the project—particularly in enforcement, institutional coordination, and long-term financing—transforming initial achievements into sustained national impact.

58. Factors Affecting Performance and Cross-Cutting Issues were rated Satisfactory. This rating is the result of rating preparation and readiness, supervision and project management, stakeholder participation and cooperation, and other cross-cutting dimensions such as gender, safeguards, communication, and country ownership.

59. Preparation and readiness were rated Moderately Satisfactory, reflecting the five-year delay between project approval and launch, caused by political turnover, pandemic disruptions, and administrative bottlenecks. Despite these challenges, preparatory actions—including stakeholder engagement, technical groundwork through U4E, and the mobilization of over USD 16.9 million in co-financing—helped establish partial readiness, even if institutional continuity remained fragile.

60. Supervision and project management were rated Satisfactory overall, with UNEP's oversight rated Highly Satisfactory and national executing agencies Moderately Unsatisfactory. UNEP ensured compliance, provided consistent technical support, and maintained structured reviews, while execution was constrained by high staff turnover, weak procurement systems, and coordination gaps. These limitations slowed delivery but did not prevent regulatory progress or municipal engagement.

61. Stakeholder participation and cooperation were rated Highly Satisfactory. Broad involvement from ministries, municipalities, utilities, and standards bodies positioned efficient lighting as a shared policy priority. The project exceeded its co-financing commitments and generated visible ownership at municipal levels, though some contributions—such as those from the Municipality of La Paz—did not materialize.

62. Other cross-cutting issues received mixed ratings. Gender and human rights integration was Moderately Satisfactory, safeguards Moderately Unsatisfactory, communication Moderately Satisfactory, and country ownership Satisfactory. While outreach and alignment with national priorities were clear, gaps remained in hazardous waste safeguards and in institutionalizing gender within technical workstreams. The upcoming USD 35 million IDB program offers a strategic opportunity to consolidate these elements, provided coordination and institutional anchoring are strengthened.

Conclusions

63. The project made a substantive contribution to strengthening Bolivia's technical and regulatory foundation for efficient lighting. Notable outputs included the drafting of a NELs, the development and publication of MEPS through a Supreme Decree, and the design of an MVE framework pending implementation. UNEP's U4E initiative supported these achievements through technical expertise, training, and awareness campaigns that reached national and municipal audiences, with messages adapted for television, radio, social media, and indigenous languages. Demonstration projects were carried out in several municipalities, providing practical experience with LED technologies and complementing policy and regulatory efforts.

64. Implementation, however, faced institutional, technical, and contextual challenges that constrained results. The project design proved ambitious relative to Bolivia's legal and operational context, particularly concerning the enforcement of binding standards and the institutionalization of new mechanisms. Political and institutional risks were underestimated, and the absence of early involvement of key actors such as MDPyEP delayed MEPS enforcement and labelling. IBMETRO's role in MVE development was compromised by the lack of essential testing equipment (goniophotometer for street lighting luminaires, an integrating sphere for luminous flux, a durability test bench for lamps, and radiation measurement equipment for assessing photobiological effects on humans), preventing the issuance of required certifications (CRTM and CCRT). In parallel, no structured approach was included for managing mercury waste management in beneficiary municipalities implementing pilot projects, leaving a critical safeguard dimension unaddressed.

65. To avoid further impacts on implementation due to frequent staff turnover within MHE and MMAyA, UNEP made significant efforts to brief new authorities, maintain coordination, and manage extension requests to uphold GEF commitments. Although these measures only partially offset delays. Procurement difficulties also prevented IBMETRO from acquiring equipment needed to operationalize the certification system, resulting in training activities being delivered without the means to fully establish testing and verification functions. Incomplete outputs, such as the proposed CRSO model, highlighted the gap between design ambitions and operational delivery.

66. At the municipal level, pilot projects exposed technical and operational weaknesses that limited their long-term viability. Voltage fluctuations caused frequent failures in photocells that activated/deactivated lighting units, undermining the performance of LED streetlights and expected energy savings. Municipalities lacked documented strategies to assume responsibility for maintenance, leaving infrastructure outside routine service plans and dependent on external support. Environmental safeguards were inadequately applied: in the municipality of La Guardia, mercury-containing lamps were stored without protective measures, creating health and environmental risks. The absence of functioning collection and disposal systems reflected the limited integration of environmental management into project design and execution.

67. While the project advanced policy drafting, technical consultations, and awareness raising, long-term sustainability remains uncertain. NELS, MEPS, and the CRTM/CCRT certification system were not fully institutionalized, monitoring and reporting did not capture key risks or lessons learned, and public awareness campaigns lacked systematic evaluation of their impact on consumer behavior. Although the project benefited from national endorsement and multi-actor engagement, reliance on external technical assistance and partial integration into budgetary frameworks constrained institutional ownership. Without the formal adoption and enforcement of core regulatory outputs, the transformation of Bolivia's lighting market remains incomplete.

Lessons Learned

68. The project highlighted lessons for strengthening regulatory reform, technical implementation, and institutional ownership in energy efficiency initiatives. The lessons learned included below emphasize the importance of early institutional engagement, readiness of infrastructure, structured monitoring, and integration of gender and environmental safeguards to ensure sustainable outcomes.

Lesson 1. Institutions with regulatory mandates must be engaged from the outset. Lack of early involvement of MDPyEP delayed MEPS enforcement and created coordination difficulties.

Lesson 2. Training should be synchronized with institutional and infrastructure readiness. Conducting MEPS-related trainings before IBMETRO had equipment for certifications related to MVE system limited its usefulness.

Lesson 3. Pilot projects must be grounded in full baseline assessments before and after implementation. Weak ex-ante diagnostics and absent consumption data undermined attribution of energy savings and exposed technical risks like voltage fluctuations.

Lesson 4. The sustainability of institutional impact and expertise on regulatory reforms requires permanent staff or low turnover. Reliance on project-based staff eroded institutional memory and stalled long-term enforcement.

Lesson 5. Gender considerations must be integrated across technical components. Limiting the GAP to communication reduced opportunities to address gender barriers in implementation.

Lesson 6. Hazardous waste management roles must be defined before closure. With no institution assuming responsibility, mercury lamps were stored unsafely in at least one municipality and disposal funding was absent.

Lesson 7. Monitoring systems must capture operational risks. Weak feedback loops delayed detection of issues such as faulty photocells and unsafe lamp storage.

Recommendations

69. The evaluation identified relevant actions to strengthen institutional mandates, technical implementation, and sustainability of future energy efficiency initiatives. The following recommendations address persistent gaps in environmental safeguards, regulatory frameworks, and institutional capacity.

Recommendation 1 (Priority: Critical). Establish a contingency plan for the safe disposal of mercury-containing lamps, starting with a systematic field assessment of storage conditions in participant municipalities. The plan could assign operational and financial responsibilities to MMAyA, DGGIRS, and municipal governments, supported by certified waste operators.

Recommendation 2 (Priority: Important). Formalize a pathway enabling coordination between MHE and MDPyEP for the updating and development of new MEPS for any technology. This should define roles, responsibilities, and coordination mechanisms, ensuring IBMETRO's technical role in issuing CRTM and CCRT certifications is operationalized.

Recommendation 3 (Priority: Important). Ensure the immediate procurement of the photometric laboratory equipment required for IBMETRO to operationalize the MVE system. Although IBMETRO is authorized by a Supreme Decree to issue CRTM and CCRT certifications for LED lamps, the cancellation of the equipment purchase left the institution without the technical capacity to substantiate these processes.

Recommendation 4 (Priority: Opportunity for improvement). Require pilot interventions to conduct pre- and post-installation assessments, covering energy use, lighting output, voltage stability, and grid conditions. Municipalities should commit to supporting these diagnostics. This will enhance transparency, allow proving project's attribution of energy savings, and generate evidence to inform project replications.

Recommendation 5 (Priority: Opportunity for improvement). Institutionalize project knowledge by establishing an information system and permanent inter-ministerial working group to safeguard institutional memory. This would mitigate staff turnover, ensure continuity of regulatory instruments, and preserve key technical deliverables, enabling future projects to build on existing foundations.

Recommendation 6 (Priority: Opportunity for improvement). Embed gender equity into technical implementation and monitoring by defining measurable, gender-disaggregated indicators, ensuring women's participation in infrastructure and regulatory roles, and including gender specialists in procurement, training, and evaluation processes. Moreover, the preparation of ex-post assessments could capture outcomes based on objective evidence.

1 INTRODUCTION

70. The project “Delivering the Transition to Energy Efficient Lighting” was implemented under the institutional framework of UNEP, within the Climate Action Subprogramme. Approved by UNEP’s Project Review Committee on 13 June 2016, and with the Project Cooperation Agreement entering into force on 30 April 2019, the initiative was designed to support Bolivia’s transition toward energy-efficient lighting systems. This transition was expected to reduce electricity demand, lower GHG emissions and enhance national energy security. The project’s contribution is aligned with Expected Accomplishment (b) of UNEP’s Programme of Work, specifically supporting countries in adopting and implementing low-emission development strategies and clean technology investments.

71. The project addressed a pressing need in Bolivia, where inefficient lighting systems—particularly in public and residential sectors—contributed to high energy consumption and GHG emissions. This situation coupled with Bolivia’s reliance on subsidized electricity prices and aging grid infrastructure increased the importance of implementing initiatives promoting cost-effective energy efficiency solutions. Thus adoption of high-efficiency lighting technologies was included among other technologies as initiatives representing a strategic opportunity to strengthen national energy policy, reduce peak demand, and improve lighting quality and safety in municipalities across the country.

72. The initial implementation period was set at 36 months, with an operational completion target of 31 December 2021. However, due to a series of unforeseen events—including the political crisis of late 2019 and the COVID-19 pandemic throughout 2020—the project suffered repeated disruptions. These events explain a share of delayed administrative processes, disrupted stakeholder coordination, and ultimately led to a project extension through 31 December 2023. As of June 2024, the project entered its closure phase.

73. The project was implemented by UNEP acting as the GEF Implementing Agency, with the MHE and the MMAyA serving as national Executing Agencies. Within UNEP, the U4E initiative also provided technical support and policy guidance. The total budget included US\$ 3,059,361 in GEF grants and US\$ 13,467,575 in confirmed co-financing from national government partners and private stakeholders.

74. The project underwent a Mid-Term Review (MTR) near the end of its original timeframe. The present report contains the Terminal Evaluation (TE) which is the first full assessment of implementation performance, effectiveness, and sustainability of project results. The project has not been part of a broader synthesis evaluation or evaluated by other agencies

75. This evaluation was commissioned by UNEP’s Evaluation Office to assess the project’s relevance, effectiveness, efficiency, and likelihood of sustainability, while identifying achieved outcomes and impacts, both actual and potential. The evaluation also considers the integration of cross-cutting issues, including gender equality and environmental safeguards.

76. The intended audiences of this report include UNEP and GEF decision-makers, Bolivian government stakeholders, development partners, and other countries or institutions designing similar projects. The findings are expected to support organizational learning, inform future programming, and strengthen accountability for the use of GEF and co-financed resources.

2 EVALUATION METHODS

2.1 UNEP's Evaluation Approach

77. The project assessment methods are based on the criteria established by UNEP's Evaluation Office. The evaluation considered the degree to which the objectives and activities defined in the ProDoc were achieved or not achieved, and the reasons for any deviations. Moreover, the evaluation also identified lessons for their use in future projects on energy efficiency or LED-related initiatives. The analysis included a review of the project's alignment with the SDGs.

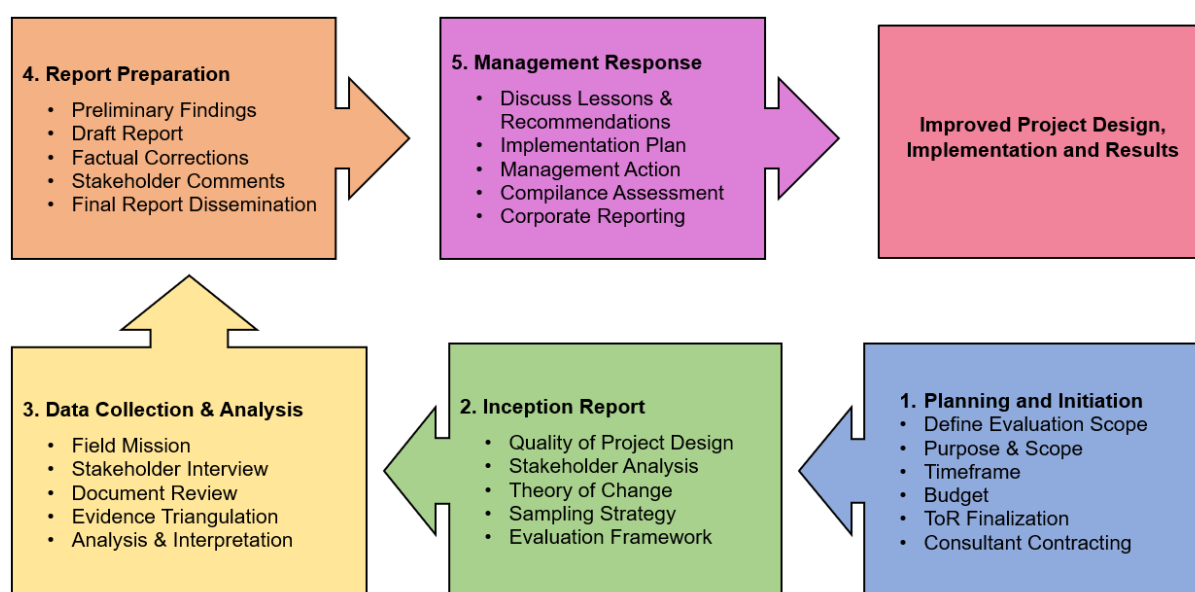
78. All evaluation criteria established under the UNEP Evaluation Policy, the UNEP Programme Manual, and the GEF Agencies' Guidelines are organized into nine categories: (A) Strategic Relevance, (B) Quality of Project Design, (C) Nature of the External Context, (D) Effectiveness, (E) Financial Management, (F) Efficiency, (G) Monitoring and Reporting, (H) Sustainability, and (I) Factors Affecting Project Performance.

79. These criteria are rated on a six-point scale as follows: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); and Highly Unsatisfactory (HU). Sustainability and Likelihood of Impact are rated on a scale from Highly Likely (HL) to Highly Unlikely (HU), while the external context is rated from Highly Favourable (HF) to Highly Unfavourable (HU). Each criterion is weighted to derive the Overall Project Performance Rating. The highest weight is assigned to achievement of results, followed by sustainability dimensions.

80. In addition to the nine evaluation criteria mentioned above, the TE addresses a set of strategic questions defined in the Terms of Reference. These questions were formulated by the evaluator in coordination with the UNEP Evaluation Office and members of the project team.

81. The project's Theory of Change (ToC) was reviewed and reconstructed to understand how the intended change was expected to be achieved through outputs and outcomes, leading to the stated impact. The ToC, supported by a graphical representation and a narrative discussion of causal pathways, was further discussed with respondents during the data collection phase and refined as appropriate. The following diagram presents the project evaluation process.

Figure 1: UNEP Evaluation Process



2.2 Data Collection

82. The evaluation was based on information gathered from field visits, interviews and documents provided by the project team (ProDoc, PIRs, PIF), as well as a broad set of technical deliverables produced under the project, which includes reports, guidelines, draft regulations, training materials, and planning tools, with a detailed breakdown available in the project's activity-based workplan. These activities sought to engage all relevant stakeholders and experts associated with the project. Participants in the meetings shared their insights regarding project design, implementation, benefits, challenges, and lessons learned.

83. The evaluation conducted an analysis, applying a critical review of the documentation to identify inconsistencies and assess project performance through consultations with the project team, authorities, and stakeholders.

2.2.1 Primary Data Collection

84. The evaluation mission provided first-hand insights into project implementation, its benefits for the country, the challenges encountered, areas for improvement, and lessons learned. It included interviews in the city of La Paz with officials from Bolivian government institutions involved in the project, including the MHE, MMAYa, MDP, IBMETRO, and IBNORCA, among others.

85. Field visits were also conducted in two out of six participant municipalities. The visits included municipalities of Warnes and La Guardia, located in the department of Santa Cruz, where pilot projects for LED-based public lighting had been implemented. These municipalities were selected based on several criteria, including the degree of progress in pilot implementation, territorial and institutional representativeness, and operational feasibility during the evaluation period.

86. La Guardia was one of the first municipalities to complete the installation of LED luminaires, which enabled the mission to observe the project's physical, operational, and social results directly. Although Warnes was not initially part of the pilot group, it was incorporated as an additional case due to its geographic proximity and the implementation of an efficient lighting initiative supported by the departmental government. Both municipalities reflect the urban and demographic features of intermediate Bolivian cities, allowing for the

extrapolation of certain implementation conditions to other parts of the country. Furthermore, the region's climatic conditions—particularly high humidity and temperature—provided a relevant setting to assess the technical performance of LED technology under demanding environmental conditions. Their geographic proximity facilitated logistics, and together they account for a total of 262 installed luminaires, gathering a substantial basis for the analysis of pilot outcomes.

87. Both municipalities offered adequate conditions for conducting in-person interviews, technical visits, and visual verification of installed equipment. Relevant municipal staff were available, which facilitated the collection of reliable and up-to-date information during the field mission. Although additional visits were initially planned for other municipalities—such as Patacamaya—these were not carried out due to logistical constraints.

88. Key informant interview guide was prepared for interviews with the project team and stakeholders to gather the necessary information, focusing on the following:

- Project design and stakeholder participation
- Project sustainability and applicability
- Achievement of project objectives
- Lessons learned and recommendations
- Difficulties and challenges

89. The interview guides included in the Terms of Reference provided a basis for the conversations; however, the level of detail was adapted depending on the interviewee's roles and perspectives on the project. For each interview, the purpose of the discussion and the type of information expected were explained. Following the interviews, additional communication was maintained via email to address any specific requests for clarification.

90. Interviewees' consent was considered. Initial contact was made by email, outlining the main topics to be discussed and proposing a tentative meeting time. If no response was received, UNEP's project team members were approached to seek support and facilitate contact.

Table 2: Evaluation Respondents and Field Visits

Target Respondents - Individuals			A. # people involved in project Total (M/F)	B.# people contacted Total (M/F)	Sample size (% B/A) ⁶	C. # people responded Total (M/F)	Response rate (% C/B) ⁷
Project Team	Project Team <i>(those with management responsibilities e.g. Project Management Unit)</i>	Implementing Agency	7 (M: 3/F: 4)	7 (M: 3/F: 4)	100%	7 (M: 3/F: 4)	100%
		Executing Agency/ies	10 (M: 9/F:1)	10 (M: 9/F:1)	100	9 (M: 8/F: 1)	90%
Beneficiaries	Direct Beneficiaries: (e.g. duty bearers, gatekeepers, training participants, etc.)		18 (M: 12/F: 6)	10 (M: 6/F: 4)	56%	10 (M: 6/F: 4)	100%
	Indirect Beneficiaries: (e.g. household members, civil society representatives, group members, etc.)		1 (M: 1/F: 0)	1 (M: 1/F: 0)	100%	1 (M: 1/F: 0)	100%
Target Respondents - Entities			A. # entities involved in project	B.# entities contacted	Sample size (% B/A) ⁸	C. # entities responded	Response rate (% C/B) ⁹
Partners	Project implementing/ executing partners (receiving project funds)		3	3	100%	3	100%
	Project collaborating/ contributing partners ¹⁰ (not receiving project fund)		5	3	60%	3	100%
Field Visits		Region / country / locality ¹¹	A.# of sites Involved	B.# sites visited	Sample Size (%B/A) ¹²		
		Bolivia	6	2	33.3 %		

2.2.2 Secondary Data Collection

91. The evaluation was based on a detailed review of secondary information sources provided by the project team and partner institutions in Bolivia. This documentation enabled the assessment of project design, implementation, and results from a documentary perspective, complementing the evidence collected through interviews and field visits.

92. The main documents reviewed included the Project Document (ProDoc), the Project Identification Form (PIF), the Project Cooperation Agreement (PCA), as well as updated versions of the logical framework and terms of reference for key consultancies. In addition, Project Implementation Reports (PIRs), quarterly progress reports, and records available on UNEP's institutional monitoring platforms—namely the Programme Information and Management System (PIMS) and the Integrated Planning, Management and Reporting (IPMR) tool—were reviewed.

⁶ Calculated as the percentage of people who were contacted out of the total number of people involved in the project.

⁷ Calculated as the percentage of people who responded out of the total number of people contacted.

⁸ Calculated as the percentage of entities who were contacted out of the total number of entities involved in the project.

⁹ Calculated as the percentage of entities who responded out of the total number of entities contacted.

¹⁰ Contributing partners may be providing resources as either cash or in-kind inputs (e.g. staff time, office space etc.).

¹¹ In case of a global project, the unit of analysis is 'region'. In case of a regional or multi-country project, the unit of analysis is 'country'. In case of a single country project, the unit of analysis is 'locality', which could refer to a city, town, village, etc.

¹² Calculated as the percentage of project sites in each region, country or locality that were visited out of the total number of project sites in those regions, countries, or localities.

93. Technical and administrative documents were also reviewed, including draft regulations (such as MEPS and MVE frameworks), internal reports on pilot activities, minutes from inter-institutional meetings, equipment inventories, and relevant institutional correspondence.

94. Additional documents produced during project execution with technical support from the U4E initiative were analyzed. These included tailored technical recommendations and regulatory proposals that informed the design of MEPS, monitoring, verification and enforcement frameworks, and environmentally sound end-of-life lamp disposal strategies. Notably, UNEP and U4E played an important role in keeping the project's registers and mitigating the institutional discontinuities caused by repeated changes in ministerial leadership. By producing technical guidance documents, draft policies, stakeholder briefings, and structured knowledge transfer tools, they ensured continuity in implementation and preserved institutional memory.

2.3 Data Analysis

95. The data analysis followed a mixed-methods approach, combining qualitative and quantitative methods to assess project performance against the nine evaluation criteria established by the UNEP Evaluation Office. Evidence collected from primary sources (interviews, field visits, and direct observation) and secondary sources (technical and administrative documentation) was systematically triangulated to ensure consistency, reliability, and validity of the findings.

96. For qualitative information, thematic coding techniques were applied to identify recurring patterns, explanatory factors, and relevant deviations from the original project design. Interview transcripts were analyzed using categories aligned with the evaluation criteria (relevance, effectiveness, sustainability, etc.), incorporating perspectives disaggregated by stakeholder type (implementers, institutional partners, local beneficiaries).

97. Quantitative data were drawn primarily from PIRs, financial monitoring records, and technical logs related to procurement, lighting installation, and participation in training activities. These data were used to calculate component-level progress, indicator achievement rates, and the efficiency of expenditure relative to the approved budget.

98. In cases where discrepancies arose between documentary sources and field testimony, an analytical triangulation approach was applied to verify data and determine the most robust interpretation, giving precedence to convergent evidence across sources. The project's ToC was reconstructed to support the causal analysis between outputs, intermediate outcomes, and intended impacts.

99. A rating matrix was applied based on UNEP's standard six-point scale, with differentiated weighting by criterion, to assign an overall project performance rating. This matrix integrates both qualitative and quantitative evidence and underpins the evaluative judgments presented in the following chapters.

3 THE PROJECT

3.1 Context

100. Bolivia's energy sector relies heavily on fossil fuels, with natural gas playing a central role in electricity generation. Despite being a major gas producer, Bolivia remains a net oil importer, with domestic gas production falling short of demand. In 2012, 70% of the country's electricity came from fossil fuels, with hydropower contributing 30% and variable renewables providing less than 1%. Energy access disparities persist, with 90% electrification in urban areas but only 51% in rural regions¹³. Without a transition to renewable energy and efficiency measures, Bolivia risks failing to meet future electricity demand under its current generation capacity.

101. To address growing electricity demand, the government has promoted energy efficiency improvements as a relevant area of work in the last 15 years. The replacement of inefficient lighting represents a significant opportunity to reduce energy consumption. From 2008 to 2009, 6.6 million compact fluorescent lamps (CFLs) were distributed, increasing market penetration and reducing energy use. This program was followed by a second phase (2011-12) in which about 10 million lamps were distributed. However, economic constraints remain a barrier, as incandescent bulbs are cheaper upfront than high-quality CFLs, influencing consumer decisions. The government implemented policies aimed at phasing out incandescent imports and included tax increments on inefficient lamps and reductions for efficient models, yet price disparities persist, limiting market transformation.

102. Consumer awareness and product quality regulation emerged as additional challenges. While CFLs became widely available, consumers lacked information on efficiency, performance, and lifespan. The absence of binding technical guidelines, standardized labelling and testing facilities hindered the final users ability to differentiate between high and low-quality products, affecting long-term sustainability. Regulatory measures sought to enforce quality standards, requiring efficiency ratings on CFL packaging to guide consumer choices and establish MEPS to eliminate inefficient products.

103. Beyond energy efficiency, environmental risks linked to mercury in CFLs necessitated waste management policies. Improper disposal of spent lamps posed health hazards and water contamination risks. The MMAyA developed regulatory measures to control mercury emissions, but Bolivia lacked a comprehensive disposal system, exacerbating environmental concerns. Without structured waste management, the shift to efficient lighting could inadvertently create new pollution challenges.

104. The introduction of LED lighting offers higher efficiency and longer lifespans while eliminating the use of toxic materials resulting in hazardous waste. The widespread adoption of LEDs across residential, commercial, industrial, and public lighting sectors could cut annual carbon dioxide (CO₂) emissions by 145,000 tons, reduce electricity consumption by 359 GWh, and generate US\$ 26 million in annual savings¹⁴. However, achieving this transition requires institutional capacity building, stronger enforcement of efficiency standards, and financial mechanisms to mitigate high initial costs for consumers.

105. Previous government-led energy efficiency programs, including lamp replacement campaigns and awareness initiatives, achieved partial success but fell short of driving a market-wide transformation. Limited institutional capacity, particularly within the MHE and

¹³ Ministry of Hydrocarbons and Energy (MHE). (2012). *National Energy Statistics Report*. La Paz, Bolivia.

¹⁴ Inter-American Development Bank (IDB). (2016). *Cost-Benefit Analysis: Bolivia Efficient Lighting Project (BO-L1222)*. Washington, D.C.

MMAyA, restricted the development of long-term policies on lighting efficiency and hazardous waste management. Persistent challenges include weak regulatory enforcement, insufficient testing facilities, and limited public awareness of cost savings associated with energy-efficient lighting. Addressing these barriers is critical to ensuring the sustainability of Bolivia's energy transition.

3.2 Results Framework

106. The “Delivering the transition to energy-efficient lighting” project was aimed at accelerating the transition to energy efficient lighting technologies in Bolivia through the development of a national efficient lighting policy and innovative implementation activities that ensure success of the transition, thereby reducing electricity demand, consumption and GHG emissions. Each of the four project components below outlines its specific results, which are further detailed into deliverables to be achieved through the execution of corresponding project activities:

3.2.1 Component 1: National policy and regulation development to promote the rapid transition to efficient lighting.

107. Outcome 1.1. National efficient lighting strategy employing the integrated policy approach to phasing out inefficient incandescent lamps endorsed, with the following outputs:

- Output 1.1.1. Comprehensive policies to ensure a successful transition to an efficient lighting market to support Bolivia in its efforts, and standards and labelling activities harmonized regionally to achieve maximum lighting market transformation developed.
- Output 1.1.2. National legislation to establish and enforce minimum energy performance standards (MEPS) for lamps developed.
- Output 1.1.3. Monitoring, verification and enforcement (MVE) frameworks created to ensure compliance.
- Output 1.1.4. Enabling regulatory environment and legal frameworks in place, to ensure environmentally sound life-cycle management of lamps.
- Output 1.1.5. Public communications and awareness raising activities designed to increase public acceptance of high efficiency products, with an understanding of economic and environmental benefits.

3.2.2 Component 2: Creation of monitoring, verification and enforcement (MVE) capacities to ensure effective transition to efficient lighting.

108. Outcome 2.1. Capacities to Monitor, Verify and Enforce energy efficient lighting products are created in Bolivia, this is divided into three outputs:

- Output 2.1.1. Legal and administrative processes of monitoring, verification and enforcement to improve compliance with national or regional standards developed.
- Output 2.1.2. Technical training and support to government authorities and customs administrations delivered.
- Output 2.1.3. Technical training and support to national laboratories to verify compliance with standards and promote regional cooperation provided.

3.2.3 Component 3: Ensuring environmentally sound management for a sustainable transition to efficient lighting.

109. Outcome 3.1. Government of Bolivia is able to enact a national plan to collect, recycle and/or responsibly dispose of spent lighting products that may contain valuable and/or hazardous materials, it breaks down into the following four proposed outputs:

- Output 3.1.1. National framework and strategy for environmentally sound management of lighting products developed.
- Output 3.1.2: Operational management pilot for disused lamps.
- Output 3.1.3. Technical training and support to government authorities and customs administrations.
- Output 3.1.4. Awareness raising and communication campaigns to promote collection and recycling of spent lamps carried out.
- Output 3.1.5. Waste management systems for spent lamps, including the design of a collection and recycling service organization (CRSO), and international coordination for the environmentally sound export/import of lamp waste developed.

3.2.4 Component 4: Lighting innovation: accelerating the use of Solid-State Lighting (including light emitting diodes (LEDs)) and controls.

110. Outcome 4.1. Consensus reached by consumers and decision makers in government and private sector on the increased use of solid-state lighting and lighting controls in the domestic, commercial/industrial and outdoor lighting applications, this is divided into three outputs:

- Output 4.1.1. National efficient lighting strategy with more stringent MEPS, taking into account advanced lighting technologies and systems, further developed.
- Output 4.1.2. Supporting policies delivered to increase user acceptance and demand for high efficiency products and systems.
- Output 4.1.3. MVE scheme to ensure high quality products that will deliver the expected energy saving and GHG emission reduction benefits developed.

111. Outcome 4.2. Municipal governments made aware of the benefits of advanced lighting systems through demonstration programs of locally appropriate street lighting LEDs and controls, it breaks down into the following outputs:

- Output 4.2.1. Demonstration program for locally appropriate LEDs and lighting controls for Bolivia's selected stakeholder groups (i.e. public lighting consumers) designed and delivered.
- Output 4.2.2. LED and controls systems procured and installed through the demonstration program.
- Output 4.2.3. Gender mainstreaming in Outputs 4.2.1 and 4.2.2 conducted.

3.3 Stakeholders

112. The Bolivian government led project execution through key institutions. The MHE formulated regulations to advance energy efficiency, while IBNORCA developed technical standards. The MDPyEP approved regulations, and IBMETRO conducted product testing and verified compliance with declared energy performance. The MMAyA managed waste disposal policies and implemented mercury emission controls for replaced fluorescent lamps. The National Customs of Bolivia (ANB) and the Electricity and Nuclear Technology Oversight Authority (AETN) monitored regulatory compliance, though their role in project design and implementation were minimal. Despite its regulatory mandate, the MDPyEP did not engage in the project's initial stages.

113. International organizations provided technical and financial oversight. UNEP's Climate Mitigation Unit served as the project's implementing entity, supervising execution for the GEF. AS part of UNEP's team U4E advised the Bolivian government on MEPS and MVE mechanisms incorporated into national regulations.

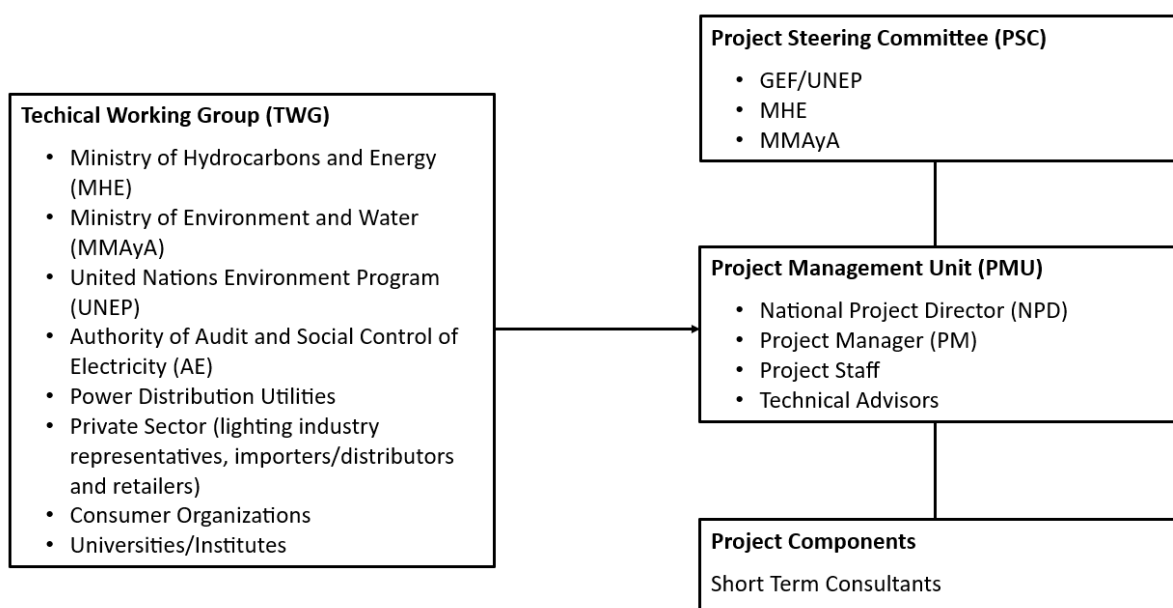
114. Private sector engagement was limited. Although not included in the original project documentation, the company Smart Services contributed by collecting data on public lighting in the Municipality of Padcaya, which was among the ten municipalities initially selected for the implementation of pilot projects. Of these ten, only six projects were ultimately implemented. Philips was identified as a co-financier in project documentation, but no official reports confirm its involvement. Municipalities were the primary beneficiaries of Component 4, receiving LED street lighting installations and providing personnel for implementation. The beneficiary municipalities included Guayaramerín, La Guardia, Warnes, San Javier, Yapacaní and Patacamaya.

3.4 Project Implementation Structure and Partners

115. UNEP oversaw the project execution to ensure compliance with GEF and internal UNEP project management policies. UNEP's Climate Mitigation Unit managed project reporting, technical reviews, and periodic evaluations while providing technical support as needed. MHE acted as the GEF Executing Agency, responsible for achieving project objectives, monitoring progress, and coordinating stakeholders. MHE also managed resource allocation, financial oversight, and engagement with national entities. The MMAyA was Bolivia's GEF operational focal point. Within MHE, the National Project Director (NPD) led project execution, while the Project Steering Committee (PSC) served as the highest decision-making body, guiding technical progress and ensuring alignment with national policies. The PSC met annually, with additional follow up meetings when necessary.

116. The Project Management Unit (PMU), under the NPD, handled daily operations, financial administration, and reporting to UNEP and MHE. The GEF-funded Project Manager (PM) led implementation, supported by technical advisors and administrative staff. MMAyA led Component 3, managing environmentally sustainable lighting waste disposal through PRONACOP, under its Vice Ministry of Environment, Biodiversity, Climate Change, and Forestry Development. The General Directorate for Integrated Solid Waste Management (DGGIRS) was responsible for regulatory enforcement. The Technical Working Group (TWG) provided specialized guidance on regulatory frameworks, market supervision, and waste management strategies, ensuring policy effectiveness and institutional coordination.

Figure 2: Organigram of the Project with key project key stakeholders



3.5 Changes in Design during Implementation

117. Several key changes were made to the project framework during implementation. Outcome 4.1 was eliminated, as no consensus was reached on increasing solid-state lighting use. Some outputs were reassigned, including integrating monitoring, verification, and enforcement (MVE) within MEPS's regulations. Additionally, a pilot on waste management for disused lamps was introduced in a second project revision. Outcome 4.2 was reformulated, emphasizing practical demonstration programs for LED street lighting and municipal engagement.

118. The regulatory framework for LED lighting faced repeated technical and legal reviews. Other project components failed to achieve significant progress, leading to extended deadlines across all activities. The project design had flaws in the legal attributions that affected implementation, and it might have benefited from design changes that were discussed but never materialized. Specifically, the MHE assumed responsibilities beyond its mandate in Component 2. While this ministry helped define MEPS, their enforcement fell under the MDPyEP.

3.6 Project Financing

119. This section presents the project's financial contributions from GEF and the Government. Table 3 below provides information about the GEF financing (extracted from the Quarterly Expenditure Reports as of December 21, 2023) while Table 4 summarizes project co-financing from the Government ministries and local governments involved, based on the annual co-financing reports.

Table 3: Expenditure by Outcome

Expected Outcomes	Estimated cost at design	Actual Cost/ expenditure	Expenditure Ratio
Outcome 1.1: National efficient lighting strategy employing the integrated policy approach to phasing out inefficient incandescent lamps endorsed.	274,510	181,521.06	66.1%
Outcome 2.1: Capacities to Monitor, Verify and Enforce energy efficient lighting products are created in Bolivia.	868,752	352,605.59	40.6%
Outcome 3.1: Government of Bolivia is able to enact a national plan to collect, recycle and/or responsibly dispose of spent lighting products that may contain valuable and/or hazardous materials.	945,780	611,576	64.7%
OUTCOME 4.1: Consensus reached by consumers and decision makers in government and private sector on the increased use of solid-state lighting and lighting controls in the domestic, commercial/industrial and outdoor lighting applications.	820,319	517,277.36	63.1%
OUTCOME 4.2: Municipal governments made aware of the benefits of advanced lighting systems through demonstration programs of locally appropriate street lighting LEDs and controls.			
Sub Total	2,909,361	1,662,980.01	57.2%
Project Management Cost (PMC)	150,000	141,416.36	94.3%
Total project costs	3,059,361	1,804,396.37	59.0%

120. Co-financing exceeded expectations. Despite the withdrawal of some initial partners, the project secured USD 16,995,547 against a planned USD 13,465,575. The main contributors were the Government of Bolivia, through the MHE, along with other national entities and public institutions. Most contributions were in-kind and concentrated in the final years of implementation. The following tables have been populated using financial information available as of May 2025:

Table 4: Actual Co-financing Sources

Sources of Co-financing	Name of Co-financier (source)	Actual Co-financing Amount (US \$)
National Government	Ministry of Hydrocarbons and Energy	65,700
	Electricity for Living with Dignity Program - PEVD	5,926,206
	Ministry of Environment and Water	10,979,881
Regional and Local Governments	Municipality of Patacamaya	20,977
	Municipality of Sacaba	2,375
	Department of Cochabamba	408
Total Co-financing		16,995,547

4 THEORY OF CHANGE AT EVALUATION

121. The evaluation of the project's ToC involved a review of the logical framework in the ProDoc, along with interviews, site visits, and project revisions made during implementation. The ToC at Evaluation was reconstructed to clarify causal pathways, refine the articulation of expected results, and align with UNEP's definitions of outputs, outcomes, and impact.

122. The adjustments made were not intended to alter the project's fundamental objectives but rather to improve clarity, reinforce logical connections, and ensure consistency with UNEP's results framework. In some cases, project outputs were revised to better reflect the activities undertaken and their expected contribution to higher-level outcomes. For example, the promotion of energy-efficient lighting was reformulated to emphasize the transformation of the lighting market across residential, industrial, commercial, and public sectors. On the other hand, the initial proposal to develop an energy efficiency law was adjusted to focus on the establishment of regulatory frameworks and standards, given that changes in legislation require longer timelines and depend on external political processes.

123. Similarly, certain outputs related to MEPS were partially integrated, as the drafts regulations included legal provisions concerning MVE procedures. In this case, while the regulatory intent was clear, the institutional framework required to operationalize these mechanisms remained incomplete at the time of project closure, and no formal MVE systems were fully implemented.

124. For waste management, an opportunity was identified to expand the project's impact in this area. As a result, the approach to waste management was restructured, leading to the addition of outputs related to broader regulations on electrical and electronic waste management.

125. Other modifications also included outcomes related to added or adjusted outputs. The outcome related to waste collection was re-worded to explicitly state that the government was enabled to enact a national plan for the collection and management of discarded lighting products. Similarly, the outcome initially framed as an awareness-raising effort was revised to focus on measurable actions supporting municipal-level energy efficiency initiatives. These adjustments sought to reframe awareness not as an outcome but as an enabling factor for broader institutional and behavioural change.

126. The reconstruction of the ToC also identified the refinement of intermediate results to strengthen their logical alignment with project activities and long-term impacts. In particular, the expected reduction in electricity costs for consumers was reframed to emphasize the reduction of power consumption as the primary effect, while financial savings were treated as a secondary consequence. Another modification addressed the expected GHG emissions, ensuring that projected emissions reductions were realistic with observed implementation patterns.

127. Several drivers were identified as essential to supporting the project's causal pathways. One of the most important was market awareness of the energy efficiency benefits, which was not solely dependent on pilot projects but could also be promoted through workshops, informational sessions, and media campaigns. Another critical driver was the institutional capacity to enforce regulatory frameworks, ensuring that market transformation was sustained beyond the project's duration. Political will was also identified as a determinant of the project's success, particularly in the integration of binding standards into national policies.

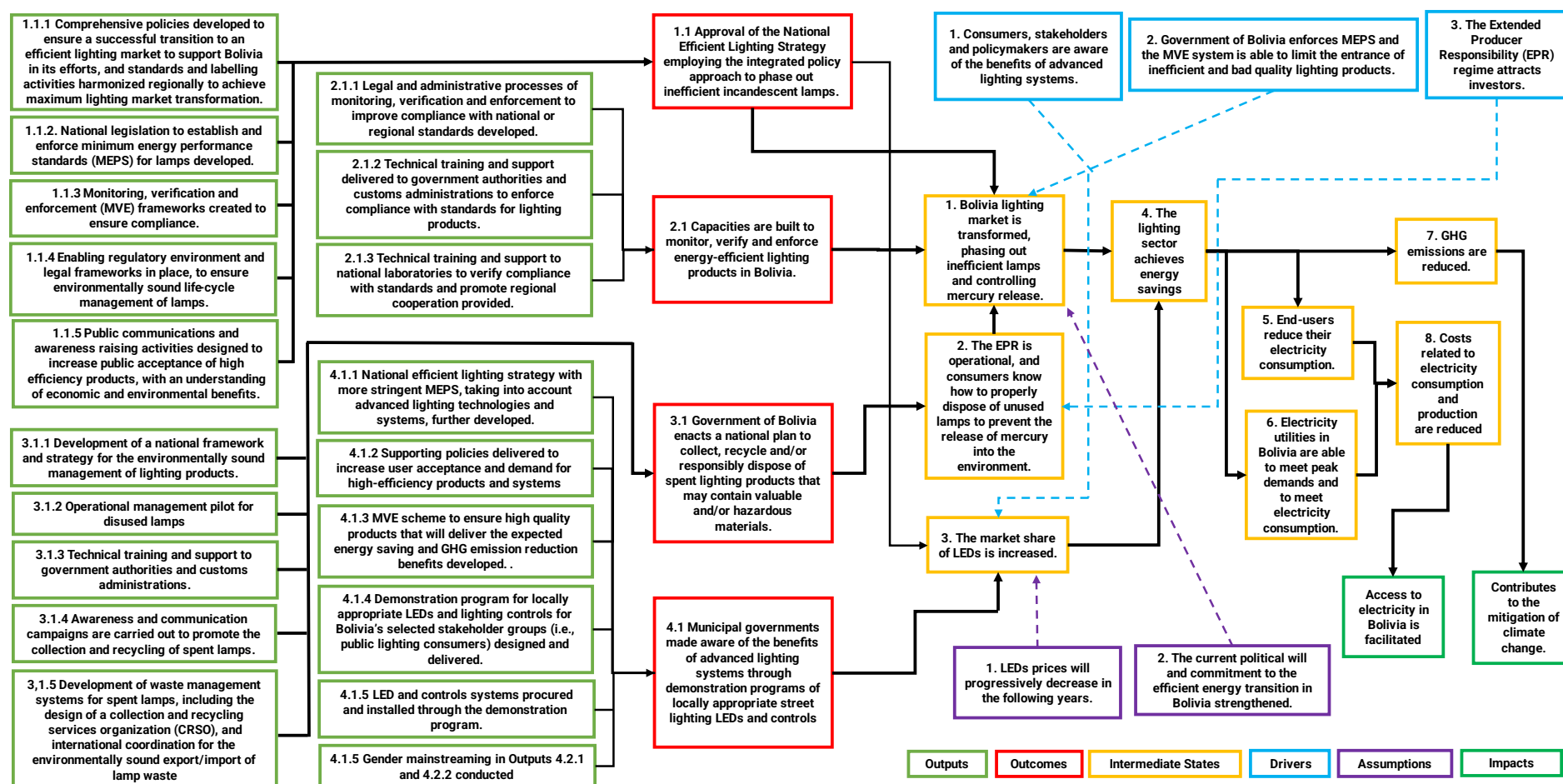
128. Certain assumptions underlying the ToC were adjusted at evaluation. The assumption that LED lamp prices would decrease over time was revised to reflect the influence of market dynamics, public awareness, and government initiatives aimed at promoting domestic production and procurement. Another key assumption regarding political commitment was refined to clarify that governmental support for energy transition should extend beyond the project's implementation period.

129. The reconstructed ToC also highlighted other cross-cutting insights. One of the main findings was that the original results framework did not clearly differentiate between regulatory outputs and behavioural change outcomes, leading to adjustments to align with UNEP's definitions. Additionally, the evaluation highlighted the need to explicitly integrate gender equality and social inclusion within the ToC. Since there was no dedicated result for this issue in the original framework, gender-sensitive awareness campaigns were incorporated into municipal outreach activities as a general driver. Another key insight was that the emphasis on cost savings as a primary driver, with the revised ToC prioritizing reductions in electricity consumption as part of core impacts. Finally, the impact statement related to climate change mitigation was refined to reflect the project's contribution within a broader decarbonization strategy rather than as an isolated outcome. Table 5 summarizes the justification for the reformulation of results statements.

Table 5: Justification for Reformulation of Results Statements

	Project Document (ProDoc) / Logical Framework	Formulation for Reconstructed ToC at Evaluation (RToC)	Justification for Reformulation
Output	2.1.2 Technical training and support to government authorities and customs administrations delivered.	2.1.2 Technical training and support delivered to government authorities and customs administrations to enforce compliance with standards for lighting products.	Improved wording to make the training objective clearer.
Project Outcome 3.1	Government of Bolivia is able to enact a national plan to collect, recycle and/or responsibly dispose of spent lighting products that may contain valuable and/or hazardous materials.	Government of Bolivia enacts a national plan to collect, recycle and/or responsibly dispose of spent lighting products that many contain valuable and/or hazardous materials.	To avoid confusion with the language at the result level, the behaviour should be “enact”, so the result would change from “Government of Bolivia is able to enact a national plan to collect...” to “Government of Bolivia enacts a national plan to collect...”.
Drivers	Demonstration programs are successful, and consumer, stakeholders, and policymakers are aware of the benefits of advanced lighting systems.	1. Consumers, stakeholders and policymakers are aware of the benefits of advanced lighting systems.	Information can be disseminated through awareness campaigns. Number 1 added.
	Government of Bolivia enforces MEPS and the MVE system is able to limit the entrance of inefficient and bad quality lighting products.	2. Government of Bolivia enforces MEPS and the MVE system is able to limit the entrance of inefficient and bad quality lighting products.	Number 2 added.
	The designed CRSO business model attracts investors.	3. The Extended Producer Responsibility (EPR) regime attracts investors.	The wording has been changed to include the ERP. Number 3 added.
Assumptions	LEDs prices will progressively decrease in the following 5-10 years.	1. LEDs prices will progressively decrease in the following years.	Prices decrease over the years as product competition increases. Number 1 added.
	The current political will and commitment to the project in Bolivia is stable or strengthened.	2. The current political will and commitment to the efficient energy transition in Bolivia strengthened.	Political will must increase to achieve energy efficiency. Number 2 added.
Intermediate States (IS)	Bolivia lighting market is transformed, phasing out inefficient lamps and controlling mercury release.	1. Bolivia lighting market is transformed, phasing out inefficient lamps and controlling mercury release.	Number 1 added.
	CRSO are operational to avoid mercury release in the environment.	2. The EPR is operational, and consumers know how to properly dispose of unused lamps to prevent the release of mercury into the environment.	The wording has been changed to include the ERP. It is important to consider training consumers on proper management of unused lamps. Number 2 added.
	End-users reduce their electricity bills	5. End-users reduce their electricity consumption.	The writing has been improved. Number 5 added.
	GHG emissions are avoided	7. GHG emissions are reduced.	Emissions will be reduced but not completely avoided. Number 7 added.

Figure 3: Reconstructed Theory of Change Diagram



4.1 Causal pathways from Outputs to Outcomes

130. As shown in the reconstructed ToC (RToC) diagram (Figure 3), Outcome 1.1.1 states: “Comprehensive policies were developed to ensure a successful transition to an efficient lighting market to support Bolivia in its efforts, and regionally harmonized standards and labelling activities to achieve maximum transformation of the domestic, industrial, commercial, and public lighting market.” This outcome directly results from Outputs 1.1.1, 1.1.2, and 1.1.3, which involved policy development and regulatory frameworks to facilitate the transition to an efficient energy market. It also included the establishment of MEPS for residential lighting and streetlights, along with a MVE system to ensure regulatory compliance and energy performance. Additionally, this outcome required awareness-raising activities targeting local communities and authorities through workshops, media, and network events to highlight the benefits of efficient lighting.

131. For Outcome 2.1, “Capacities to Monitor, Verify, and Enforce energy-efficient lighting products are created in Bolivia,” Outputs 2.1.1 focused on the enabling conditions for energy efficiency standards compliance; while Outputs 2.1.2 and 2.1.3 were directed to training personnel from institutions responsible for energy regulations and customs enforcement to ensure compliance with MEPS requirements for lighting products. At the most technical level, Output 2.1.3, included training for laboratory staff at IBMETRO to improve their ability to use equipment that was expected to be procured, to verify product compliance with regulatory parameters and the manufacturer’s stated performance product labels. Before the project IBMETRO’s laboratory was already equipped to conduct voluntary testing on some lighting technologies for residential purposes.

132. Achieving Outcome 3.1 “The Government of Bolivia enacts a national plan to collect, recycle, and/or responsibly dispose of spent lighting products that may contain valuable and/or hazardous materials,” required implementing the related outputs (3.1.1 to 3.1.5). These covered the development of a national strategy for managing hazardous lighting waste, training authorities, retailers, and waste collection companies, and raising public awareness on proper disposal practices. Additionally, the outcome involved establishing a collection service system, coordinating with national firms responsible for processing these materials, and designing an Extended Producer Responsibility (EPR) framework.

133. Outcome 4.1, “Demonstration program for locally appropriate LEDs and lighting controls for Bolivia’s selected stakeholder groups (i.e., public lighting consumers) designed and delivered,” considered the development of Outputs 4.1.1 to 4.1.3. Output 4.1.1 supported the necessary regulatory foundation for adopting MEPS. Complementary supporting policies under Output 4.1.2 helped align consumer preferences with these policy objectives; while Output 4.1.3 strengthened the MEPS impact chain by integrating a MVE system, ensuring their effectiveness.

134. Outcome 4.2, “Municipal governments made aware of the benefits of advanced lighting systems through demonstration programs of locally appropriate street lighting LEDs and controls,” considered the development of Output 4.2.1 which enabled the design and delivery of demonstration programs showcasing LED and lighting control solutions suited to local contexts. These include pilot projects in six selected municipalities for the installation of LED systems and controls. Output 4.2.2 facilitated the procurement and installation of these systems, allowing stakeholders to assess performance in real-life conditions. Last, Output 4.2.3 integrated gender considerations into the design and implementation of the demonstration and installation activities, promoting inclusive participation of diverse user groups.

4.2 Causal pathways from Outcomes to Intermediate Results

135. Intermediate Result 1, “Bolivia lighting market is transformed, phasing out inefficient lamps and controlling mercury release” required the full implementation of all objectives and activities under Outcomes 1.1 and 2.1. This included the development of a national strategy for efficient lighting to phase out incandescent lamps and the establishment of an MVE system to enforce MEPS regulations for both domestic and public lighting products. It was expected that political commitment from the Bolivian government would increase to support the transition to efficient lighting. A key factor was the government's capacity to ensure MEPS compliance for imported and domestic lighting products through the MVE system.

136. Intermediate Result 2, “The EPR is operational and consumers know how to properly dispose of unused lamps to prevent the release of mercury into the environment” required the full implementation of Outcome 3.1. This involved the development of a national plan by the Bolivian government and have an active value chain ensuring the proper management of lighting product waste. A key factor was building the entire value chain with relevant stakeholders and mobilizing investments to consolidate the EPR system.

137. Intermediate Result 3, “The market share of LEDs is increased,” required the full implementation of Outputs 1.1 and 4.1. These involved the development of a national strategy for efficient lighting and the implementation of pilot projects that enabled municipalities to become familiar with these technologies. It was assumed that LED lamp prices would progressively decrease. The key drivers included the learning gained during the implementation of the pilot projects, the execution of necessary corrective actions to ensure their successful operation, and the assessment of the benefits of an improved lighting system for the population, the municipality, and the environment serving as a reference for replication and for the development of larger-scale initiatives.

138. Intermediate Result 4, “The lighting sector achieves energy savings,” and Intermediate Result 7 “GHG emissions are reduced” depended mainly on the completion of Intermediate Results 1 and 3, which involved transforming the lighting market, and increasing LED adoption. Since these results directly affected Intermediate Results 5, and 6, achieving the expected energy savings and reduction on associated GHG emissions was essential for enabling further progress.

139. Intermediate Results 5 and 6 influenced Intermediate Result 8, “Costs related to electricity consumption and production are reduced.” This required a decline in electricity consumption among users and the ability of energy providers to meet both peak demand and overall consumption efficiently. Improved capacity to manage demand and supply not only reduced operational pressures but also contributed to lowering production costs for utilities.

4.3 Causal pathways from Intermediate Results to Impacts

The expected project impacts, “Contributes to the mitigation of climate change” and “Access to electricity in Bolivia is facilitated,” are linked to Intermediate Result 7 and 5. The first impact requires a reduction in GHG emissions from energy production (Intermediate Result 7), driven by the implementation of policies under the national efficient lighting plan. The second impact depends on lowering electricity consumption (Intermediate Result 5), which should result from the adoption of more energy-efficient technologies. When more efficient technologies are adopted, they allow a greater number of end-uses in the residential and municipal sectors for the same level of consumption. This efficiency gain expands the effective availability of electricity without requiring additional generation capacity, reduces strain on the grid during peak hours, improves service reliability, and enables the extension of access to underserved areas.

5 EVALUATION FINDINGS

5.1 Strategic Relevance

5.1.1 Alignment to UNEP MTS, POW and Strategic Priorities

140. The project aligns with UNEP's Medium-Term Strategy (MTS) 2014–2017, which was in effect at the time of its design. Among the six priority areas of the MTS, the project corresponds to two, each linked to specific objectives set by UNEP:

- **Climate Change:** Countries are expected to progress toward low-emission economic development while strengthening resilience and adaptation to climate change. This priority area aligns with the following SDGs: No Poverty (1), Affordable and Clean Energy (7), Climate Action (13), and Life on Land (15).
- **Chemicals and Waste:** The sound management of chemicals and waste, along with improvements in air quality, is essential for a healthier environment and public well-being. This priority area aligns with the following SDGs: Good Health and Well-being (3), Clean Water and Sanitation (6), Affordable and Clean Energy (7), Sustainable Cities and Communities (11), and Responsible Consumption and Production (12).

141. The project aimed to achieve these energy and environmental objectives through UNEP's Work Programme 2016-2017, leveraging UNEP's expertise and capacities. U4E experts supported Bolivia's transition to energy-efficient lighting by contributing to MEPS regulations, MVE frameworks, and environmentally sound waste management, aligning with U4E's pillars on policy, monitoring, and sustainable disposal. They strengthened IBMETRO's capacity for compliance verification and assisted in selecting equipment for testing lighting efficiency, reinforcing national enforcement mechanisms and ensuring high-performance products in public and private sector applications.

Rating for Alignment to UNEP MTS, POW and Strategic Priorities: Highly Satisfactory

5.1.2 Alignment to UNEP/GEF/Donor Strategic Priorities

142. The project aligns with donor priorities as it supports Objective 1 of the Climate Change Focal Area (CCM-1) under GEF-5, which focuses on promoting, demonstrating, implementing, and transferring low-carbon technologies. It advances this goal by promoting high-efficiency lighting, such as LED lamps and controls.

143. The project also supports Objective 2 of the Climate Change Focal Area (CCM-2), as lighting is an energy-consuming appliance across all buildings and sectors. Additionally, it contributes to the objective of the Chemicals Strategy (CHEM-3) by addressing issues related to the improper disposal of end-of-life lamps and the recovery of mercury from compact fluorescent lamps and other mercury-containing lighting products.

Rating for Alignment to UNEP/GEF/Donor Strategic Priorities: Highly Satisfactory

5.1.3 Relevance to Global, Regional, Sub-regional and National Priorities

144. The project aligns with global, regional, and national strategies. At the global level, it supports the Agenda 2030 and the Paris Agreement by targeting GHG reductions. By promoting energy-efficient lighting, it contributes to global efforts to enhance energy efficiency, reinforcing commitments to limit global warming.

145. Regarding reducing mercury pollution, the project aligns with Bolivia's commitments under the Minamata Convention on Mercury—signed by the country on October 10, 2013 and

later ratified—, which is an international treaty aimed at protecting human health and the environment from anthropogenic mercury emissions and releases.

146. At the regional level, the project supports the Regional Energy Pacts promoted by the Economic Commission for Latin America and the Caribbean (ECLAC), which aim to ensure universal electricity access, promote renewable energy use, and enhance energy efficiency.

147. At the national level, the project supports Bolivia's National Economic and Social Development Plan (PDES) 2021-2025, particularly Objectives 9 and 10:

- Objective 9: Ensure universal access to energy and promote energy efficiency. The transition to efficient lighting directly contributes by reducing energy consumption and improving access to reliable energy services.
- Objective 10: Mitigate climate change impacts and promote integrated natural resource management. Efficient lighting lowers GHG emissions, supporting national climate mitigation efforts.

Rating for Relevance to Global, Regional, Sub-regional and National Priorities: Highly Satisfactory

5.1.4 Complementarity with Existing Interventions/ Coherence

148. At the national level, collaboration with institutions such as IBNORCA the Bolivian Institute responsible for technical [standardization and quality certification](#) further enhances this complementarity by promoting the adoption of internationally recognized measurement procedures as Bolivian technical standards.

149. The project complements existing initiatives in Bolivia, including the Enhance Energy Efficiency of Street Lighting Systems supported by the Inter-American Development Bank (IADB or IDB). This program, approved in 2024, is a US\$ 35 million loan to Bolivia to make the country's public lighting systems more energy efficient adopting technologies, such as LED lighting. Municipal governments will also benefit from training for their technical personnel and an estimated 50% cost savings in public lighting services from lower electricity consumption and operating costs.

150. In addition to aligning with IDB-led initiatives, the project is also complementary to other UNEP Climate Action efforts designed to promote energy efficiency, particularly in lighting. Examples include "Community Light Centers" in Africa and Latin America, "Efficient Lighting and Micro Enterprise Creation for Nigerian BOP," and the "Lighting Manyattas Initiative" in Kenya. This strong alignment was recognized in the Mid-Term Review, which rated complementarity with existing interventions as "Highly Satisfactory."

151. Importantly, the project builds upon the UNEP-GEF en.lighten Global Partnership, which laid the foundation for advancing energy-efficient lighting at the global level. It adopted the integrated policy approach developed and currently implemented under the U4E initiative. This ensured alignment with international best practices and allowed the use of established technical guidance and implementation tools. The approach also contributed the harmonization of standards and labelling schemes across Latin America, facilitating regional market transformation for lighting products.

Rating for Complementarity with Existing Interventions/Coherence: Highly Satisfactory

Rating for Strategic Relevance: Highly Satisfactory

5.2 Quality of Project Design

152. The project design was rated as Moderately Satisfactory (MS). While it demonstrates strengths in terms of strategic alignment and formal structure, it presents significant weaknesses in its intervention logic, institutional clarity, and results articulation, which affected its internal coherence and technical feasibility from the outset.

5.2.1 Design strengths:

153. The project is strongly aligned with UNEP's mandates and with the GEF focal areas on climate change and chemicals. It also reflects Bolivia's national priorities, including the Economic and Social Development Plan (PDES), the energy efficiency goals of the MHE, and the country's commitments under the Minamata Convention.

154. It builds on the methodological frameworks of U4E which provide a solid technical basis for the development of standards, regulations, and monitoring schemes in the lighting sector.

155. The ProDoc presents a structured breakdown of components, outputs, and activities, supported by a logical framework matrix with outcome indicators, a preliminary risk analysis, and a communication strategy.

5.2.2 Design weaknesses:

156. The causal logic contains ambiguities at multiple levels. Some outcomes are formulated as potential capacities rather than verifiable actions (e.g., "is able to enact"), and there is weak linkage between some of the outputs, intermediate outcomes, and impact.

157. There are overlaps and fragmentation in the distribution of outputs across components. For example, training and monitoring activities are spread across different outcomes without a clear hierarchy, which complicates tracking.

158. The design does not clearly define institutional roles in the development, approval, and enforcement of MEPS regulations. Although responsibilities are assigned to the MHE, MDPyEP and the customs authority—both critical for regulatory enforcement and product control at the border—were not involved from the outset.

159. The section on environmental and social safeguards lacked the operational instruments needed to translate safeguard commitments into effective action. While the project complied with the standard documentation requirements of GEF-funded initiatives, no operational strategy at municipal level was developed for the safe handling and disposal of mercury-containing lamps, despite their environmental and health risks. Likewise, no regulatory framework was foreseen to implement the EPR system. In the absence of institutional arrangements, enforcement mechanisms, and a clear implementation pathway, the safeguard elements remained largely conceptual, limiting their potential to generate lasting environmental and social impact.

160. Although gender is mentioned, it was not integrated across the technical components. There were no gender-disaggregated indicators or targeted actions within the core results framework. The stakeholder analysis did not include segmentation by gender, indigenous peoples, or vulnerable groups, which limited the equity considerations of the design. While incorporating these elements would have represented good practice and aligned with emerging expectations on inclusive project design, they were not explicit policy requirements under GEF or UNEP at the time of project approval. Therefore, this observation should be

interpreted in the context of evolving institutional standards rather than as a shortcoming relative to formal obligations.

161. In the Inception Report, the quality of the project design was rated as **Satisfactory** (S). However, this terminal evaluation revised the rating to **Moderately Satisfactory** (MS), based on the following considerations:

- i. The Inception Report was based on a theoretical review of the design documentation, without direct engagement with territories or key actors.
- ii. The reconstructed Theory of Change revealed structural weaknesses in areas such as gender integration, hazardous waste management involving mercury, and maintenance of installed luminaires.
- iii. Field visits and interviews identified design deficiencies not reflected in the documentation, particularly in the areas mentioned above.
- iv. At the time of preparing the Inception Report, the limited participation of certain ministries—such as the MDPyEP—was not yet evident. Subsequent data collection revealed that their exclusion during the design phase, combined with the absence of inter-institutional coordination mechanisms, created critical gaps, including the inability to procure laboratory equipment required for national verification systems.

Table 6: Quality of project design

	SECTION	SELECT RATING	SCORE (1-6)	WEIGHTING	TOTAL (Rating x Weighting/10)
A	Operating Context	Satisfactory	5	0.4	0.20
B	Project Preparation	Moderately Satisfactory	4	1.2	0.48
C	Strategic Relevance	Satisfactory	5	0.8	0.40
D	Intended Results and Causality	Moderately Satisfactory	4	1.6	0.64
E	Logical Framework and Monitoring	Moderately Satisfactory	4	0.8	0.32
F	Governance and Supervision Arrangements	Moderately Unsatisfactory	3	0.4	0.12
G	Partnerships	Moderately Unsatisfactory	3	0.8	0.24
H	Learning, Communication and Outreach	Satisfactory	5	0.4	0.20
I	Financial Planning / Budgeting	Moderately Satisfactory	4	0.4	0.16
J	Efficiency	Moderately Unsatisfactory	3	0.8	0.24
K	Risk identification and Social Safeguards	Moderately Unsatisfactory	3	0.8	0.24
L	Sustainability / Replication and Catalytic Effects	Moderately Satisfactory	4	1.2	0.48
M	Identified Project Design Weaknesses/Gaps	Moderately Satisfactory	3	0.4	0.12
TOTAL SCORE		Moderately Satisfactory			3.84
1 (Highly Unsatisfactory)					< 1.83
2 (Unsatisfactory)					>= 1.83 < 2.66
3 (Moderately Unsatisfactory)					>=2.66 <3.5
4 (Moderately Satisfactory)					>=3.5 <=4.33
5 (Satisfactory)					>4.33 <= 5.16
6 (Highly Satisfactory)					> 5.16

Rating for Project Design: Moderately Satisfactory

5.3 Nature of the External Context

162. This section evaluates the prevalence of conflicts, natural disasters, and political instability as external factors that have affected the project's operational aspects.

163. At the time of project design, Bolivia was not experiencing ongoing conflicts or adverse conditions that could impact implementation, nor was such a scenario anticipated. The country is not prone to significant natural disasters, and this factor did not impose constraints on project activities. However, political instability emerged in 2019, causing a slowdown in project's implementation. In 2020, the COVID-19 pandemic further delayed the start of activities. These initial setbacks resulted in the withdrawal of co-financing commitments from partners such as Philips and the National Lighting Test Center (NLTC) in China, who had signed a three-year co-financing agreement. The Municipal Government of La Paz also withdrew its financial contribution, as municipalities cannot commit funds beyond a one-year period. The project, initially planned for 32 months, was ultimately extended to 62 months.

164. Frequent staff turnover within the implementation institutions was a key factor adding delays in project execution and causing a loss of institutional memory in government agencies. The UNEP implementation team made significant efforts to quickly brief new government authorities and technical teams on the project's status and objectives. However, the frequency of leadership and personnel changes limited the effectiveness of these efforts, making it difficult to align new stakeholders with the project's timeline. The team also adopted a more flexible approach to managing extension requests while ensuring that commitments to the GEF were met as closely as possible. This required innovative strategies to maintain alignment with project indicators despite the unforeseen external conditions and ongoing political instability. Despite these efforts, the impact of this issue was not fully mitigated.

Rating for Nature of the External Context: Unfavourable

5.4 Effectiveness

5.4.1 Availability of Outputs

165. Output 1.1.1 "Comprehensive policies developed to ensure a successful transition to an efficient lighting market to support Bolivia in its efforts, and standards and labelling activities harmonized regionally to achieve maximum lighting market transformation". The project supported the development of a draft Energy Efficiency Strategy for Lighting in collaboration with the U4E team. The proposal underwent several technical revisions and was made available to national authorities. A draft Supreme Decree on Minimum Energy Performance Standards was also completed but not submitted for adoption due to contains established by Law 305. As both products were delivered and made available for use, the output is considered fully achieved. The lack of subsequent adoption is attributed to regulatory and institutional constraints beyond the scope of this output.

166. Output 1.1.2 "National legislation to establish and enforce minimum energy performance standards (MEPS) for lamps developed". The project supported the preparation of two MEPS regulations: one for LED lamps and one for LED luminaires. Both drafts were completed and formally submitted to national authorities. The regulation for LED lamps was adopted in March 2024, while the regulation for LED luminaires remained under review at the time of project closure. Based on the availability of these regulatory drafts the output is considered fully delivered. Implementation faced institutional limitations. MHE led the process, the legal authority to enact MEPS was vested in the MDPyEP, which had not been involved in project design. This misalignment contributed to delays in regulatory adoption and reduced the likelihood of short-term enforcement.

167. Output 1.1.3. “Monitoring, verification and enforcement (MVE) frameworks created to ensure compliance”. Progress on this output remained limited, and it was claimed to be partly attributed to the delays in Output 1.1.2. Output 1.1.3 intended to include within the MEPS regulations the necessary provisions for defining the scope and enforcement mechanisms of the MVE system. Given that neither of the MEPS regulations was finalized on time, the development of an MVE framework remained incomplete. Without the full adoption and enforcement of both MEPS regulations, the MVE system lacks a comprehensive foundation for enforcement.

168. Output 1.1.4 “Enabling regulatory environment and legal frameworks in place, to ensure environmentally sound life-cycle management of lamps”. According to the 2024 PIR, progress on this output reached 55%, as the regulatory framework was not finalized. Technical proposals were prepared to support the development of a national regulatory framework for the environmentally sound management of lamps. Although the framework was not formally adopted, the deliverables continue to be relevant as technical inputs that are expected to inform the future Energy Efficiency Plan and national legislation.

169. Output 1.1.5 “Public communications and awareness raising activities designed to increase public acceptance of high efficiency products, with an understanding of economic and environmental benefits”. According to the 2023 PIR, this output had reached 60% completion as of June that year. It is considered a key element for achieving the project objective, and a communication campaign has been planned to support it, including media outreach and workshops aimed at promoting energy savings in lighting and raising public awareness. The 2024 PIR does not provide further information on the progress of this output.

170. Output 2.1.1 “Legal and administrative processes of monitoring, verification and enforcement to improve compliance with national or regional standards developed” Similar to Output 1.1.3, progress on this output remained limited. The slow progress was initially assumed that the MEPS regulations, once approved, would serve as an adequate foundation of MVE requirements. However, while the draft MEPS included general references to compliance, they lacked the structured provisions necessary to make the regulations enforceable through a MVE system. In the Bolivian context, MEPS only become legally binding when accompanied by specific mechanisms outlining how compliance will be monitored and enforced—including procedures for testing, oversight of adherence to IBNORCA standards, and sanctions for non-compliance. Since no legal or administrative instruments were developed to operationalize these elements, the output was not fully delivered, and critical components for regulatory enforcement remained absent from the framework envisioned in the project’s ToC.

171. Output 2.1.2 “Technical training and support to government authorities and customs administrations delivered”. Progress on this output reached 39%, primarily due to the signing of a training agreement with the National Customs Authority and the support provided by the U4E initiative in disseminating information on project developments, as reported in the 2022 and 2023 PIRs. These reports also noted that training activities would begin once the acquisition of laboratory equipment had been completed, which ultimately did not occur. The 2024 PIR attributes the limited progress on this output to the provision in the MEPS regulation that establishes a 240-day grace period before entry into force, following its approval in March 2024. As a result, training activities were expected to begin in November 2024, by which time the project’s implementation would have already concluded from an administrative standpoint.

172. Output 2.1.3 “Technical training and support to national laboratories to verify compliance with standards and promote regional cooperation provided”. The 2024 PIR reports 100% completion of this output, stating that IBMETRO has developed the necessary

capabilities to conduct measurements on LED lamps and, as it operates under the MDPyEP, will have institutional support for the implementation of the regulation. The project proposed a virtual training for IBMETRO focused on MEPS, test standards, lighting metrics, and accreditation procedures. This training was not fully delivered, primarily due to limited institutional engagement. While part of the technical capacity building was not formally contingent on the delivery of laboratory equipment - which would have involved separate technical training provided by the supplier- skills development on MEPS and MVE aiming at an effective impact inherently requires, as a prior stage, binding MEPS and MVE conditions and the purchase and training on the use of equipment to verify standards and lighting metrics. Although the proposed U4E training was not implemented, the output remains substantially delivered, as key technical materials were developed and made available to the national counterpart.

173. Output 3.1.1 “National framework and strategy for the environmentally sound management of lighting products developed” The 2024 PIR reports 100% completion of this output, as [Bolivian Standard NB 69022](#) on the management of end-of-life lamps was officially enacted and published in September 2023, becoming part of Bolivia’s national regulatory framework.

174. Output 3.1.2 “Operational management pilot for disused lamps” The 2024 PIR states that this output was incorporated during the project's second revision and reached 100% completion by collecting real data on end-of-life lamp management to support amendments to Bolivian Standard NB 69022. The objective was to ensure environmentally sound management practices aligned with Bolivia’s context. Activities included:

- Coordination with the Autonomous Municipal Government of Sacaba and the Departmental Government of Cochabamba.
- Public awareness campaigns via radio and social media to inform urban populations about the separation, drop-off, and collection points for fluorescent lamps.
- Collection, transportation, and treatment of 4,000 lamps from designated collection points, handled by an authorized operator.

175. Despite the 2024 PIR reporting full completion, significant concerns remain regarding the evidence of proper treatment of 4,000 lamps recovered in the project. Field visits to municipality of La Guardia showed improper storage of replaced mercury-containing lamps and the recovery of mercury from compact fluorescent lamps in streetlights. In this municipality many replaced luminaires are stored in unlabelled cardboard boxes, which do not ensure their integrity (see photos below). Moreover, these lamps are kept in machine storage areas that lack the minimum safety conditions required to prevent mercury gas leaks or contamination in case of breakage. These locations typically house newly acquired equipment awaiting installation alongside discarded items, increasing the risk of accidental breakage due to movement within storage spaces. When consulted, none of the interviewed municipalities (Warnes, La Guardia and Cochabamba) provided photographic evidence or official certification confirming the proper disposal of mercury-containing lamps. Nor did they report the existence of any informational guidelines detailing procedures for safe handling, removal from street lighting poles, transport, or temporary storage prior to final disposal. While the number of improperly stored lamps observed is relatively limited, new efficient lighting initiatives combined with current storage practices lead the evaluation team to suspect the environmental and public health risk persist and is increasing - particularly for workers handling these materials in confined spaces in most of the municipalities that participated in the pilots.



Figure 4: Compact fluorescent lamps, field visit
Pictures provided by the municipality of La Guardia

176. Output 3.1.3 “Technical training and support to government authorities and customs administrations” According to the 2024 PIR, this output reached 100% completion following a technical training visit to Spain, where participants visited various waste treatment facilities for electrical and electronic equipment (Recyberica, Derichebourg, Ecochemistry, Wirec, and Envirobat). The objective was to understand the role of these facilities within the EPR model. The evaluation mission, included participants from both public and private sectors, including MMAyA, municipal representatives, and waste operators. While the training was not directly linked to other project activities and no specific follow-up actions for applying the knowledge acquired were identified, it was mentioned that its value-added lies in building awareness and technical exposure to international good practices. The replication of such experiences is inherently gradual and context dependent. Therefore, the output is considered delivered, although its long-term influence will depend on subsequent steps taken by national stakeholders.

177. Output 3.1.4 “Awareness and communication campaigns are carried out to promote the collection and recycling of spent lamps”. During project implementation, a communication strategy was developed to raise awareness about efficient lighting, the collection, and recycling of end-of-life lamps. Audiovisual and graphic materials were created, addressing the issue and operational management of spent lamps. These materials were successfully broadcasted through various radio networks covering multiple regions of Bolivia. Additionally, content related to the issue of mercury-containing lamps and the importance of separate collection was disseminated across media outlets and social networks. Printed materials, including calendars, posters, stickers, and children's storybooks, were produced for distribution at public fairs organized by the MMAyA and MHE. Based on these activities, the 2024 PIR reports 100% completion of this output.

178. Output 3.1.5 “Development of waste management systems for spent lamps, including the design of a collection and recycling services organization (CRSO), and international coordination for the environmentally sound export/import of lamp waste”. According to the 2024 PIR, progress on this output reached 55%. As part of the technical assistance provided by U4E, a document titled “Implementation of Extended Producer Responsibility in Bolivia – Legal Analysis and Recommendations for the Implementation of EPR, with Emphasis on Electrical and Electronic Equipment (EEE)” was developed. This document outlines guidelines

for drafting regulations on Waste from Electrical and Electronic Equipment (WEEE) under the EPR framework. Based on these guidelines, the Project Team drafted a preliminary regulation on WEEE under the EPR system. However, the process did not advance further, as the General Directorate for Integrated Waste Management (DGGIR) proposed the development of a general regulatory framework for the EPR system, from which specific implementation strategies for different waste types would be derived.

179. Output 4.1.1 “National efficient lighting strategy with more stringent MEPS, taking into account advanced lighting technologies and systems, further developed” The 2024 PIR reports 60% progress on this output. To achieve full implementation, it was proposed that the MEPS regulation undergo periodic updates to maintain and enhance technical efficiency in lighting, with scheduled reviews to assess the relevance of such revisions. The advancement of this output is closely linked to the delays in Output 1.1.2, where the MEPS regulation for LED luminaires remains unfinished, and the regulatory framework for enforcement (Output 1.1.3) remains incomplete. Without a fully operational MVE system (Output 2.1.1), it is unrealistic to expect stricter requirements to be achieved. A binding baseline must first be established, from which standards can be progressively strengthened. Additionally, the regulatory gaps in Output 1.1.4 affect the broader framework needed to ensure environmentally sound management of lighting technologies once they reach the end of their life cycle. Given these interdependencies, the effective revision and strengthening of MEPS are still pending and will require addressing the remaining regulatory and enforcement challenges.

180. Output 4.1.2 “Supporting policies delivered to increase user acceptance and demand for high-efficiency products and systems”. This output focused on the development of two technical studies. The first was a proposal for a lighting labelling system, outlining criteria, implementation options, and regulatory pathways. The second study provided an assessment of supporting policy instruments that could be adopted by the government to promote the use of LED technologies and control systems. Both studies were developed by the U4E team and delivered to national counterparts. These deliverables aim to guide future regulatory development and policy formulation to facilitate market uptake. Based on the completion of these activities, the 2024 PIR reported 100% achievement of this output.

181. Output 4.1.3 “MVE scheme to ensure high quality products that will deliver the expected energy saving and GHG emission reduction benefits developed”. A preliminary MVE scheme was developed to ensure that LED lamps comply with quality standards and deliver the expected energy savings and GHG emission reductions. The scheme was structured around the coordination of national institutions responsible for compliance and enforcement. IBMETRO was designated as the supervisory authority responsible for enforcing compliance with the MEPS Regulation for LED Lamps under the delivered MVE. The enforcement of this framework falls under the MDPyEP, through its Vice Ministry of Industrialization Policies, with additional involvement from the National Customs Authority, importers, and the Public Ministry. According to the 2024 PIR, progress on this output reached 60%. However, the MVE scheme could not become effectively mandatory through the provisions of the MEPS, preventing the articulation of a framework that could effectively support its enforcement.

182. Output 4.2.1 “Demonstration program for locally appropriate LEDs and lighting controls for Bolivia’s selected stakeholder groups (i.e., public lighting consumers) designed and delivered”. The demonstration program was implemented to showcase the benefits of LED luminaires and lighting controls for public lighting in selected municipalities. The project expanded to six municipalities what it was initially planned for four municipalities. In 2022, 180 streetlights were installed in Patatamaya, while in December 2023, an additional 722 luminaires were installed in Warnes, La Guardia, Yapacaní, San Javier, and Guayaramerín. According to the 2024 PIR, this output achieved 100% completion.



Figure 5: Energy Efficient Street lighting in La Guardia, Bolivia

Photo Credit: UNEP / Fernando Anaya, Evaluation Mission 2025

183. Output 4.2.2 “LED and controls systems procured and installed through the demonstration program”. The installation of streetlights was executed by municipal staff in accordance with agreements signed between the MHE and the respective municipalities. The 2024 PIR reports 80% progress, but it does not specify which activities remain incomplete to achieve 100% completion. Interviews confirmed that all planned installations were completed,

indicating that this output was fully achieved despite the lower progress reported. The evaluator suspects that it is likely that the activities reported as pending were related to technical assessments of system operation or to conducting closure visits across all municipalities to gather lessons learned. Field observations revealed that voltage fluctuations affected the operation of photocells in installed luminaires, causing numerous units to remain on during daylight hours. This issue evidence the need of additional technical assessments for preventing a reduced operational efficiency and expected energy savings of the pilot activities. Moreover, no protocols were established for the safe handling or storage of mercury-containing lamps in case of accidental breakage during pilot implementation during field visits to Municipality of La Guardia and Warnes. While the evaluation does not have field-level evidence confirming that this issue occurs uniformly across all municipalities, no information was provided to suggest otherwise revealing the need of a comprehensive revision in all the beneficiary municipalities. Despite repeated requests, none of the interviewed municipalities nor the counterparts within MEM and MMAyA were able to supply documentation or certification of proper disposal practices for mercury-containing lamps. This gap limited the project's capacity to demonstrate adequate risk management in practical scenarios. Moreover, no formal project closure visits or mechanisms for documenting experiences at the municipal level were carried out. This omission restricted the project's ability to capture lessons and inform the design of future public lighting programs.

184. Output 4.2.3 "Gender mainstreaming in Outputs 4.2.1 and 4.2.2 conducted". A Gender Action Plan was developed in the second quarter of 2023 to promote gender equality through equal participation of men and women in all activities and awareness-raising among key stakeholders. The plan targeted decision-making authorities, municipal technical staff, representatives of major social organizations in each municipality, and youth organizations, providing them with analytical tools, including gender-related definitions and conceptual frameworks. Between June and December 2023, the plan was partially implemented in the municipalities of Warnes, La Guardia, Ypacaní, and San Javier, in the Santa Cruz department. However, administrative and financial constraints led to delays, preventing its application in additional municipalities. Despite the existence of this plan, it is noteworthy that a few women were reported to have been hired during the streetlight replacement process. During field visits, the evaluator inquired about this absence, and the response pointed to physical strength requirements and safety concerns. It was explained that handling public lighting fixtures required significant physical effort and that climbing the tall ladders necessary to access the luminaires was considered too dangerous for women. This anecdotal example perhaps (as it is not a survey necessarily representing broader tendencies) highlights the cultural challenges that the energy sector might face in Bolivia, which, if that is the case, goes beyond what the project could or aimed to address, gender not being a direct focus of the project design by definition.

185. According to the reported information and field visits, five outputs were 100% completed. Three outputs reached 75% or higher, including Output 1.1.1, which progressed to 75% despite a previous PIR report of only 5% progress. Six outputs showed progress between 50% and 75%, particularly those affected by regulatory and enforcement delays (e.g., Outputs 1.1.4, 4.1.1, and 3.1.5). Finally, four outputs remained below 50% completion, primarily those related to the MVE framework and delayed enforcement mechanisms. Based on this, the availability of the outputs can be assessed as follows:

Rating for Availability of Outputs: Unsatisfactory

5.4.2 Achievement of Project Outcomes

186. The project design initially included nine indicators for the project outcomes; however, after the removal of Outcome 4.1, the total number of indicators was reduced to eight. By the 2023 PIR period, only one indicator target had been achieved, whereas by the 2024 PIR period, five targets had been completed.

187. Outcome 1.1 “National efficient lighting strategy employing the integrated policy approach to phasing out inefficient incandescent lamps endorsed”. Gaps left by several incomplete outputs prevented the full achievement of this outcome. The strategy, which aimed to integrate the progress made in strengthening the legal and regulatory framework, remained as a draft document. Further discussion and dissemination among relevant stakeholders and decision-makers require additional time for its socialization and finalization. Outcome 1.1 will be fully achieved once the country achieves the enabling conditions for implementing the National efficient lighting strategy, with both MEPS regulations and MVE provisions for LED lamps and LED luminaires effectively adopted, and the necessary laboratory equipment and technical capacities in place to verify the energy performance of all technologies subject to MEPS in Bolivia.

188. Three indicators were established for this outcome. The first, “Number of national efficient lighting strategies approved by the government,” had a target of one, but the National Efficient Lighting Strategy was not approved. The second, “Standardized and complete MEPS for efficient lighting adopted by the government,” also had a target of one; while the MEPS regulation for LED lamps was approved, the MEPS regulation for LED luminaires remains under review. The third indicator, “Number of actors involved in the development of the strategy,” initially targeted two actors, but ultimately six actors participated in the process.

189. The rating for achievement of Outcome 1.1 “National efficient lighting strategy employing the integrated policy approach to phasing out inefficient incandescent lamps endorsed” is Moderately Unsatisfactory.

190. Outcome 2.1 “Capacities to Monitor, Verify and Enforce energy efficient lighting products are created in Bolivia”. Supreme Decree No. 5121, enacted on February 21, 2024, grants the MDPyEP, through IBMETRO, the authority to issue the Technical Regulation Sample Certificate (CRTM) and the Technical Regulation Compliance Certificate (CCRT) for the quality control of LED lamps. However, progress on the MVE was limited as were the responsibilities assigned to national labs for enforcement. The certification of IBMETRO as a testing laboratory could not be completed due to the lack of necessary equipment (goniophotometer for street lighting luminaires, an integrating sphere for luminous flux, a durability test bench for lamps, and radiation measurement equipment for assessing photobiological effects on humans), stemming from previously mentioned challenges. Regarding the procurement of testing equipment IBMETRO faced institutional hierarchy constraints that limited direct communication with MHE and prevented timely access to information or influence over procurement decisions. On the other hand, MHE stated that equipment procurement was not within its responsibilities and requested a budget reallocation, which was ultimately rejected due to the project’s technical validity period not being extended.

191. Two indicators were established for this outcome. The first, “Number of regulations establishing the MVE system adopted by the government,” had a target of one, which in practice was not achieved despite the Supreme Decree No. 5121 approving the MEPS regulation for LED technologies and granting IBMETRO the authority to issue CRTM and CCRT. These certifications form a central component of an MVE system, as they validate product samples against technical and energy efficiency standards and confirm regulatory compliance prior to commercialization; however, they have not yet been prepared nor submitted for public consultation before adoption by the government. The second, “Increase

in the number of laboratories certified to evaluate MEPS and labels for lighting products," aimed to certify one laboratory, but this could not be completed.

192. The rating for achievement of Outcome 2.1 "Capacities to Monitor, Verify and Enforce energy efficient lighting products are created in Bolivia" is Unsatisfactory.

193. Outcome 3.1 "Government of Bolivia is able to enact a national plan to collect, recycle and/or responsibly dispose of spent lighting products that may contain valuable and/or hazardous materials" For this outcome, the key indicator was the design of at least one business model for a CRSO. Although U4E experts developed a business model proposal, concerns remain regarding its adoption, and implementation within MMAYA. Responsibilities across institutions remain undefined; no entity has been formally designated to lead the plan's implementation; and there is certification platform to connect accredited operators with stakeholders or institutions responsible for the collection, transport, and final disposal of hazardous lighting waste. Bolivia still lacks readiness of legal mandates, assignment of operational roles, creation of monitoring systems, technical training, and the use of licensed service providers operating under safety and environmental standards and able to demonstrate compliance. Field observations during the evaluation among stakeholders including municipalities and government institutions further illustrated the operational risks of proceeding without a fully established regulatory and oversight framework. As a result, the target has not been met. The rating for achievement of Outcome 3.1 "Government of Bolivia is able to enact a national plan to collect, recycle and/or responsibly dispose of spent lighting products that may contain valuable and/or hazardous materials" is Unsatisfactory.

194. Outcome 4.1 "Municipal governments made aware of the benefits of advanced lighting systems through demonstration programs of locally appropriate street lighting LEDs and controls" This outcome primarily depended on the procurement and installation of LED luminaires in the selected municipalities.

195. Two indicators were established for this outcome. The first, "Number of municipalities that have acquired LEDs," set a target of three municipalities, therefore this goal was exceeded, reaching six municipalities. The second, "Number of men and women beneficiaries of the above-mentioned result determined," initially targeted 250 beneficiaries, but only 60% of this number was officially recorded. Despite this, the overall perception of the evaluator is that the outcome was fully achieved (100%), as the actual number of men and women benefiting from improved security and public lighting due to the streetlight replacement is estimated to far exceed the 250-person target.

196. The rating for achievement of Outcome 4.1 "Municipal governments made aware of the benefits of advanced lighting systems through demonstration programs of locally appropriate street lighting LEDs and controls" is Satisfactory.

Rating for Achievement of Project Outcomes: Moderately Unsatisfactory

5.4.3 Likelihood of Impact

197. The likelihood of impact assessment (LIA) is based on the presence necessary enabling conditions for transitioning from outcomes to intermediate states and eventually achieving long-term impacts.

198. The transition from outcomes to intermediate results in the project required specific drivers to be in place, ensuring the effective implementation and sustainability of energy efficiency and waste management interventions. The observations outline drivers and their alignment with Intermediate Results 1, 2, 3, and 4:

- The government commitment to energy efficiency as part of its national strategy is relevant to Intermediate Results 1 and 3 related to lighting market transformation and the increased LED market share. While Bolivia's commitments under the Paris Agreement, the SDGs, and PDES 2021-2025 provide a framework for promoting energy efficiency, the project implementation showed institutional misalignment and regulatory gaps that affected its full implementation. The lack of strong inter-ministerial coordination, particularly between MHE and MDPyEP, delayed the enforcement of MEPS regulations and complicated the procurement of laboratory equipment, directly impacting Outputs 1.1.2 (MEPS development) and 2.1.1 (MVE enforcement). Moreover, the political instability observed during the project lifecycle resulted in frequent government transitions, limiting continuity in policy implementation and creating delays in decision-making, particularly in establishing long-term institutional ownership of energy efficiency policies. Last, while some progress was made in regulatory development, the lack of enforcement mechanisms for energy efficiency standards and institutional uncertainties weakened the likelihood of achieving these intermediate results.
- Capacity-building and regulations activities leading to institutional uptake and policy implementation are highly relevant to Intermediate Result 1: Lighting Market Transformation and Intermediate Result 4: Energy Savings. The project made some progress in training government authorities and municipalities. However, gaps in institutional capacity remain, particularly in the ability of IBMETRO to support the enforcement of energy performance standards partly due to the lack of necessary testing equipment and the absence of a clear budgetary allocation for laboratory certification. To be able to issue the Technical Regulation Sample Certificate and the Technical Regulation Compliance Certificate, as mandated to IBMETRO by Supreme Decree No. 5121 and required for lighting market operators to achieve the phasing out of inefficient lamps, IBMETRO first needed to ensure it had the equipment necessary to perform these certifications. While technical training sessions were conducted, there were no formal budgetary mechanisms to ensure the integration of acquired knowledge into regulatory processes, leading to limited application of technical recommendations. On the other hand, the project design did not fully account for final users, utilities and municipal governments' technical limitations, particularly regarding public lighting baseline assessments, procurement, and maintenance. This affected the evidence to prove the project attribution on Intermediate Result 4: Achieving energy savings, as municipalities and stakeholders are unable to provide objective evidence on historical energy consumption of replaced technologies that can help proving the energy savings. In addition, the rebound effect—where efficiency gains are partially offset by increased use of the resource—may have further influenced the net savings. This does not imply that savings were not achieved, but rather that without adequate data it is difficult to conclusively demonstrate their magnitude. Municipalities also lack monitoring devices to verify correct operation of public lighting during hours when it should be switched off. During field visits, the evaluator observed streetlights on during daylight hours, explained by local technicians as photocells malfunction or burnouts due to voltage fluctuations. This situation reduces the effective nighttime illumination hours. It was commented that these issues are typically detected through resident complaints, but municipalities reported that people are more likely to complain when lights stop working rather than when they remain on continuously during daylight hours.
- Sustained municipal engagement in public lighting programs and energy efficiency adoption is important to Intermediate Results 3 and 4: Increased LED Market Share & Energy Savings. Several municipalities have begun integrating efficiency criteria into procurement processes for LED and high-efficiency lighting systems. The project has

also facilitated coordination to scale up initiatives such as the IDB-financed National Program for Energy Efficiency in Public Lighting (USD 35 million, Loan BO-L1230) approved in 2024. However, field visits revealed that several municipalities lack technical capacity to verify technical specification of LED technologies, manage communications with the electricity providers (ENDE Distribution) regarding voltage fluctuations affecting the operation of recently installed streetlights and to conduct technical assessments for introducing corrective measures for implementing new public lighting programs. Additionally, municipalities lack the necessary infrastructure and financial resources to ensure the proper management of replaced mercury-containing lamps. The absence of structured guidance, training, and dedicated budget for monitoring LED-related project may limit the long-term sustainability of municipal energy efficiency initiatives.

- The establishment of an effective EPR System for lighting waste management is relevant to Intermediate Result 2: Operational EPR & Mercury Emission Reduction. The proposed CRSO remains under discussion, as MMAyA has not yet committed to its implementation. At the municipal level, these stakeholders lack the capacity and cross cutting coordination to properly store and dispose of hazardous waste at the national level. The absence of traceability mechanisms, reliable data on national inventories of replaced mercury-containing technologies, certified waste disposal providers, enforcement frameworks and uncertainty about financial responsibilities for waste collection and disposal has led to lack of information on current stockpiling of spent lamps, increasing environmental and public health risks.
 - Financial and technical sustainability of waste management and recycling systems are essential to Intermediate Result 2: Operationalization of the EPR System & Mercury Emission Reduction. The project supported the development of a business model for a CRSO, but its sustainability is not yet ensured. Additionally, municipalities reported limited capacity to properly dispose of spent mercury-containing lamps, and no financial mechanism has been defined for covering final disposal costs. As of the evaluation visit, only one company in Cochabamba had the potential technical capacity to extract mercury from replaced streetlights. Municipalities reported they were still waiting for a certified list of disposal companies from MMAyA, raising concerns about the long-term feasibility of the EPR system.
 - The integration of lessons learned into future policy and program development is also linked to Intermediate Results 3 and 4: Increased LED Market Share & Energy Savings. The project sought to inform future energy efficiency initiatives through the lessons learned from pilot projects. However, weaknesses on the feedback mechanisms limited the ability to include corrective measures in the lighting program. In the case of pilot projects, no formal closure visits were conducted to document experiences and assess technical or operational improvements. It would be important to verify whether most if not all the benefited municipalities faced challenges with voltage fluctuations damaging photocells, causing public lighting to remain on during daylight hours. These issues were not identified in the project's design phase, highlighting insufficient baseline assessments and communication. On the other hand, it is also important to gather lessons learned on waste management, not only for streetlights but also at the national level for collected lamps.
199. Regarding the assessment of assumptions from Outcomes to Intermediate States:
- The government remains committed to implementing and enforcing MEPS and energy efficiency regulations: Partially held. The approval of the MEPS for LED lamps is a step

forward, but the MEPS and MVE for LED luminaires remain under review, and enforcement mechanisms are still incomplete.

- Municipalities have the technical capacity and financial resources to sustain energy efficiency initiatives: Not held. Municipal governments lack structured technical assistance and sustainable funding mechanisms for scaling up public lighting programs.
- Proper infrastructure is in place to ensure waste management and mercury recovery from streetlights: Not held. Field visits showed that the municipalities assessed lack safe storage facilities for mercury-containing lamps, and there is no gathered evidence that other municipalities are performing better or applying clear framework for financing their final disposal.

200. On the assessment of assumptions from Intermediate States to Impact:

- Regulatory mechanisms will be fully operational, ensuring sustained compliance with energy efficiency standards: Not held. The lack of enforcement of MEPS and the delayed implementation of MVE frameworks undermine the project's ability to generate market transformation.
- Stakeholders have sufficient capacity and willingness to scale up energy efficiency investments: Partially held. Although no formal ex-post survey was conducted at the national level, interviewees reported that some final users and municipalities prefer LED technologies and have integrated LED procurement criteria. At the institutional level, overall technical and financial constraints limit the scalability of street lighting programs.
- Sufficient financial mechanisms exist to support long-term implementation of waste management and energy efficiency programs: Not held. There is no financial mechanism in place for the responsible disposal of hazardous lighting waste, and funding for municipal energy efficiency initiatives remains uncertain.

Rating for Achievement of Likelihood of Impact: Unlikely

Rating for Effectiveness:	Moderately Unsatisfactory
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5.5 Financial Management

5.5.1 Adherence to UNEP's Financial Policies and Procedures

201. The financial management and reporting of the project adhered to UNEP's financial policies and procedures, with no evidence of deficiencies. The executing agencies complied with these policies to ensure the fulfilment of financial requirements for all relevant reports.

202. The financial reports were submitted by the project manager to the executing agencies for review and feedback. The UNEP task manager was responsible for revision and approval. An audit was conducted for the 2023–2024 project management period, with no significant issues reported.

Rating for Adherence to UNEP's Financial Policies and Procedures: Highly Satisfactory

5.5.2 Completeness of Financial Information

203. The financial information submitted by the executing team at UNEP was complete and well-organized. All key documents were shared with counterparts through dedicated

electronic folders, including the institutional agreements for project implementation and details on fund flows. Approved and certified quarterly financial reports were provided for every year from 2020 to 2023, alongside expenditure records and unliquidated obligations.

204. The documentation package also included annual inventory reports listing non-expendable equipment procured under the project, such as computers, printers, public lighting luminaires, and connectors. Final audit reports, approved project budgets, and co-financing reports were also submitted in full.

Rating for Completeness of Financial Information: Highly Satisfactory

5.5.3 Communication Between Finance and Project Management Staff

205. According to interviews with the project's finance team, communication between this team and the project management staff was consistent and frequent, particularly during the final two years of implementation. This improvement was partly attributed to a reduction in staff turnover. Efforts were made to ensure coordination among the three implementing ministries—MHE, MMAyA and MDPyEP—which faced recurring challenges on their finance teams. Weekly follow-up meetings were held with personnel from each of the participating ministries, with the MPD consistently involved, given its responsibility for overseeing and monitoring other programmes.

Rating for Communication Between Finance and Project Management Staff: Highly Satisfactory

Rating for Financial Management: Highly Satisfactory

5.6 Efficiency

206. The project experienced significant delays due to political instability and the COVID-19 pandemic, leading to an extension from 32 to 62 months without additional budget allocations. Delays posed challenges in executing the planned expenditures over the extended implementation period. Despite the external disruptions, the implementation team managed to maintain coherence with the procurement plans and results framework, and no-cost extensions were used to complete pending activities within the available budget.

207. Weekly coordination meetings with each implementing ministry helped ensure institutional alignment and maintain momentum. Reduced staff turnover during the last two years of implementation contributed to improved communication and continuity between the project management and finance teams.

208. Nonetheless, staff changes in the project cycle significantly affected the implementation schedule. These changes triggered repeated discussions on legal frameworks and generated additional demands on the project team, such as organizing new technical workshops and consultations with institutions including U4E, IBMETRO, and IBNORCA. The PSC had to conduct repeated training for incoming staff—four times for MHE and twice for MMAyA—resulting in time and resource inefficiencies.

209. The sequence of activities showed some misalignments, although not all were unreasonable given the project context. For instance, laboratory training for IBMETRO was conducted prior to the acquisition of testing equipment—a decision that sought to ensure early preparedness for the eventual enforcement of MEPS through binding regulations that granted IBMETRO the authority to certify product samples and compliance for LED lamps. However, progress in implementing the market verification and enforcement system remained limited,

and the role of national laboratories in supporting enforcement was not fully operationalized. While the equipment purchase was expected to proceed, a breakdown in internal decision-making within the MHE led to its cancellation, limiting the laboratory's ability to operationalize its functions. MEPS workshops were held before the full approval of technical regulations and the Supreme Decree, which affected the timely implementation of the MVE system.

210. The main obstacle preventing IBMETRO from publishing and enforcing the CRTM and the CCRT was the cancellation of the laboratory equipment purchase¹⁵. Without this equipment, the laboratory was unable to conduct the necessary tests to issue these certifications, which explains the lack of significant progress in this area. This directly affected the establishment of a functioning MVE system, limiting the national capacity to verify the performance of efficient lighting technologies. As a result, while IBMETRO received technical training on MEPS and certifications, its operational capacity remained constrained.

211. The project made use of pre-existing institutions such as IBMETRO and IBNORCA and built on existing partnerships. U4E supported IBMETRO in developing professional testing capabilities and facilitated the identification and specification of necessary equipment to verify energy performance of public lighting technologies. However, the fragmented institutional mandates and lack of early involvement from the MDPyEP, which oversees IBMETRO, hindered coordination and delayed procurement processes.

212. At the UNEP management level, a structured approach was implemented to minimize carbon footprint by conducting frequent virtual follow-up meetings and using digital tools for document preparation, systematization, and storage. These measures demonstrated that, on the management side, reducing travel did not compromise the quality of technical advice or the effectiveness of project oversight. At the local implementation level, coordination with different regions of the country was carried out in a hybrid format, combining in-person and digital interactions to reduce the need for field travel. However, certain activities still required on-site follow-up to ensure proper implementation. Although the COVID-19 pandemic demonstrated the potential of remote communication to maintain project coordination, connectivity limitations and gaps in technological availability at the local level often hindered communication, commitments, and overall project progress.

213. During the implementation period (2020–2024), the project received five disbursements from the GEF-assigned budget, amounting to USD 1,977,333. Of this amount, USD 1,889,542 was spent, leaving a remaining balance of USD 87,791. However, the full GEF funding allocated to the project was not disbursed. While USD 3,056,361 had been committed, USD 1,079,028 remained undisbursed as the project was approaching its closure and no further extension was approved.

214. Overall, while several corrective measures were introduced to address delays and maintain budgetary discipline, inefficiencies in sequencing, institutional coordination, and equipment procurement constrained the timely delivery of outputs. The project's ability to leverage institutional synergies was mixed, with some effective technical collaboration but limited integration across ministries and oversight bodies. These factors reduced the overall efficiency of implementation despite the mitigation efforts deployed.

Rating for Efficiency: Moderately Unsatisfactory

¹⁵ Goniophotometer for street lighting luminaires, an integrating sphere for luminous flux, a durability test bench for lamps, and radiation measurement equipment for assessing photobiological effects on humans

5.7 Monitoring and Reporting

5.7.1 Monitoring Design and Budgeting

215. The monitoring framework included in the project design was structured around the logical framework but lacked sufficient operational detail. Although a basic results matrix was defined, the project did not develop a dedicated monitoring manual to specify methods, responsibilities, or data management protocols. Several indicators presented design limitations, particularly at the outcome level, where definitions lacked measurable baselines.

216. The project relied primarily on annual PIRs and periodic updates to track progress. However, the frequency and nature of data collection were not tailored to the specific requirements of each indicator. Most data were self-reported by implementing partners, and the absence of independent verification reduced the analytical reliability of reported results. For example, indicators related to institutional capacity, energy savings, behavioural change on preference for LED technologies, establishment of an effective hazardous waste management chain, and enforcement of environmental safeguards were not supported by national ex-post surveys and adequate measurement tools. In addition, the monitoring system did not incorporate mechanisms to assess gender-related outcomes or stakeholder satisfaction.

217. Roles for data collection and reporting were shared between UNEP and national counterparts, but no clear assignment of responsibilities was established at the operational level. This affected the consistency and timeliness of data consolidation and limited the effectiveness of adaptive management throughout the project cycle.

218. Budgeting for monitoring activities was included in the project design but proved insufficient. For example, no targeted resources were allocated to improve the quality of primary data collection at the subnational level.

Rating for Monitoring Design and Budgeting: Satisfactory

5.7.2 Monitoring of Project Implementation

219. The broader monitoring of project progress across all components exhibited implementation gaps. The project did not develop a dedicated monitoring plan beyond the logical framework, and no baseline data or indicator-specific methodologies were defined. Data were collected through activity reports and PIRs but were not systematically consolidated at the local level or disaggregated by beneficiaries (residential and commercial sector, and municipalities) and gender. The monitoring budget included in the ProDoc was limited and its execution was not tracked in detail.

220. Weekly coordination meetings between UNEP and the lead ministries functioned as a continuous mechanism to review progress and address implementation challenges. These meetings helped monitor delivery timelines and solve administrative bottlenecks but were not formally linked to the project's monitoring and evaluation system. Overall, UNEP's project team effectively applied a structured monitoring system, enabling a clear understanding of project progress, identification of broad gaps requiring additional technical assistance, and general corrective measures needed to comply with both UNEP's project management policies and GEF requirements. Despite the structured monitoring design, challenges were observed in the actual implementation of project activities, which, although reported as completed in the mandatory reports, were not always executed effectively. Implementation risks at the granular level were neither anticipated nor updated on a regular basis, and an updated risk registry was not implemented.

221. Furthermore, there is no clear evidence of systematic follow-up on the recommendations provided in the PIR or the MTR. The MTR also notes deficiencies in the PMU related to document handling and operational continuity. During interviews, UNEP's implementing team indicated that, given the project-specific implementation circumstances, additional monitoring efforts were undertaken, making this project considerably more resource-intensive to monitor than similar projects managed in other regions. That said, the project still required more attention than UNEP's team could provide, even with these additional efforts. Moreover, the dedicated budget to project monitoring was exhausted leaving small additional budgetary room to strengthen these functions.

222. Financial monitoring was implemented consistently throughout the project. In addition to regular oversight, quarterly expenditure reports were submitted on a constant basis, budget revisions were made, and workplan adjustments were undertaken to reflect evolving priorities. These measures ensured continuous financial monitoring, allowing the project to adapt its resource allocation to changing circumstances. However, challenges also emerged. The delay in conducting the independent financial audit—caused by procurement-related issues—led to a temporary suspension of disbursements and disrupted key activities, including the acquisition of photometric equipment for IBMETRO. While this issues highlights a gap between financial compliance mechanisms and their coordination with technical delivery, it also underlines the value of maintaining strong linkages between financial controls and programmatic planning to anticipate and mitigate similar disruptions.

Rating for Monitoring of Project Implementation: Moderately Satisfactory

5.7.3 Project Reporting

223. The TE included the revision of reports generated during implementation, including annual PIRs, half-yearly progress reports, quarterly financial statements, and co-financing reports. PIRs covering the period from 2020 to 2024, outlined progress toward the project's objectives, implementation status, and risk management in relation to the component indicators. They included information on activities such as energy audits, training workshops for awareness raising, mobilization of co-financing for efficient lighting equipment in demonstration municipalities, and the development of new codes and standards for LED technologies. Half-yearly reports and quarterly expenditure reports documented physical and financial execution; while co-financing reports were updated monthly, tracking contributions from national and local actors. The reports containing UNEP's requirements completion had different levels of analytical depth. In several cases, these documents focused on activity delivery rather than results and did not fully assess the performance of outcome-level indicators. Although reporting outputs fulfilled basic accountability functions, their contribution to adaptive management was limited. With the exception of MTR 2023 that addressed project performance and strategic direction, reports often lacked dedicated sections for addressing changes in national context or specific implementation challenges, risks, and corrective actions.

Rating for Project Reporting: Satisfactory

Rating for Monitoring and Reporting:	Satisfactory
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5.8 Sustainability

5.8.1 Socio-political Sustainability

224. For Outcome 1.1, related to the endorsement of a national efficient lighting strategy, the project demonstrated alignment with Bolivia's energy efficiency priorities and received initial support from key institutions such as MHE, MMAyA, IBMETRO, and IBNORCA. However,

the strategy remained in draft form at the end of the project, and the MEPS regulation for the considered LED technologies had not yet been approved. Despite active involvement from technical staff and six actors in the drafting process, institutional ownership at higher decision-making levels was weak, and impact sustainability remains uncertain. Frequent political transitions and institutional instability disrupted continuity, and no mechanisms were established to secure long-term political commitment or adapt to evolving policy priorities. Nevertheless, the broader macroeconomic context—marked by persistent shortages of foreign currency and imported fuels—has increased the practical relevance of energy efficiency in national planning. These structural pressures may incentivize greater political support for energy-saving policies in the medium term. Since these contextual conditions are expected to persist in relation to the priorities to be set by the incoming Bolivian government (as of 8 November 2025) and given that the national efficient lighting strategy is expected to be endorsed and serve as a guiding framework for decision-making, the Socio-political Sustainability of Outcome 1.1 is ranked as Moderately Likely.

225. For Outcome 2.1, which aimed to establish capacities to monitor, verify and enforce energy-efficient lighting products, the project facilitated limited capacity-building activities and supported the development of a regulatory framework. However, weak inter-institutional coordination and frequent staff turnover significantly undermined the sustainability of these efforts. IBMETRO's inability to finalize its certification role due to unresolved procurement issues and inter-ministerial barriers further exposed institutional fragility. Without a long-term staffing strategy or mechanisms to manage institutional memory, the knowledge and capacities developed are at risk of being lost. That said, the project experience has heightened IBMETRO's awareness of the need to actively pursue the operationalization of the responsibilities assigned to it under Supreme Decree No. 5121. Although there is no evidence of adaptive mechanisms to reinforce these institutional roles amid political shifts—a recurring challenge in Bolivia—IBMETRO has in the past secured essential equipment despite similar barriers. At present, it is well positioned to obtain the remaining resources and has indicated its commitment to advancing their full implementation. As such, the socio-political sustainability of Outcome 2.1 is ranked as Moderately Likely.

226. For Outcome 3.1, focused on enabling a national plan for the environmentally sound management of lighting waste, the project succeeded in developing technical standards and proposing a CRSO business model. Nevertheless, implementation remains uncertain due to institutional fragmentation and unclear leadership between MHE and MDPyEP. Municipalities lack the capacity to manage hazardous waste, and the project did not secure long-term political or financial commitments for waste treatment and disposal. That said, the reported previous infrastructure projects implemented by multilateral institutions such as UNDP, World Bank, CAF and the IDB has heightened awareness within institutions such as MHE and MMAyA—currently working on EPR and hazardous waste initiatives—of the need to fully adopt the lighting waste management plan and actively pursue the implementation of their environmental impact reduction mandates. While there is no evidence yet of adaptive mechanisms to reinforce these roles amid political shifts, MMAyA has in the past secured the resources needed to advance similar agendas, suggesting that in the Bolivian institutional context there is potential for sustained impact. As such, the socio-political sustainability of Outcome 3.1 is ranked as Moderately Likely.

227. For Outcome 4.1, which aimed to raise awareness among municipal governments on the benefits of advanced lighting systems, the project achieved visible impacts. Demonstration pilots were completed in five municipalities, public lighting improved, and municipal staff and community members, including women and youth, engaged with the project's objectives. Local governments have shown interest in integrating efficient lighting criteria into procurement processes, suggesting emerging social ownership. However, technical issues like voltage fluctuations and lack of structured knowledge retention

mechanisms present risks to sustaining these benefits. Nevertheless, the outreach and awareness activities partially mitigate the risks, and municipalities appear inclined to continue the transition. As such, the socio-political sustainability of Outcome 4.1 is ranked as Moderately Likely.

228. Despite institutional weaknesses, such as high staff turnover and limited policy continuity, the project-maintained engagement from key national and local stakeholders. While formal adoption of regulatory outputs remained pending, the availability of technical deliverables and the country's structural need to reduce fuel imports and foreign currency dependence increase the likelihood of political support for energy efficiency in the medium term. Based on these factors, socio-political sustainability is rated as Moderately Likely.

Rating for Socio-political Sustainability: Moderately Likely

5.8.2 Financial Sustainability

229. For Outcome 1.1, financial sustainability is constrained by the absence of dedicated national resources to finalize and implement the draft national strategy and enforce adopted MEPS. Although the MEPS for LED lamps was approved and the one for luminaires is under development, there is no operational MVE framework yet to support long-term compliance. However, the Executing Agency project team informed the progress of an approved follow-on operation supported by the Inter-American Development Bank (IDB), focused on scaling up energy-efficient public lighting systems across Bolivia (Project code: BO-L1230). While this new project offers a pathway for continuing financing the application of national standards and institutional coordination mechanisms initiated under the GEF project, it does not guarantee financial continuity for all project components. As such, the financial sustainability of Outcome 1.1 is ranked as Moderately Unlikely.

230. For Outcome 2.1, which aimed to create capacities to monitor, verify and enforce energy-efficient lighting products, the project failed to secure the necessary equipment for laboratory certification and did not provide the required financial resources to operationalize IBMETRO's testing role. That said, the upcoming IDB project for scaling up energy-efficient public lighting systems across Bolivia will require IBMETRO's certification functions and includes a capacity-building component expected to provide financing for the laboratory to acquire the remaining equipment, complete final trainings, and reach the conditions needed to operationalize the MVE system. The project created capacities at IBMETRO which is expected to actively pursue the operationalization of its MVE responsibilities, although no funding streams were established and no exit strategy was developed to address these issues. As such, the financial sustainability of Outcome 2.1 is ranked as Unlikely.

231. Without any similar follow-up activities complementing Outcome 3.1, the financial sustainability outlook is particularly fragile. The proposed CRSO business model for lighting waste management would remain unfunded, and no commitments—financial or institutional—would be secured for its implementation. The environmental liability associated with this situation could increase future fiscal burdens. Although the upcoming IDB project for scaling up energy-efficient public lighting systems across Bolivia is expected to provide fresh financing closely aligned with follow-up and complementary activities to enact the national plan for collecting, recycling, and disposing of spent lamps containing hazardous materials, its success will depend on the effective integration of a comprehensive waste management plan and implementation activities with stringent environmental safeguards. Through the safeguards embedded in the IDB project, which the Bank has committed to uphold, this initiative is expected to build on and extend the impacts of Outcome 3.1. However, the scope of support may remain more narrowly focused on the specific objectives of a public lighting operation, rather than continuing the broader national and cross-sectoral approach of the GEF project, which had envisioned system-wide impacts across residential, commercial, and

municipal sectors, including but not limited to public lighting. As such, the financial sustainability of Outcome 3.1 is ranked as Moderately Unlikely.

232. For Outcome 4.1, financial benefits such as reduced electricity costs and improved public services were realized through demonstration projects. While municipalities have not received new resources to continue or replicate these efforts, the IDB's follow-on program builds directly on the GEF project's results and is expected to finance the expansion of efficient lighting technologies at the national level. This external financing improves the outlook for sustained implementation. As such, the financial sustainability of Outcome 4.1 is rated as Moderately Likely.

Rating for Financial Sustainability: Moderately Unlikely

5.8.3 Institutional Sustainability

233. For Outcome 1.1, institutional sustainability is challenged by the lack of legal endorsement of the national strategy and pending MEPS regulations. Although Supreme Decree 5121 marks a significant milestone in the development and enforcement of MEPS, the MHE's reliance on MDPyEP mandates for issuing regulatory updates or introducing new MEPS slows the pace of implementation. Nonetheless, this initial MEPS has established a replicable pathway to formalize the draft nature of key instruments and create structured mechanisms for cross-ministerial implementation. Capacity-building efforts delivered to ministries, combined with upcoming initiatives on energy-efficient lighting—such as the IDB-supported operation—are expected to sustain momentum, anchor institutional memory, and strengthen institutional ownership. As such, the sustainability of the institutional framework for Outcome 1.1 is ranked as Likely.

234. For Outcome 2.1, the sustainability of capacities built to monitor, verify and enforce energy efficiency lighting products is supported by the Supreme Decree 5121. Further MVEs or updates of Supreme Decree might be constrained by the absence of a functioning governance structure for enforcing energy efficiency regulations. Although IBMETRO is not ready yet for completing the certifications responsibilities that the Supreme Decree granted throughout the MDPyEP for materializing the MVE framework for efficient lighting, it is expected that the laboratory will continue efforts to acquire the necessary equipment and position the laboratory to collaborate with the forthcoming IDB project that will require support from IBMETRO for LED technologies certification. The IDB project's Component 1 includes supervision of system installation and quality control of supplies, while Component 2 covers investments in metrology, data analysis, and smart public lighting system management. As such, the sustainability of the institutional framework for Outcome 2.1 is ranked as Likely.

235. Despite the formal adoption of NB 69022, the Outcome 3.1 remains unachieved. The absence of a fully operational national framework for environmentally sound management of lighting waste, coupled with fragmented coordination between key institutions such as MMAyA and MHE, limits the regulation's long-term enforcement. Nevertheless, institutional advances achieved under the project—particularly in EPR and stakeholder engagement—are expected to be preserved and strengthened through the upcoming IDB operation. Under Component 1, the IDB project finances the final disposal of hazardous and non-hazardous waste generated from the replacement of conventional luminaires with LED technology, directly reinforcing the waste management value chain. Complementary investments in digital metering, tele management, and centralized monitoring systems will improve traceability and compliance oversight, ensuring disposal processes meet safety and environmental standards. Furthermore, Component 2 provides targeted capacity building for municipal governments in metrology, data analysis, and the management of intelligent public lighting systems, strengthening institutional capabilities to maintain and expand best practices in

hazardous waste handling over the long term. As such, the sustainability of the institutional framework for Outcome 3.1 is ranked as Likely.

236. For Outcome 4.1, institutional sustainability is partially supported by municipal engagement during pilot demonstrations yet undermined by the lack of formal mechanisms to maintain capacities. Although municipalities benefited from hands-on experience, the absence of structured training integration and long-term staffing strategies jeopardizes the continuity of knowledge gained. That said, the upcoming IDB operation—explicitly designed to empower municipal governments as the central actors in the procurement, installation, and maintenance of public lighting systems—bring high expectations of sustainability of impacts at the municipal level when the IDB sets technical standards, strengthen coordination channels, and embed public lighting reforms within local governance structures. By aligning capacity development in municipalities with operational responsibilities, the IDB initiative can help ensure that the technical skills, management practices, and institutional knowledge developed under the GEF project are preserved, expanded, and applied at scale. As such, the sustainability of the institutional framework for Outcome 4.1 is ranked as Likely.

Rating for Institutional Sustainability: Likely

Rating for Sustainability (Likelihood):	Moderately Unlikely
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5.9 Factors Affecting Performance and Cross-Cutting Issues

5.9.1 Preparation and Readiness

237. The preparation and readiness period extended from project approval in June 2016 to July 2021, when the Steering Committee was formally established. Although the PCA entered into force in April 2019, implementation was effectively delayed until March 2021. This prolonged preparatory phase was marked by administrative delays, political instability, and pandemic-related disruptions, which together postponed institutional setup and financial disbursement, resulting in a nearly five-year gap between project approval and full operational readiness.

238. Initial plans included forming a national coordination committee, conducting inception workshops, and establishing thematic working groups. However, delays in fund transfers due to national procedures and approvals for receiving international funds (funds had to be transferred to the central bank which then distributed them to the ministries) and also delays in the recipient ministries providing bank details, political turnover, and COVID-19 severely disrupted timelines. As result, funds were not available until July 2020 (more than a year after the PCA was signed), and the Project Manager was hired late. These issues caused a 17-month delay in implementation requiring adjustments to the original project schedule.

239. Despite major challenges, some readiness steps were undertaken. The partner U4E began technical engagement in 2020, including consultations with manufacturers and development of the regulatory proposal and assessments. Stakeholder outreach with local governments and private sector players was initiated. Preparatory activities—like the designation of a national focal point, planning of thematic working groups, and preliminary gender analysis—were defined in the CEO Endorsement Document.

240. The CEO Endorsement Document served as the foundational reference for preparatory actions, outlining roles, co-financing commitments, and plans for national working groups. Co-financing letters from government entities and the private sector confirmed early financial support. The MTR highlights these activities, referencing the PIF, PCA, and implementation agreements. While some meeting records (e.g., inception workshop) were not available,

existing documentation confirms that initial coordination and planning frameworks were intended and partially advanced.

241. Institutional plans included a National Director, Steering Committee, PMU, and TWGs. Yet, key structures and appointments were delayed; the Steering Committee was not formalized until July 2021. Frequent staff turnover weakened continuity, and unclear roles between two executing agencies slowed coordination. Financially, co-financing commitments were strong on paper but lagged in execution. The first disbursement faced transfer issues, and only 0.22% of expected co-financing materialized by FY2021. Delays undermined the initial momentum and partner confidence. However, it is worth noting that, although governance structures and institutional capacity were not fully prepared to manage both the project's ambition and the significant external shocks encountered, the project teams and local counterparts made concerted efforts to foster synergies and establish the institutional conditions needed for effective implementation.

242. Despite the delays and early implementation gaps, field visits revealed that national counterparts regarded the project as a significant institutional advance for Bolivia. This suggests that, although initial conditions were not ideal, the project helped strengthen governance frameworks. Still, considering the prolonged mobilization period, incomplete stakeholder engagement, late staffing, and coordination challenges, the project's readiness is rated unsatisfactory. Early efforts were sufficient to overcome some structural limitations and external disruptions, making the initial implementation phase difficult.

Rating for Preparation and Readiness: Moderately satisfactory

5.9.2 Quality of Project Management and Supervision

5.9.2.1 UNEP

243. UNEP, acting as the GEF Implementing Agency, fulfilled its core responsibilities in managing and supervising the project in Bolivia, ensuring compliance with GEF and UNEP standards and reporting requirements. UNEP maintained formal engagement through regular review and clearance of project reports, participation in meetings, and provision of strategic and technical oversight. Through the U4E initiative, UNEP delivered specialized technical assistance that extended beyond general support. U4E developed tailored proposals and recommendations based on national assessments, which directly informed the drafting and refinement of key regulations, technical standards, and institutional policies. This included the formulation of MEPS, the design of the MVE framework, and the preparation of implementation tools used by national counterparts.

244. UNEP adopted a multifaceted monitoring approach that included technical and financial oversight. This included weekly and/or biweekly coordination meetings between UNEP and the executing agencies—MHE and MMAyA—as well as systematic review of semi-annual and annual progress reports, procurement tracking, and outcome-level monitoring. Although UNEP's Budget and Finance Officer was informed of the financial status, there were delays and gaps in co-financing data and audit documentation from national partners. These mismatches between financial and technical supervision reduced the agency's ability to respond rapidly to procurement delays.

245. Overall, UNEP's performance as the implementing agency was adequate; however, the effectiveness of its supervision was constrained by systemic limitations within the national implementation context. High staff turnover, weak inter-institutional coordination, and limited capacity among national stakeholders undermined the continuity of project execution. The inability to fully operationalize key regulatory and technical components of the project—such

as the MVE system and CRSO business model—reflects issues that could not be fully addressed through external supervision alone.

UNEP's Rating for Quality of Project Management and Supervision: Satisfactory

5.9.2.2 Executing Agencies:

246. The performance of the MHE and MMAyA was affected by persistent structural and administrative limitations throughout project implementation. One of the most critical issues was the high turnover of technical and administrative personnel, particularly within MHE's PMU, which experienced nearly five different coordinators over the course of implementation, including one who served in two non-consecutive periods. This instability led to discontinuities in knowledge management, loss of institutional memory, and repeated delays in executing key activities.

247. MHE, as the lead executing agency, faced substantial internal challenges that severely hampered project progress. Frequent staff turnover, administrative complexity, and unsuccessful procurement processes delayed the acquisition of laboratory equipment and LED lamps for pilot interventions. These issues also undermined budget execution. The revision of workplans, budgets, and terms of reference was often delayed due to complex internal procedures and limited technical-administrative capacity within MHE. In several cases, U4E was required to provide direct support to ensure timely and accurate revisions. One financial audit of MHE's expenditure was delayed for an extended period, raising fiduciary concerns.

248. Project efficiency was also affected by delays in the operationalization of the photometric laboratory at IBMETRO and the implementation of the MVE system—both under MHE's responsibility. These issues contributed to Moderately Unsatisfactory (MU) performance ratings for multiple MHE-led outputs in the MTR. Despite these issues, MHE contributed to drafting regulatory frameworks and maintaining engagement with IBMETRO and IBNORCA.

249. MMAyA faced similar challenges, including staff changes that disrupted workflow and delayed the approval of legal documents. Nonetheless, MMAyA demonstrated more consistent progress in specific reporting periods and collaborated actively with MHE and U4E on the NELs. It also led activities related to the environmentally sound management of spent lighting products, with technical support from U4E.

250. Despite constraints, both MHE and MMAyA supported relevant technical outputs and engaged national stakeholders. However, limited interinstitutional coordination and the absence of active political leadership reduced the project's capacity to embed results within Bolivia's institutional framework. These structural limitations, compounded by external shocks, suggest that the governance context may not have been fully prepared to absorb a project of this ambition during the evaluated period.

Executing Agency's Rating for Quality of Project Management and Supervision: Moderately Unsatisfactory

Rating for Quality of Project Management and Supervision: Moderately Satisfactory

5.9.3 Stakeholders Participation and Cooperation

251. The project engaged a broad and diverse set of stakeholders, including ministries, regulatory bodies, technical agencies like IBMETRO and IBNORCA, national utilities, municipal governments, private sector actors, customs authorities, and lighting manufacturers,

importers, and distributors. While the level of engagement of some private sector actors was more limited than initially anticipated, they participated in several project activities and consultations. Mechanisms such as the PSC, technical working groups, workshops, and targeted consultations were used to facilitate engagement. Participation was particularly notable during training events and technical discussions on MEPS, MVE, and environmentally sound management, with institutions like IBMETRO and IBNORCA having key responsibilities in norm development and capacity building.

252. At the municipal level, the project effectively involved subnational authorities through awareness campaigns and LED demonstration programs. Workshops were held across several municipalities, and local officials actively participated in training sessions. Companies such as Philips contributed to technical discussions and supported product specification work. A clear indicator of early stakeholder commitment was the mobilization of co-financing from multiple sectors. The total co-financing mobilized by project closure reached USD 16,995,547, notably surpassing the initial target of USD 13,467,575 set at design. This outcome runs counter to the common trend in GEF-financed initiatives, where co-financing at closure frequently falls short of projections, and further illustrates the high level of stakeholder participation and cooperation maintained throughout implementation. Institutions such as the Federation of Municipal Associations contributed to high-level governance arrangements, fostering a shared understanding of efficient lighting priorities.

253. Stakeholder participation levels varied over the course of project implementation but overall reflected a high and sustained interest in engagement. While certain mechanisms, such as the PSC and technical groups, became fully operational later than planned, and participation from some private sector actors and municipalities declined during periods of delay, these factors did not diminish the strong collaborative environment achieved. In a few instances, planned contributions—such as co-financing from the Municipality of La Paz—did not materialize, and demonstration municipalities did not establish formal structures for long-term maintenance. Nonetheless, the project maintained broad-based collaboration, exceeded its co-financing targets, and built a solid basis for continued stakeholder involvement beyond its duration.

Rating for Stakeholders Participation and Cooperation: Highly Satisfactory

5.9.4 Responsiveness to Human Rights and Gender Equality

254. The project incorporated human rights and gender equality considerations into its design and implementation, but the integration was uneven and faced several operational challenges. The initial design acknowledged the importance of mainstreaming gender. The CEO Endorsement Document committed to conducting a gender assessment and developing a Gender Action Plan (GAP). It also envisioned gender-balanced participation across project activities, gender-sensitive communication campaigns, and the hiring of a gender specialist to support implementation. These intentions were aligned with UNEP's Policy and Strategy for Gender Equality and the Environment and with broader UN commitments to human rights.

255. According to the 2021 PIR, activities to mainstream gender began only after the recruitment process for a gender specialist had started in the second half of that year. Substantive efforts in this area only advanced in mid-2022 following the appointment of new personnel. By April and May 2023, a GAP was developed, targeting local populations in pilot municipalities through awareness workshops. These activities aimed to promote equitable participation of men and women and to highlight the social benefits of LED lighting and shared household responsibilities. Gender-sensitive materials were developed, and workshops were conducted in several municipalities with students and parents to promote environmental awareness and women's engagement in energy-related decision-making. The GAP also introduced specific indicators to monitor participation, and efforts were made to track male

and female beneficiaries, particularly in Output 4.2.3, which was explicitly dedicated to gender mainstreaming. In some workshops, the female participation rate reached 50%.

256. The implementation of the GAP met the agreed requirements, though progress was uneven across components. The turnover of gender coordination staff affected the continuity and documentation, and the mainstreaming approach was applied mainly through outreach activities rather than being fully integrated into technical, regulatory, or training elements. While no direct actions were undertaken to reduce structural gender gaps, and no indicators were established to systematically track gender-specific outcomes beyond participation rates, the project delivered the activities foreseen in the plan and ensured that gender considerations were reflected in stakeholder engagement and awareness efforts.

257. Although certain gender stereotypes were noted during the field visit, these appeared anecdotal and not necessarily representative of the broader project environment. During interviews conducted in at least two of the municipalities visited, evaluators asked why so few women were involved in the installation and maintenance of public lighting systems, and respondents explained that such tasks required body strength and involved working at heights, which they claimed made women less suitable due to fear of climbing and perceived physical limitations. Given the anecdotal nature of these observations, a formal study would be required to assess the actual extent and impact of such perceptions. From the perspective of the project's commitments, the agreed gender-related deliverables were achieved, with participation opportunities integrated into outreach and engagement activities.

Rating for Responsiveness to Human Rights and Gender Equality: Moderately Satisfactory

5.9.5 Environmental and Social Safeguards

258. The project was classified as low risk in terms of environmental and social safeguards. As a result, no specific mitigation measures were activated during the initial phase. However, several environmental risks were identified during the design phase. These included inadequate management of mercury-containing lamps, the risk of mercury spills during transport, and an increase in hazardous waste.

259. To mitigate these risks, the project proposed several measures: development of a national framework for end-of-life management of lighting products, establishment of a CRSO, pilot initiatives, mercury content limits in line with the Minamata Convention, and training and awareness campaigns. The project also aimed to align with the Basel Convention and national laws, including NB 69022.

260. While efforts were made to consolidate a waste management value chain, during the implementation the stakeholders and coordination channels were not fully consolidated. Field visits observed in Municipality of La Guardia that mercury-containing lamps were stored in unlabelled cardboard boxes placed in shared storage areas, increasing the risk of breakage and contamination. While the evaluation does not have field-level evidence confirming that this issue occurs uniformly across all municipalities, no information was provided to suggest otherwise revealing the need of a comprehensive revision in all the beneficiary municipalities. Despite repeated requests, none of the interviewed municipalities nor the counterparts within MHE and MMAyA were able to supply documentation or certification of proper disposal practices for mercury-containing lamps or contingency protocols for breakage, no staff guidance, and clarity on institutional responsibility for final disposal.

261. The MTR rated safeguard performance as Moderately Satisfactory. It acknowledged early planning efforts but noted that safeguards were not applied during implementation. The project failed to meet its stated objectives on environmentally sound waste management and did not ensure compliance with international conventions. These conditions reflected

unaddressed gaps to ensure safeguards foreseen in the project design. While NB 69022 was developed, it was not fully operationalized at the time of project implementation. Institutions are still working on consolidating the operationalization of regulatory and implementation elements of waste management to ensure the enabling conditions for the forthcoming initiatives, including the IDB project on streetlights. PIRs from 2021 to 2023 continued to classify the project as low-risk, reporting full compliance with environmental regulations. No risks were flagged, and no actions were taken, noting that the 2021 and 2022 PIRs were prepared prior to the pilots being finalized.

Rating for Environmental and Social Safeguards: Moderately Unsatisfactory

5.9.6 Country Ownership and Driven-ness

262. The project was aligned with national energy efficiency policies and was implemented through government institutions, primarily the MHE and MMAyA. Sustained country ownership was affected due to frequent changes in authorities, although the high relevance of the project and its alignment with established energy agenda priorities reinforced the need to support and ensure its continuity. While the project benefited from early high-level endorsement—including the designation of the Vice Minister of Energy Development as project focal point and the participation of the Ministry of Planning in the 2022 Steering Committee.

263. The development of MEPS and the MVE system involved coordination with key institutions such as IBNORCA, IBMETRO, AETN, ENDE, and MDPyEP. Working groups were established and ministries formally participated in policy formulation and demonstration programs. These processes were delayed by frequent staff turnover, short-term contracting, and limited continuity in institutional roles.

264. The evaluator observed some gaps in the approach to capacity ownership. While MHE and MMAyA relied on UNEP-GEF project financing to cover part of the technical capacities needed for implementation, this does not imply a lack of project ownership. On the contrary, their formal participation in donor-financed initiatives demonstrate commitment and ownership, although further efforts to internalize and lead certain technical processes would strengthen institutional self-sufficiency beyond project closure.

265. At the municipal level and stakeholder participation, although some participation in demonstration projects was achieved, the withdrawal of in-kind support from key stakeholders such as the Municipality of La Paz reflected fluctuations in engagement levels. While this could be interpreted as a sign of fragile institutional support, it was largely influenced by external factors, including the pandemic and political instability, which led to the withdrawal of certain co-financing partners and a temporary loss of momentum. Nevertheless, the project was able to re-engage stakeholders over time, attracting new contributions from other national entities and public institutions, and sustaining strong multi-actor collaboration through the later stages of implementation.

Rating for Country Ownership and Driven-ness: Satisfactory

5.9.7 Communication and Public Awareness

266. The communication component was one of the most visible and effectively implemented areas of the project. Multichannel awareness campaigns were deployed, including television spots, social media content, educational videos, infographics, and materials in indigenous languages. These campaigns helped raise national awareness about energy efficiency and its benefits through an inclusive outreach strategy. Publicity materials

were also disseminated via radio, fairs, and local workshops in project municipalities, often targeting women and youth through gender-sensitive messaging.

267. Workshops and training sessions were organized to support municipal authorities, technical staff, and neighbourhood organizations, contributing to knowledge sharing and public engagement. U4E and national institutions such as MHE and MMAyA facilitated learning exchanges, while a study tour to Spain provided exposure to international best practices in mercury waste treatment.

268. Despite these efforts, the project lacked a centralized system to consolidate materials and document outcomes. Campaign content was dispersed across multiple platforms and institutions, limiting access to a comprehensive overview of activities. This fragmentation made it difficult for both evaluators and national actors to assess the campaign's reach and impact. Therefore, while high-level outreach was achieved, the long-term impact of these activities remains uncertain.

269. There was no clear integration of the communication strategy into national education or government outreach policies. The project established platforms for experience-sharing among stakeholders, including the PSC and technical working groups. However, these mechanisms were not supported by a structured knowledge management system. This reduced the effectiveness of internal learning and cross-sector collaboration, particularly considering frequent staff turnover and the involvement of multiple agencies.

Rating for Communication and Public Awareness: Moderately Satisfactory

Rating for Factors Affecting Performance and Cross-Cutting Issues: Satisfactory	Moderately
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6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

270. The project “Delivering the Transition to Energy Efficient Lighting” made a substantive contribution to strengthening the technical and regulatory framework for promoting the adoption of efficient lighting technologies in the country. A NELS was drafted, and MEPS were developed and published through a Supreme Decree, along with the necessary MVE framework that is pending for implementation. These efforts were supported by UNEP’s implementation team and the U4E initiative, which provided technical expertise, training sessions, and guidance materials that informed policy development and capacity building. Demonstration projects were implemented in several municipalities, and public awareness campaigns were disseminated through television, radio, social media, local fairs, and materials in indigenous languages.

271. The project implementation faced significant institutional, technical, and contextual limitations that constrained results. The project’s original design was ambitious relative to Bolivia’s legal and operational context, particularly regarding the enforcement of binding efficiency standards. The materialized political and institutional risks were underestimated affecting the project performance. Key institutions such as the MDPyEP, which holds the mandate for technical norms, were not integrated early on in the design phase—delaying MEPS enforcement and the labelling system. In addition, IBMETRO’s role in MVE implementation was hindered by the absence of required equipment to ensure the laboratory capacity to deliver LED-technology certifications. No structured approach for mercury waste management protocols was included in the design.

272. Execution was affected by staff turnover in MHE and MMAyA, which caused disruptions in implementation and the loss of institutional memory. However, UNEP’s implementation team made significant efforts to quickly brief new government authorities and technical teams on the project’s status and objectives. The team also adopted a more flexible approach to managing extension requests while ensuring that commitments to the GEF were met as closely as possible.

273. At the municipal level, pilot projects revealed technical and operational weaknesses that limited their long-term viability. One of the most recurrent issues was the damage to photocells in LED streetlights caused by voltage fluctuations which compromised the correct functioning of the lighting systems and, in turn, the expected energy savings. These technical problems were compounded by the absence of documented strategies to transfer operational responsibilities or to strengthen local capacities for managing the new infrastructure. As a result, municipalities remained dependent on external support, with installed assets often excluded from routine maintenance plans. Moreover, the project did not succeed in operationalizing safe disposal systems for replaced mercury-containing lamps; in at least one municipality (La Guardia), these were stored in cardboard boxes without protective measures, creating both environmental and public health risks.

274. Bolivia advanced towards replacing inefficient lighting with LED technologies. This integrated policy approach, aligned with the enlighten methodology, UNEP’s Medium-Term Strategy, GEF climate priorities, and national development goals, helped set the direction for this transition but fell short of securing full institutional consolidation. Despite multiple extensions, NELS, MEPS, and the publication of the CRTM and the CCRT for the quality control of LED lamps were not formally adopted. The lack of a functioning legal and regulatory framework compromised the project’s impact for displacing inefficient lighting technologies.

275. Procurement of key equipment for IBMETRO was unsuccessful due to internal coordination issues within the executing agencies. As a result, some MEPS-related training activities directed to IBMETRO were conducted without the relevant equipment needed to ensure the laboratory's capacity to issue CRTM and CCRT, which form the basis of the MVE system. Moreover, several components, including the proposed CRSO model, were left incomplete.

276. Monitoring and reporting were broadly consistent with UNEP's requirements and supported effective oversight of project progress. PIRs were submitted as planned and generally reflected the status of the project at each stage. However, once demonstration activities were underway, some emerging operational and safeguard risks—such as issues observed during pilot implementation—were noted in practice but not always fully captured in reporting. The absence of a central repository to consolidate lessons learned, technical documentation, and campaign materials limited the ability to systematically share information among institutions. While public awareness campaigns were implemented at scale, the lack of structured feedback or evaluation made it difficult to assess their actual influence on consumer behaviour.

277. The project benefited from national ownership, reflected in high-level endorsement and the formal leadership of MHE and MMAYa. Engagement was reinforced through working groups with IBNORCA, IBMETRO, AETN, ENDE and MDPyEP, which played a central role in advancing the development of MEPS and the MVE framework. Although frequent leadership and staff changes affected continuity and slowed decision-making, the project maintained collaboration with key stakeholders and adapted to shifting institutional contexts. The withdrawal of in-kind co-financing by the Municipality of La Paz reflected the impact of external shocks, such as the pandemic and political instability; however, the project succeeded in re-engaging actors, attracting new contributions, and sustaining multi-actor participation. Reliance on external technical assistance and the partial integration of outputs into national planning and budgetary processes continued to limit the prospects for long-term institutionalization beyond the GEF funding cycle.

278. The advances achieved in awareness raising, technical consultations, and regulatory drafting positioned Bolivia to transition towards efficient lighting technologies. However, these gains remain vulnerable without the formal adoption of NELS, enforcement of MEPS and MVE, and the establishment of operational systems for EPR and hazardous waste management. The absence of these measures limits the project's ability to consolidate market transformation and ensure the long-term sustainability of impacts.

Responses to Strategic Questions

Question 1: *In what ways, and to what extent, was gender mainstreamed in the implementation and monitoring of the project?*

279. The project met the gender-related requirements established at the time of its approval, ensuring formal compliance within its design and reporting processes. While the original framework did not include a dedicated result for gender equality or social inclusion, gender-sensitive awareness campaigns were incorporated into municipal outreach activities as a general driver. However, gender considerations were not systematically embedded in the technical components—such as MEPS, waste management, or technical training—and the results framework lacked gender-disaggregated indicators or targeted measures. The stakeholder analysis did not segment by gender, indigenous peoples, or vulnerable groups, limiting the extent to which equity considerations were integrated. While broader incorporation of these elements would have reflected emerging good practices in inclusive project design, such measures were not explicit policy requirements under GEF or UNEP at

the time of approval. An ex post evaluation will be necessary to accurately assess the impact of the gender-focused actions employed and to inform future initiatives.

Question 2: *To what extent were learnings from Terminal Evaluations of previous projects incorporated into this project's design? In what ways, and to what extent, were the recommendations from the Mid Term Review actioned upon? To what extent did the project use or upscale tools or methodologies previously developed by other UNEP projects?*

280. The project design drew extensively on lessons from terminal evaluations of previous initiatives in Latin America and the Caribbean, including prior efforts in Bolivia such as the 2008–2012 nationwide program for the massive replacement of incandescent lamps with CFLs, which demonstrated measurable energy savings and reductions in peak load demand.

281. The recommendations from the Mid-Term Review were only partially implemented. Although certain risks were acknowledged and priorities adjusted, no effective corrective measures were applied in key areas, including equipment delivery, regulatory coordination, and waste management.

282. On the other hand, the project notably benefited from the methodological approach and tools developed under the U4E initiative, previously deployed across several UNEP-GEF energy efficiency projects. These tools, case studies, technical guidelines, and reference materials were adapted to Bolivia's context and directly informed the design of MEPS, MVE frameworks, and regulatory instruments.

Question 3: *What changes were made to adapt to the effects of COVID-19 and how might any changes have affected the project's performance*

283. To adapt to the effects of COVID-19, the project shifted to remote coordination, replacing in-person activities with virtual modalities and intensifying weekly meetings between UNEP and the lead ministries to oversee implementation, address bottlenecks, and maintain alignment among partners. These changes preserved coherence with the procurement plan and results framework, enabling completion of pending activities within the available budget through no-cost extensions. However, connectivity limitations and unequal access to technology at the local level constrained stakeholder engagement, delayed commitments, and slowed certain field-based activities, ultimately extending the implementation period from 32 to 62 months.

Question 4: *In which ways and to what extent was the private sector engaged in implementation of the project and what could have been done better?*

284. Private sector engagement in the project was limited in both scope and depth. The project engaged the private sector primarily through technical consultations and information-sharing, without translating these interactions into lasting commercial partnerships or market commitments. This was partly due to the lack of a binding regulatory framework for MEPS and the uncertainty over enforcement, which limited business confidence. The project involved private actors—particularly importers and distributors of lighting products—in the development of MEPS and related regulatory proposals. Engagement could have been strengthened by pairing regulatory measures with market-enabling instruments, such as credit guarantee facilities for SMEs importing efficient lighting, performance-based incentives for companies investing in local assembly or distribution, and public procurement programmes guaranteeing minimum demand volumes. Such measures would have reduced perceived risks and signalled a stable, investable market for efficient lighting technologies in Bolivia.

285. The table below provides a summary of the ratings and finding discussed in Chapter 5. Overall, the project demonstrates a rating of **Moderately Unsatisfactory**.

Table 7. Summary of project findings and ratings¹⁶

Criterion	Summary assessment	Rating
Strategic Relevance		HS
1. Alignment to UNEP MTS, POW and Strategic Priorities	Supports climate mitigation, chemical safety, and national capacity through aligned policy and technical assistance	HS
2. Alignment to UNEP Donor/GEF/Partner strategic priorities	Promotes low-carbon lighting and mercury management, aligning with both UNEP and GEF climate and chemicals priorities	HS
3. Relevance to global, regional, sub-regional and national environmental priorities	Supports global, regional, and national energy efficiency and mercury reduction goals	HS
4. Complementarity with existing interventions/ Coherence	Builds on global initiatives and aligns with national, regional, and IDB programs	HS
Quality of Project Design	Design underestimated institutional complexity; lacked stakeholder alignment, pilot detail, and outcome clarity	MS
Nature of External Context	Delays from political instability, pandemic, and staff turnover disrupted execution and co-financing	U
Effectiveness		MU
1. Availability of outputs	Low completion across key outputs due to regulatory delays, limited enforcement, and overstated progress	U
2. Achievement of project outcomes	Limited achievement of outcome indicator targets; regulatory, institutional, and implementation gaps remain significant	MU
3. Likelihood of impact	Lack of enforcement, funding, and institutional capacity undermines long-term impact potential	U
Financial Management		HS
1. Adherence to UNEP's financial policies and procedures	Full compliance with UNEP financial rules and audit confirmed strong financial oversight	HS
2. Completeness of project financial information	Budget execution delays occurred, but financial information was complete and allocations appropriate	HS
3. Communication between finance and project management staff	Consistent coordination and weekly meetings strengthened financial-management communication across ministries	HS
Efficiency	Delays, weak sequencing, and institutional fragmentation constrained implementation efficiency despite corrective efforts	MU
Monitoring and Reporting		S
1. Monitoring design and budgeting	Overestimated assumptions, weak risk tracking, and unclear M&E budget reduced system effectiveness	S
2. Monitoring of project implementation	Weak application, undetected risks, and coordination gaps hindered effective monitoring	MS
3. Project reporting	Descriptive reports lacked critical analysis and adaptive use; MTR partially filled gaps	S
Sustainability		MU
1. Socio-political sustainability	Weak institutional ownership, political instability, and missing adaptation mechanisms undermine sustainability prospects	ML

16 Most criteria will be rated on a six-point scale as follows: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU). Sustainability and Likelihood of Impact are rated, also on a six-point scale, from Highly Likely (HL) down to Highly Unlikely (HU) and Nature of External Context is rated from Highly Favourable (HF) to Highly Unfavourable (HU).

Criterion	Summary assessment	Rating
2. Financial sustainability	No post implementation funding mechanisms, exit strategies, or financial commitments to sustain outcomes	MU
3. Institutional sustainability	No formal mandates, clear responsibilities, or long-term structures to sustain institutional roles	L
Factors Affecting Performance		MS
1. Preparation and readiness	Extended delays, late staffing, weak coordination, and unmet readiness plans undermined implementation start	MS
2. Quality of project management and supervision		MS
2.1 UNEP/Implementing Agency:	Maintained oversight and technical support, but systemic national issues limited full effectiveness	S
2.2 Partners/Executing Agency:	Persistent staff turnover, procurement delays, and weak coordination undermined execution capacity and institutional embedding	MU
3. Stakeholders' participation and cooperation	Broad engagement achieved, but irregular coordination and declining participation limited sustained stakeholder ownership	HS
4. Responsiveness to human rights and gender equality	Gender efforts delayed, outreach-focused, lacked structural integration and failed to challenge stereotypes	MS
5. Environmental and social safeguards	Safeguards unimplemented; mercury risks unmanaged; no systems, protocols, or institutional clarity	MU
6. Country ownership and driven-ness	Limited follow-up, weaknesses in institutional continuity, and internal capacity hindered sustained ownership	S
7. Communication and public awareness	Inclusive campaigns raised awareness, but lack of centralized documentation limited long-term impact	MS
Overall Project Performance Rating		MU

6.2 Lessons learned

Lesson Learned #1:	Integrate institutions with regulatory mandates from the outset to avoid delays in enforcement.
Context/comment:	In Bolivia, the MDPyEP, which holds the legal mandate to approve technical norms, was not included in the initial project design. This omission delayed the adoption and enforcement of MEPS regulations and caused coordination failures between MDPyEP and MHE. Similar projects must ensure that institutions with regulatory authority are engaged from the start and that their roles are clear.
Lesson Learned #2:	Avoid technical training before institutional and infrastructure readiness for regulatory implementation is fully ensured.
Context/comment:	The project trained IBMETRO staff before completing the procurement of required testing equipment that was a condition for the laboratory's capacity to enforce the MVE system and issue the CRTM and CCRT. This limited the applicability of the training and prevented the certification of lighting products. Future projects must synchronize equipment delivery with training schedules and ensure that regulatory adoption, institutional capacity, and infrastructure readiness are secured beforehand. The positive experience with U4E experts highlights how structured methodologies and international technical support can help align training with operational readiness and institutional mandates.

Lesson Learned #3:	Design pilot projects based on full baseline assessments to avoid operational and measurement failures.
Context/comment:	Unanticipated voltage fluctuations damaged installed photocells, making luminaires ineffective. This issue was not detected due to incomplete diagnostics. Moreover, the absence of comprehensive public lighting baseline assessments limited the ability to attribute energy savings directly to the project. Municipalities and stakeholders lacked objective records on historical energy consumption of replaced technologies, making it difficult to quantify the actual impact. In addition, the rebound effect—where efficiency gains are partially offset by increased use of the resource—may have further influenced net savings. This does not imply that savings were not achieved, but rather that without adequate baseline data and technical assessments, it is challenging to conclusively demonstrate their magnitude. Projects should therefore conduct full baseline assessments, including both technical conditions and energy consumption data, before launching pilots to ensure that results can be properly measured and validated.
Lesson Learned #4:	Do not rely on project-based staff to implement long-term regulatory frameworks.
Context/comment:	Staff turnover in MHE and MMAyA created repeated knowledge gaps. Because technical capacities were not institutionalized, regulatory development and enforcement stalled. Sustainable policy reform requires permanent staffing strategies and mechanisms to preserve institutional memory.
Lesson Learned #5:	Gender equality must be embedded in technical components, not just in communication activities
Context/comment:	The GAP focused on outreach but has limited influence on technical activities like procurement or training. Moreover, measures challenging gender norms could have an impact on women's participation in energy efficiency work. Future projects should further integrate gender in all workstreams, including staffing and implementation.
Lesson Learned #6:	Operational and financial roles for hazardous waste management must be clarified before project closure
Context/comment:	The CRSO model remained in draft form and no institution assumed responsibility for mercury waste disposal. On the other hand, at least the Municipality of La Guardia was left storing lamps unsafely, with no disposal funding or guidance. Projects dealing with hazardous waste must ensure exit strategies and institutional accountability are secured early. There is a complexity of linking lamp recycling to broader electronic waste management frameworks under the EPR approach.
Lesson Learned #7:	Project monitoring systems must detect operational risks and be linked to decision-making
Context/comment:	Issues such as mercury lamp storage and faulty photocells were only identified during the final evaluation field visits, despite being present for years. The monitoring framework lacked structured feedback loops and did not detect implementation risks, including performance losses from malfunctioning photocells and inadequate disposal of mercury-containing lamps. Monitoring systems must include operational checks and rapid response protocols.

6.3 Recommendations

Recommendation #1:	Assess the current situation of spent lamps in municipalities, and then establish a contingency plan for safe disposal of mercury-containing lamps
Challenge/problem to be addressed by the recommendation:	Field visits revealed that at least in one Municipality many mercury-containing lamps replaced during the pilot projects are stored unsafely in municipal facilities. In Municipality of La Guardia these lamps were kept in cardboard boxes, in areas not designed for hazardous waste storage, in a machine room shared with operational equipment. This underscores the need to conduct a field assessment in all beneficiary municipalities to determine the status of replaced luminaires and gather verifiable evidence of their final disposal – for example, an official statement from an MMAyA-certified company confirming that the declared lamps have been duly disposed of. The recurrence of inadequate storage practice of mercury-containing lamps across beneficiary municipalities poses significant environmental and public health risks. This situation highlights an urgent gap in environmental safeguards and raises concerns regarding private sector's capacity to meet its EPR commitments. Without immediate action, mercury exposure risks may occur, and the environmental impact of the project will be undermined
Priority Level:	Critical
Type of Recommendation	Partners
Responsibility:	MMAyA, Vice Ministry of Environment, DGGIRS, municipalities.
Proposed implementation time-frame:	Immediate (within 1–3 months)
Cross-reference(s) to rationale and supporting discussions: Paragraph 175, 177, 183, 260175	

Recommendation #2:	Formalize a pathway enabling coordination between MHE and MDPyEP for the updating and development of new MEPS for any technology
Challenge/problem to be addressed by the recommendation:	The delayed development and enforcement of MEPS for LED lamps and luminaires resulted from a lack of early engagement of MDPyEP, the ministry legally mandated to issue technical standards. MHE was tasked with coordinating MEPS under the project but lacked the legal mandate, leading to significant bottlenecks. MDPyEP's technical decision-making on energy-related areas lies outside its core expertise and has slowed the MEPS progress, reinforcing the need to consolidate working synergies that can facilitate smoother coordination in the future. This institutional mismatch also created coordination barriers with IBMETRO, which falls under MDPyEP. Decision-making challenges were three-way involving MHE and MDPyEP and IBMETRO: IBMETRO possessed highly specialized technical knowledge that MHE lacked in the field of energy-consuming appliance measurement, including familiarity with the equipment specifications required to carry out accurate testing and meet the protocols for CCRT and CRTM—both essential for operationalizing the MVE system. As a result, enforcement of MEPS was delayed, and the MVE framework was not fully implemented due to the cancellation of procurement of equipment for CCRT and CRTM. UNEP may be positioned to support this follow-up, mindful of the country's political constraints.
Priority Level:	Important
Type of Recommendation	Partners

Responsibility:	MHE and MDPyEP
Proposed implementation time-frame:	6 months-1 year
Cross-reference(s) to rationale and supporting discussions: Paragraphs 166, 181, 198	

Recommendation #3:	Ensure the immediate procurement of the equipment required for IBMETRO to guarantee the implementation of the MVE system
Challenge/problem to be addressed by the recommendation:	Although Supreme Decree No. 5121 (21 February 2024) authorizes IBMETRO, through the MDPyEP, to issue the Technical Regulation Sample Certificate (CRTM) and the Technical Regulation Compliance Certificate (CCRT) for LED lamps, the cancellation of the photometric laboratory equipment purchase left the institution without the testing capacity required to substantiate certifications within the MVE. As a result, certification issuance did not advance, and IBMETRO, despite MEPS and certification training, was unable to publish and enforce the CRTM and CCRT or effectively support MEPS enforcement under the MVE framework.
Priority Level:	Important
Type of Recommendation	Partners
Responsibility:	MHE, MDPyEP and IBMETRO
Proposed implementation time-frame:	For future interventions
Cross-reference(s) to rationale and supporting discussions: Paragraphs 190, 198, 209, 210	

Recommendation #4:	Conduct ex-ante and ex-post baseline assessments of streetlight to demonstrate actual project savings and impacts, and gather lessons learned from the implementation of demonstration projects.
Challenge/problem to be addressed by the recommendation:	Although no formal ex-post survey was conducted at the national level, interviewees reported that some final users and municipalities prefer LED technologies and have integrated LED procurement criteria. However, the absence of ex-ante and ex-post baseline assessments of streetlight operation limited the ability to demonstrate actual project savings and to systematically capture lessons learned from the demonstration projects. Among these lessons, field experience revealed that in municipalities such as La Guardia and Warnes, voltage fluctuations damaged photocells, leading to inefficient use of installed LED streetlights. These issues were not anticipated due to the lack of comprehensive baseline assessments of electrical infrastructure, and while the problem may affect all pilot sites, no data exist to confirm its scale. Moreover, no contingency measures or monitoring mechanisms were in place to detect or correct such problems early on. This resulted in energy waste, reduced performance, and a missed opportunity to refine public lighting programs based on municipal realities. Future replications must be based on technical diagnostics covering voltage stability, grid integration, maintenance capabilities, and environmental safeguards. In addition, hazardous waste management practices for mercury-containing lamps remain largely undocumented. While unsafe storage was observed in La Guardia, no systematic information exists for other municipalities, and in cases where the issue may have been resolved, there is no record of how compliance with environmental safeguards was achieved. Documenting such practices, where effective, would allow replication in other municipalities facing similar conditions.

Priority Level:	Opportunity for improvement
Type of Recommendation	Partners
Responsibility:	UNEP, MHE, Municipal Governments, ENDE Distribution
Proposed implementation time-frame:	3–6 months
Cross-reference(s) to rationale and supporting discussions: Paragraph 183	

Recommendation #5:	Institutionalize project knowledge by establishing mechanisms to safeguard institutional memory on energy efficiency projects, mitigating the impacts of staff turnover in future initiatives
Challenge/problem to be addressed by the recommendation:	High staff turnover, and weak inter-institutional coordination eroded continuity and institutional memory, delaying the adoption of regulatory instruments and undermining the sustainability of results. Procurement bottlenecks, compounded by unclear ministerial responsibilities, prevented IBMETRO from finalizing its certification role, highlighting the fragility of institutional arrangements. Although the project generated valuable technical deliverables and heightened IBMETRO's awareness of its regulatory responsibilities, the absence of long-term staffing strategies or formal knowledge management mechanisms leaves these gains vulnerable to loss. For future initiatives, it is recommended to establish a working group responsible of compiling technical outputs, regulatory drafts, and records of inter-agency coordination. This working group can create information system linked to a structured knowledge transfer protocol to facilitate onboarding, preserve institutional memory, and support the operationalization of regulatory functions by permanent units in relevant ministries.
Priority Level:	Opportunity for improvement
Type of Recommendation	Partners
Responsibility:	MHE, MMAyA and MDPyEP
Proposed implementation time-frame:	For future interventions
Cross-reference(s) to rationale and supporting discussions: Paragraphs 164, 225, 241, 269	

Recommendation #6:	Integrate gender equity and social inclusion into project implementation, monitoring and ex-post impact assessments.
Challenge/problem to be addressed by the recommendation:	While the GAP met its formal commitments and delivered targeted outreach activities, gender equality and social inclusion were not systematically integrated into the project's technical components. The absence of a dedicated result for gender in the original framework, combined with the lack of gender-disaggregated indicators or targeted actions in the core results framework, limited the project's ability to measure gender-related outcomes. Stakeholder analysis did not segment participants by gender, indigenous identity, or vulnerability, reducing opportunities to address equity considerations in design and implementation. In some cases, participation rates among women reached parity, but integration into procurement processes, technical training, and regulatory workstreams remained minimal. Turnover of gender coordination staff further weakened continuity and documentation, and the monitoring system did not include mechanisms for assessing gender-related results beyond participation counts. While anecdotal perceptions of women's suitability for infrastructure tasks were noted in field visits, no systematic study was undertaken to assess their

	prevalence or impact. Future projects should embed gender considerations into all technical workstreams from inception, define measurable gender indicators within the results framework, ensure gender expertise is represented in procurement and implementation teams, and include ex-post impact assessments to capture outcomes for women and other underrepresented groups.
Priority Level:	Opportunity for improvement
Type of Recommendation	Project
Responsibility:	Gender Focal Points at MHE and MMAyA, UNEP Gender Unit, Project Managers
Proposed implementation time-frame:	9 months and future interventions
Cross-reference(s) to rationale and supporting discussions: Paragraph 129, 160, 184, 216, 219, 256	

ANNEX I. RESPONSE TO STAKEHOLDER COMMENTS

Response to stakeholder comments received but not (fully) accepted by the evaluator(s), where appropriate

Page Ref	Stakeholder comment	Evaluator(s) Response	UNEP Evaluation Office Response
	All comments were addressed sufficiently		

ANNEX II. EVALUATION FRAMEWORK/MATRIX

Evaluation Criteria Questions	Indicators	Information Source	Data Collection Method
Strategic Relevance			
1. To what extent was the project aligned with the UNEP Medium Term Strategy (MTS), Programme of Work (POW) and UNEP Strategic Priorities (Bali Strategic Plan for Technology Support and Capacity Building (BSP) and South-South Cooperation (S-SC)	Evidence of alignment between the project and the MTS, the POW and the UNEP strategic priorities.	Prodoc and project planning documents UNEP MTS, POW UNEP staff.	Project documentation review Interviews with project staff.
2. To what extent was the project suited to, or responding Donor/Partner Strategic Priorities	Evidence of alignment between the project and Donor Strategic Priorities.	Project documents prepared for individual donors Donor agreements to identify earmarking Donor reporting where applicable	Project documentation review Interviews with project staff.
3. To what extent was the project aligned to Global, Regional, Sub-regional and National Environmental Priorities	Evidence of alignment between the project and Global, Regional and National Environmental Priorities	Project documents and activities reporting Pilot project proposals SDGs	Project documentation review Interviews with project staff.
4. To what extent was the project complementarity and coherent with Relevant Existing Interventions	Evidence of efforts to ensure complementarity and coherence with IDB-led initiatives and UNEP-GEF en.lighten Global Partnership	ProDoc – situation analysis Documented actions (discussions, adaptation of strategies, collaboration, etc)	Project documentation review Interviews with project staff.
Criterion B. Quality of Project Design			
Criterion C. Nature of External Context			
1. What changes were made to adapt to the effects of COVID-19 and how might any changes affect the project's performance?	Effects of COVID.19 pandemic on project operations Evidence of adaptation	Project Implementation Reports (PIRs) Project revisions/extensions	Project documentation review Interviews with project staff.
Criterion D. Effectiveness			

Evaluation Criteria Questions	Indicators	Information Source	Data Collection Method
1. <i>Availability of Outputs</i> : was the project successful in producing and making available its outputs and achieving milestones as set out in the ProDoc?	Number and type of outputs delivered against logframe targets Timeliness of output delivery against the work plan and milestones Quality of outputs delivered: level of alignment with plan and with needs Availability of outputs to external parties	PIRs Project planning documents UNEP staff & partners	Project documentation review Interviews with project staff.
2. <i>Achievement of direct outcomes</i> : Did the outputs achieve its direct outcomes as set out the reconstructed theory of change and as specified in the project logframe	Number and extent of achievement of milestones toward meeting direct outcome indicators Evidence of attribution of direct outcomes to the project / or contribution of the project	PIRs UNEP staff & partners	Project documentation review Interviews with project staff.
3. <i>Catalytic role</i> : Has the project has played a catalytic role or promoted scaling up and/or replication	Evidence of institutional changes, policy changes, follow on financing, uptake of tools and guidance, generation of ownership beyond that anticipated in the outcomes	PIRs Project team, partners, direct beneficiaries	Project documentation review Interviews with project staff. Field visit
Criterion E. Financial Management			
1. Was the rate of disbursement consistent with the work plan, the length of implementation to date and the outputs delivered?	Budget execution per year, component and output, against planned expenditure and total budget	Project budgets and expenditure reports (ERs) PIRs	Project documentation review Interviews with project staff and Finance team.
2. Did the project comply with financial reporting and/or auditing requirements including quality and timeliness of reports?	Proportion and types of financial reporting and/or auditing materials submitted a) correctly and b) on time Quality of financial reporting/auditing materials	Financial reporting Auditing documents	Project documentation review Interviews with project staff and Finance team.
3. Were there any aspects of financial management that affected project performance?	Timeliness of income Timeliness of contracting Timeliness of disbursements Availability to PM of budget information	Financial reporting ERs Project team	Project documentation review Interviews with project staff and Finance team.
Criterion F. Efficiency			

Evaluation Criteria Questions	Indicators	Information Source	Data Collection Method
1. To what extent were outputs achieved in a cost-effective and timely manner	Timing and sequence of outputs against work plan Level of alignment between planned and incurred implementation costs and nature of divergences Cost-effectiveness of human resources arrangements	Workplan, output delivery dates PIRs Financial reporting and budget(s) ERs Staffing arrangements and recruitment Project team	Project documentation review Interviews with project staff and Finance team.
2. What have been the main reasons for any project delays or extensions? To what extent did the delays have an impact on the delivery of project outcomes?	Delivery times for outputs milestones Evidence of impacts - qualitative / descriptive	PIRs Review of documentation related to project extensions Project team and partners	Project documentation review Interviews with project staff. Field visit
3. To what extent were learnings from Terminal Evaluations of previous projects incorporated into this project's design? In what ways, and to what extent, were the recommendations from the Mid Term Review actioned upon? To what extent did the project use or upscale tools or methodologies previously developed by other UNEP projects?	Evidence of adaptive measures - qualitative / descriptive	ProDoc Project revisions after MTR PIRs Project team	Project documentation review Interviews with project staff
G. Monitoring and Reporting			
1. <i>Monitoring design and implementation:</i> Was the monitoring plan well-conceived, and sufficient to monitor results and track progress toward achieving project outputs and direct outcomes?	Use of SMART indicators Existence and quality of: – Baseline – Performance measurement framework/ logframe – Monitoring plan – Definition of roles & responsibilities – Budget and timeframe/ work plan	ProDoc revision logframe	Project documentation review Interviews with project staff

Evaluation Criteria Questions	Indicators	Information Source	Data Collection Method
2. Monitoring Implementation: Was the monitoring plan operational and effective in tracking results and progress towards objectives?	Availability of monitoring results Frequency of updates Scope of monitoring compared to logframe / workplan	Review of monitoring practice PIRs	Project documentation review Interviews with project staff
Criterion H. Sustainability (Socio-political, Financial resources, Institutional framework)			
1. Did the project design and implement any measures to promote sustainability and mitigate risks to sustainability?	Identification of measures put in place at global, regional and local levels during the project timeframe (Qualitative) Verification and review of an exit strategy	Analysis of project strategy and measures including follow on projects by UNEP and by implementation partners Project team and partners	Project documentation review Interviews with project staff. Field visit
2. What factors in place at the close of the project have enabled or hindered the persistence of achieved direct outcomes?		Brief situation analysis based on interests and concerns of partners	Interviews with project staff. Field visit
H. Factors Affecting Project Performance and Cross-Cutting Issues			
i. Preparation and Readiness			
1. Were appropriate measures were taken to address weaknesses in the project design or respond to changes that took place between project approval, the securing of funds and project mobilisation?	Number, appropriateness and timeliness of adjustments made Extent of stakeholder engagement during the project inception phase	ProDoc Project stakeholders	Project documentation review Interviews
ii. Quality of Project Management and Supervision			
1. Were management, supervision and governance arrangements sufficient to keep the project on track to and adapt to emerging issues and opportunities?	Evidence of overall supervision arrangements Evidence of day-to-day supervision Evidence of adaptive management	Consi of oversight and support modalities	Project documentation review Interviews
2. Was support and guidance to implementing partners appropriate and timely?	Evidence of supervision arrangements in agreements with implementing partners Evidence of day-to-day engagement with partners	Consultation of oversight and support modalities	Project documentation review Interviews
iii. Stakeholder Participation and Cooperation			

Evaluation Criteria Questions	Indicators	Information Source	Data Collection Method
1. Were the stakeholder communication and consultation mechanisms effective and inclusive of differentiated groups?	Number and type of stakeholder engagement activities at each stage of the project Evidence of participation from a stakeholder groups, including differentiated groups Proportion of male/female implementing partners, and participants of workshops, trainings or knowledge exchange Evidence that issues and feedback provided by stakeholders were taken into consideration in project implementation	PIRs Project team, Partners, stakeholders in pilot projects	Project documentation review Interviews with project staff. Field visit
2. To what extent were effective partnerships arrangements established for implementation of the project with relevant stakeholders	Number and types of partnerships developed between project and local bodies/organisations Extent and quality of interaction/ exchange between project implementers and local partners	Project reporting Agreements Project team, Partners, stakeholders in pilot projects	Project documentation review Interviews with project staff.
3. In which ways and to what extent was the private sector engaged in the implementation of the project and what could have been done?	Evidence of consideration of differentiated groups in implementation: engagement in activities, consideration in outputs Evidence of consideration of differentiated groups in monitoring	Review of activity reports PIRs	Project documentation review Interviews with project staff.
iv. Responsiveness to Human Rights and Gender Equality			
1. To what extent did the project design, implementation and monitoring take into account gender inequalities and differentiation?	Number and quality of measures in project design, implementation and monitoring, respectively, that address: - possible gender inequalities in access to and control over resources. - specific inequalities in access to and control over resources	ProDoc and Revisions Pilot project proposed	Project documentation review Interviews with project staff and beneficiaries. Field visit
iv. Environmental and Social Safeguards			

Evaluation Criteria Questions	Indicators	Information Source	Data Collection Method
1. Did the project meet UNEP requirements <i>review</i> risk ratings on a regular basis; <i>monitor</i> project implementation for possible safeguard issues; <i>and</i> (where relevant) to safeguard issues?	Evidence of consideration in pilot projects	ProDoc Revisions Pilot project proposed	Project documentation review Interviews with project staff and beneficiaries. Field visit
v. Communication and Public Awareness			
1. Did the project effectively communicate lessons and experience with project partners and interested groups?	Number and quality of public awareness activities undertaken Changes in awareness of target audiences as a result of outreach/ communication by project (if feasible).	Communications strategy Communications output Data on access to / reach of communications outputs	Project documentation review Interviews with project staff
2. Did the project implement appropriate outreach and public awareness campaigns?	Number and scope of outreach activities Number and type of public reached	<i>As above</i>	Project documentation review Interviews with project staff

ANNEX III. PEOPLE CONSULTED DURING THE EVALUATION

Organization	Position	Gender
United Nations Environment Programme (UNEP)	Task Manager	Male
	Fund Management Officer	Female
	Project Specialist LAC	Male
	Finance and Budget Assistant	Female
	Risk Management Specialist	Female
	Project Specialist LAC	Female
United for Efficiency (U4E)	Project coordinator – U4E	Female
	Regional coordinator	Male
Ministry of Hydrocarbons and Energy (MHE)	Project manager	Male
	Execution manager	Male
	Vice Ministry of Electricity and Renewable Energy	Male
Ministry of Environment and Water (MMAyA)	Former Director	Male
	Director of DGGIRS	Male
	Director	Male
	Administrative Specialist	Male
Ministry of Development Planning (MPD)	Director of Ministry of Development Planning	Female
Bolivian Institute of Standardization and Quality (IBNORCA).	Normalization Professional	Female
	National Director of Standardization	Male
Bolivian Institute of Metrology (IBMETRO)	Executive General Director	Female
	Director of Accreditation	Female
	Head of Accreditation Laboratory	Female
	Head of Measurement Laboratory	Male
Smart Services	Electrical Systems Engineer	Male
IDB	Technical Analyst	Male
Municipality of La Guardia	Chief of Streetlight Unit	Male
	Public Lighting Technician	Male
	Public Lighting Technician	Male
Municipality of Warnes	Public Lighting Technician	Male

Note: For confidentiality of the informants, their names and contact addresses are not presented in the table.

ANNEX IV. KEY DOCUMENTS CONSULTED

Project planning and reporting documents

- PIF (Project Identification Form)
- CEO Endorsement Document
- PCA (Project Cooperation Agreement) between UNEP & MHE, MMAyA
- IA (Internal Agreement) between UNEP & U4E
- Work Plan – Original & Rev. 2021 11 03
- Supervision Plan
- SCR (1st, 2nd, 3rd, 4th and 5th SCM)
- Quarterly ERs (MHE, MMAyA and U4E)
- Audit Report 2023-2024

Project outputs – Overall

- PIR 2020, 2021, 2022, 2023 and 2024
- Co-finance general report
- HYPR U4E 2021, 2022, 2023

Project outputs – Component 1

Efficient lighting Strategy (draft)

U4E - MEPS and labeling proposal for domestic lighting

U4E - MEPS and labeling proposal for street lighting

Supreme Decree 5121 - National legislation to establish and enforce MEPS and MVE for lamps

Technical Regulation for S.D. (draft)

Supreme Decree – Ban on Incandescent Lamps (draft)

“Preliminary Remarks of LED Norm NB87005” report

“MEPS proposal for Residential Lighting in Bolivia” report

“MEPS proposal for Street Lighting in Bolivia” (available in English and Spanish).

Marco Legal - Implementación de la Responsabilidad Extendida del Productor en Bolivia

U4E Comments on the Bolivian Norm EQNB 87006

Revision and comments of Lighting National Strategy

Report “Evaluation and proposal on strengthening monitoring, verification and compliance”.

Report “Límites de Contenido de Mercurio para luminarias en Bolivia”

Project outputs – Component 2

U4E - ECONOLER - Assessment and proposal for an MVE scheme - Jun 22 (Activity 1)

U4E - ECONOLER - Legal framework for a MVE scheme for MEPS - Sep 22 (Activity 3)

U4E - ECONOLER - Certification process harmonization according to best practices - Sep 22 (Activity 5)

U4E - Assessment of testing laboratories for lighting efficiency - Mar 23

U4E - Training for government and customs about MVE scheme operation (Activity N°2) (ToR)

U4E - Training for laboratories, and suppliers about best practices for MVE (Activity N°4) (material & participation)

U4E Report - Assessment of laboratories and strengthening needs

Project outputs – Component 3

U4E - Key aspects on lamps collecting in Bolivia - Ignacio Duque - Jun 23

U4E Report – Mercury limits recommendations - Dec 21

S.D. - Regulation on lamps Hg content (draft)

U4E - Operational framework proposal

U4E - Legal framework assessment & recommendations

Report Meteomod - Hg monitoring to select CRSO pilot
MMAyA - Technical regulation - Electric Residues Management in an EPR framework (draft)
Revised Norm NB 69022 - "Residues Management – Used lamps" (Under approval)
Training on environmentally sound management of lighting residues
Report - CRSO Pilot Project Sacaba - Management of used lamps - Patricia Rojas
Communications strategy

Project outputs – Component 4

U4E - Guidelines for sustainable public purchases - Efficient lighting - Oct 22
Technical Specs for LED procurement under the project demonstration
Designing demonstrations and evaluations of LEDs and lighting controls, including case studies of financial models (Publication)
Gender Assessment and Formulation of Gender Action Plan
Gender-sensitive communication campaigns focused on LED technology and controls.

IDB Project Documentation

Program for the Development of Energy Efficiency in Street Lighting Systems in Bolivia
Plan de Monitoreo y Evaluación BO-L1230, March 2025
BO-L1230 First period Jan-Jun 2024 - Public Report
BO-L1230 Second period Jan-Dec 2024 - Public Report

Previous evaluations

Mid-Term Review of UNEP Project "Delivering the transition to energy efficient lighting" 2023

Reference documents

- GEF 3457 TE Global EE
- GEF 3876 TE Lighting in Cote d'Ivoire
- GEF 4139 TE Lighting in Morocco
- GEF 4173 TE Lighting in Peru
- GEF 5150 TE Lighting Chile

ANNEX V. EVALUATION ITINERARY

Date	Activity	Names ¹⁷ of people met/interviewed
19 January 2025	Travel from New York, to La Paz, Bolivia - Field Visit	
20 January 2025	Meeting with Project Team	Director of DGGIRS
January 21st, 2025	Meeting with Project Team	Execution Manager
	Meeting with technology provider Smart Services SRL	Staff member
	Site visit to IBNORCA laboratories.	Normalization professional, National Director of Standardization
	Site visit to IBMETRO laboratories.	Executive General Director, Director of Accreditation, Head of accreditation laboratory, Head of measurement laboratory
January 22nd, 2025	Travel from La Paz to Santa Cruz de la Sierra	
January 23rd, 2025	Site visit to Warnes Municipality.	Public lighting technician
	Site visit to La Guardia Municipality.	Streetlight Technician
	Travel from Santa Cruz de la Sierra to La Paz	
January 24th, 2025	Meeting with MPD	Director of Ministry of Development Planning
	Travel from La Paz, Bolivia from New York	

¹⁷ For confidentiality of the informants, their names and contact addresses are not presented in the table.

ANNEX VI. FINANCIAL MANAGEMENT

Financial management components:		Rating	Evidence/ Comments
1. Adherence to UNEP's policies and procedures:		S	The financial management and reporting of the project adhered to UNEP's financial policies and procedures, with no evidence of deficiencies.
Any evidence that indicates shortcomings in the project's adherence ¹⁸ to UNEP or donor policies, procedures or rules		No	
2. Completeness of project financial information¹⁹:		S	
Provision of key documents to the reviewer		S	
A	Co-financing and Project Cost's tables at design (by budget lines)	Yes	- Co-financing by source (CEOER) - Project Cost by project Component (CEOER) - Full sheet with reconciliation (Annex F1 & F2 from CEOER)
B	Revisions to the budget	Yes	- Rev. 1 - Rev. 2
C	All relevant project legal agreements (e.g. SSFA, PCA, ICA)	Yes	- PCA between UNEP (IA) and MHE - PCA between UNEP (IA) and MMAyA - IA between UNEP (IA) and U4E - Co-financing contribution letter – MHE - Co-financing contribution letter – MMAyA - Co-financing contribution letter – Municipality of La Paz - Co-financing contribution letter – Municipality of Sacaba - Co-financing contribution letter – Municipality of Patacamaya - Co-financing contribution letter – Department of Cochabamba - Co-financing contribution letter – Philips - Co-financing contribution letter NLTC - Co-financing contribution letter – UNEP/Energy Branch - PCA Amendment 1 – MHE – UNEP - PCA Amendment 1 – MMAyA – UNEP - PCA Amendment 2
D	Proof of fund transfers	Yes	
E	Proof of co-financing (cash and in-kind)	Yes	- Most proof of cash - General Co-financing Report presents receipts for in-kind contributions.
F	A summary report on the project's expenditures during the life of the project (by budget lines, project components and/or annual level)	Yes	Expenditure reports quarterly from MHE, MMAyA and U4E are all available
G	Copies of any completed audits and management responses (where applicable)	Yes	Audit on MMAyA – Zabala auditores srl - Nov 21, 2022 (Includes 2019, 2020 & 2021)

¹⁸ If the evaluation raises concerns over adherence with policies or standard procedures, a recommendation maybe given to cover the topic in an upcoming audit, or similar financial oversight exercise.

¹⁹ See also document 'Criterion Rating Description' for reference

Financial management components:		Rating	Evidence/ Comments
			An external audit was conducted on the management of the MHE for the period Informe de Auditoría Externa MHE – 2023 - 2024 Versión en Ingles
H	Any other financial information that was required for this project (list):	N/A	
3. Communication between finance and project management staff		HS:HU	
Project Manager and/or Task Manager's level of awareness of the project's financial status.		HS:HU	Staff changes led to a learning curve to the EA PM and EA administrative-finance support, with several training sessions. UNEP was well aware of the project's financial status.
Fund Management Officer's knowledge of project progress/status when disbursements are done.		HS	There is no evidence of ignorance of the progress/status of the project when disbursements are made by the Fund Management Officer's
Level of addressing and resolving financial management issues among Fund Management Officer and Project Manager/Task Manager.		MS	EA staff changes led to mistakes or misunderstandings that led to back and forth on disbursement requests. Many of them were not part of budget and could not be executed in the project.
Contact/communication between by Fund Management Officer, Project Manager/Task Manager during the preparation of financial and progress reports.		S	EA staff changes led to mistakes or misunderstandings that led to back and forth on reports presentation
Project Manager, Task Manager and Fund Management Officer responsiveness to financial requests during the review process		HS	There is no evidence of delays in the delivery of requested funds.
Overall rating		HS	

ANNEX VII. ASSESSMENT OF PLANNING AND MANAGEMENT OF ENVIRONMENTAL AND SOCIAL SAFEGUARDS²⁰ BY THE EVALUAND²¹

Step 3a: Evidence of mitigative measures by project management²² for Environmental and Social Risks identified at project design and/or during implementation

Identified Safeguard Standards Risks	Mitigation / avoidance/ management approach	Supporting documentation ²³
3.1 The release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	The project did not include activities involving direct emissions or pollution. No significant risk was identified.	ProDoc; PIRs 2020–2024
3.2 the generation of waste (both hazardous and non-hazardous)?	A technical proposal was developed for managing waste from obsolete lighting products. Although no disposal system was implemented, the risk was conceptually addressed.	EPR strategy report; Output 3.1.1; PIRs 2021–2023
3.3 The manufacture, trade, release, and/or use of hazardous materials and/or chemicals?	The project supported the transition from mercury-based lamps to LED technology, in line with the Minamata Convention.	Draft MEPS regulation; MEPS technical report; Communication materials (Component 4)
3.4 The use of chemicals or materials subject to international bans or phase-outs? (e.g. DDT, PCBs and other chemicals listed in international conventions such as the Montreal Protocol , Minamata Convention , Basel Convention , Rotterdam Convention , Stockholm Convention)?	The project directly addressed the risk by promoting the elimination of mercury in lighting, in accordance with international standards.	ProDoc; Minamata Convention reference; Output 3.1.2
4.2 air pollution, noise, vibration, traffic, physical hazards, water runoff?	No civil works or physically risky activities were carried out. Risk not applicable.	PIRs; Field visit reports

²⁰ GEF Policy on Environmental and Social Safeguards was approved in 2018 (updated in 2019), for identifying and addressing environmental and social risks and impacts in GEF-financed projects and programs. UNEP established its safeguard policy in early 2015 and operationalized it in 2017. In UNEP, the Environmental and Social Sustainability Framework (ESSF) helps to promote human well-being and the protection of the environment. UNEP screens and categorizes proposed programme and project activities using the Safeguard Risk Identification Form (SRIF), introduced in 2019, to identify potential environmental and social risks and impacts. The ESSF was revised in 2020; subsequently, tools, templates, guidance notes and reference materials have been developed.

²¹ Project/ Programme under Evaluation

²² For most low-moderate risk projects, good practice approach may be sufficient. In that case, no separate management plan is necessary. Instead, the project document demonstrates safeguard management approach in the project activities, budget, risks management, stakeholder engagement or/and monitoring segments of the project document to avoid or minimize the identified potential risks without preparing a separate safeguard management plan.

²³ E.g., GEF Project Implementation Report (PIR), Progress Report, Minutes, etc.

Identified Safeguard Standards Risks	Mitigation / avoidance/ management approach	Supporting documentation ²³
4.4 Adverse impacts on natural resources and/or ecosystem services relevant to the communities' health and safety (e.g. food, surface water purification, natural buffers from flooding)?	The project did not intervene in ecosystems or affect environmental services. Risk not applicable.	ProDoc; Evaluation mission report
4.5 Transport, storage use and/or disposal of hazardous or dangerous materials (e.g. fuel, explosives, other chemicals that may cause an emergency event)?	No direct transport or disposal took place. A technical proposal was developed for future management of hazardous waste, including mercury-containing lamps.	Output 3.1.2; Draft EPR regulation; Technical note on waste management
4.6 Engagement of security personnel to support project activities (e.g. protection of property or personnel, patrolling of protected areas)?	Not applicable. The project did not involve security personnel or activities in sensitive areas.	ProDoc; PIRs

Step 3b: Observed Environmental and Social Risks that were overlooked at project design and/or during project implementation

Unidentified Safeguard Standards Risks	Consequence of Risk to the Project	Justification (source of information)
3.1. Lack of an operational strategy for managing mercury waste (post-consumer fluorescent lamps)	Risk of accumulation of hazardous waste and loss of opportunity to develop sustainable EPR mechanisms.	Technical reports for Components 3.1.1 and 3.1.2; interviews with municipalities, MHE and MMAyA.

Step 4: Overall assessment

Sufficiency in planning for Safeguard Standards and associated risks during project design:

The project design acknowledged certain environmental risks, such as mercury in lighting products, and aligned with international conventions (e.g., Minamata). However, it did not include a concrete operational strategy for post-consumer hazardous waste management or for the institutional implementation of Extended Producer Responsibility (EPR), limiting the comprehensiveness of the safeguards approach.

Responsiveness (evidence of mitigative measures by project management) to Environmental and Social Risks identified during project implementation:

The project produced technical guidelines and proposals for EPR and waste management (Outputs 3.1.1 and 3.1.2), but no mitigation measures were implemented during the project period. Response was limited to conceptual and planning activities without institutional or operational follow-up.

Negative effects from unidentified Environmental and Social Risks²⁴:

No direct environmental or social damage was observed. However, the absence of a defined post-consumer waste strategy represents a missed opportunity to prevent future environmental risks and to institutionalize safe disposal pathways.

²⁴ Refer to table 3b above

ANNEX VIII. BRIEF CV OF THE EVALUATOR

Name	Fernando Anaya
Profession	Mechanical Engineer and Public Policy Specialist
Nationality	Chilean and Venezuelan
Country experience	- Latin America and the Caribbean: Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Cuba, Dominican Republic, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay. - Asia-Pacific: Bhutan, China, India, Mongolia, Pakistan, Vietnam. - Middle East: Iran
Education	Sustainable Investing Certificate, Harvard University, Boston (2022), MA in Economics and Policy Management, Columbia University, New York (2014), Strategy Design and Execution Certificate, University of Chile, Santiago, Chile (2010), BS in Mechanical Engineering, Universidad Simón Bolívar, Caracas, Venezuela (2006).

Short biography

Fernando Anaya is a mechanical engineer with a master's degree in economics and public policy from Columbia University and certifications in sustainable investment and low-carbon infrastructure from Harvard University. He has over 15 years of experience specializing in the evaluation and preparation of energy, transport, and climate change projects, with a strong focus on securing funding from bilateral and multilateral donors, vertical funds (GCF, CTF, GEF, and MAF), and collaborating with national development banks, local governments, and civil society organizations.

Key specialties and capabilities cover: Evaluation of energy and transport projects, climate finance and project structuring, infrastructure transformation and decarbonization, integration of energy, transport, and water systems, institutional strategy and policy research.

Selected assignments and experiences include: Final evaluation of GEF 5299 project on energy-efficient lighting in Bolivia (UNEP, 2024), preparation of CTF projects for low-emission technologies in Viet Nam and Uzbekistan (WBG-ESMAP, 2024), GEF project supporting the Eco-efficiency Credit Programme in Bolivia (UNDP, 2024), GHG mitigation assessments for solar PV facilities in Bhutan and MAF Outline document (UNDP, 2024), investment opportunities for decarbonizing the natural gas value chain in LAC (OLADE-CAF, 2024-2025), identification of bankable investment opportunities for aluminium, pulp, and paper industries in LAC (IDB, 2022-2023), renewable readiness assessments in Honduras (IRENA, 2022-2023) and Paraguay (IRENA, 2020-2021), and preparation of a policy paper on best practices for coal phase-out and just energy transition in Asia-Pacific (UNDP, 2024).

ANNEX IX. GEF PORTAL INPUTS

The following table contains text to be uploaded to the GEF Portal. **It will be drawn from the Evaluation Report, either as copied or summarised text.** In each case, references should be provided for the paragraphs and pages of the report from which the responses have been copied or summarised.

Table i: GEF portal inputs

Question: What was the performance at the project's completion against Core Indicator Targets? (For projects approved prior to GEF-7²⁵, these indicators will be identified retrospectively and comments on performance provided²⁶).
Response: <i>Indicators were defined for outputs and outcomes; however, some showed weaknesses in specificity, and measurability. Although no formal revisions were made to the logical framework or the Theory of Change, several assumptions and drivers were overestimated, which affected the effectiveness of the monitoring system. The project indicators are as follows:</i> <i>The amount of energy savings in the lighting sector in Bolivia</i> ➤ <i>End of Project Target: Direct: 532 MWh Direct post-project: 7,970 GWh.</i> <i>The amount of CO2eq emissions avoided in the lighting sector in Bolivia</i> ➤ <i>End of Project Target: Direct: 233 tCO2eq Direct post-project: 3.500 ktCO2eq</i> <i>Market share of lamps entered into the Bolivian market: IL / Hal / CFL / LED / others at the end of the project, but also in each adoption of the MEPS.</i> ➤ <i>End of Project Target: In 2018: IL:55,5%; Hal: 4% CFL: 29%; LED: 3.5% Other: 8% In 2021: IL: 22,5%; Hal: 4% CFL: 62%; LED: 3.5% Otros: 8% In 2025: IL: 9%; Hal: 1%; CFL: 68,5%; LED: 13.5%; Otros: 8%</i> <i>National framework for collecting, recycling and/or disposing of spent lighting products endorsed by the government.</i> ➤ <i>End of Project Target: 1</i>
Question: What were the progress, challenges and outcomes regarding engagement of stakeholders in the project/program as evolved from the time of the MTR? <i>(This should be based on the description included in the Stakeholder Engagement Plan or equivalent documentation submitted at CEO Endorsement/Approval).</i>
Response: <i>Participation was particularly notable during training events and technical discussions on MEPS, MVE, and environmentally sound management, with institutions like IBMETRO and IBNORCA having key responsibilities in norm development and capacity building.</i> <i>At the municipal level, the project successfully involved subnational authorities in awareness-raising campaigns and LED demonstration programs.</i>

²⁵ The GEF is currently operating under the seventh replenishment period of the GEF Trust Fund covering the period July 1, 2018 to June 30, 2022. The GEF Portal Reporting Guide for FY20 Reporting Process indicates that GEF-6 projects that have yet to map existing indicators to GEF-7 Core Indicators need to do so at MTR stage or (if already there) at the time of the TE. (i.e. not GEF projects approved before GEF-6)

²⁶ This is not applicable for Enabling Activities

However, stakeholder participation and cooperation varied during the project cycle. While mechanisms for engagement were defined, their operationalization was often delayed or irregular. For example, the PSC did not convene effectively until mid-2022, well after key decisions had been taken. Technical groups did not function with sustained regularity. Engagement from the private sector and some municipalities declined as project delays undermined confidence and reduced the perceived value of participation.

Question: What were the completed gender-responsive measures and, if applicable, actual gender result areas? (This should be based on the documentation at CEO Endorsement/Approval, including gender-sensitive indicators contained in the project results framework or gender action plan or equivalent).

Response:

The initial design acknowledged the importance of mainstreaming gender. The CEO Endorsement Document committed to conducting a gender assessment and developing a Gender Action Plan (GAP). It also envisioned gender-balanced participation across project activities, gender-sensitive communication campaigns, and the hiring of a gender specialist to support implementation. These intentions were aligned with UNEP's Policy and Strategy for Gender Equality and the Environment and with broader UN commitments to human rights.

Despite these planning efforts, the integration of gender considerations during the initial implementation phase was delayed. The implementation of the GAP remained uneven. No direct actions were taken to reduce structural gender gaps, and no indicators were established to systematically track gender-specific outcomes beyond participation rates.

Interviews conducted during the evaluation field visit indicated that prejudices about women's roles in energy projects continue to exist, limiting their involvement in technical and decision-making roles.

Question: What was the progress made in the implementation of the management measures against the Safeguards Plan submitted at CEO Approval? The risk classifications reported in the latest PIR report should be verified and the findings of the effectiveness of any measures or lessons learned taken to address identified risks assessed. (Any supporting documents gathered by the Consultant during this review should be shared with the Task Manager for uploading in the GEF Portal).

Response:

The project was classified as low risk in terms of environmental and social safeguards. However, several environmental risks were identified during the design phase. These included inadequate management of mercury-containing lamps, the risk of mercury spills during transport, and an increase in hazardous waste.

Field visits confirmed that mercury-containing lamps were stored without safety measures in at least one municipality. No collection, storage, or disposal systems were in place. There were no contingency protocols for breakage, no staff guidance, and no clarity on institutional responsibility for final disposal.

The Mid-Term Review rated safeguard performance as Moderately Satisfactory. It acknowledged early planning efforts but noted that safeguards were not applied during implementation.

Question: What were the challenges and outcomes regarding the project's completed Knowledge Management Approach, including: Knowledge and Learning Deliverables (e.g. website/platform development); Knowledge Products/Events; Communication Strategy;

Lessons Learned and Good Practice; Adaptive Management Actions? *(This should be based on the documentation approved at CEO Endorsement/Approval)*

Response:

The communication component was one of the most visible and effectively implemented areas of the project. Multichannel awareness campaigns were deployed, including television spots, social media content, educational videos, infographics, and materials in indigenous languages. These campaigns helped raise national awareness about energy efficiency and its benefits through an inclusive outreach strategy. Publicity materials were also disseminated via radio, fairs, and local workshops in project municipalities, often targeting women and youth through gender-sensitive messaging.

Question: What are the main findings of the evaluation?

Response:

- *The project's original design was ambitious relative to Bolivia's legal and operational context, particularly regarding the enforcement of binding efficiency standards*
- *Political and institutional risks were underestimated*
- *No structured approach for pilot implementation or mercury waste management protocols was included in the design.*
- *Execution was severely affected by staff turnover in MHE and MMAyA, which caused disruptions in implementation and the loss of institutional memory.*
- *At the municipal level, pilot projects created momentum and at the same time revealed technical deficiencies. Voltage fluctuations damaged photocells in LED devices, reducing energy efficiency performance. Municipalities remained dependent on external support, and no transfer of responsibilities or capacity-building strategies were documented.*
- *Despite multiple extensions, NELS, MEPS, and the MVE framework were not formally adopted.*
- *The gender approach was not operationalized within key technical components such as MEPS, waste management, or technical training. This limited its contribution to women's empowerment and to reducing gender gaps in the energy sector .*

ANNEX X. QUALITY ASSESSMENT OF THE EVALUATION REPORT

Evaluand Title: Terminal Evaluation of the UNEP/GEF Project: Delivering the transition to energy efficient lighting (GEF ID 5299) (2016 -2024).

All UNEP 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.

	UNEP Evaluation Office Comments	Final Report Rating
Report Quality Criteria		
Quality of the Executive Summary Purpose: acts as a stand alone and accurate <u>summary</u> of the main evaluation product, especially for senior management. To include: • 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 • reference to where the evaluation ratings table can be found within the report • summary response to key strategic evaluation questions • summary of the main findings of the exercise/synthesis of main conclusions • summary of lessons learned and recommendations.	Final report (coverage/omissions): The executive summary includes all the expected sections. Final report (strengths/weaknesses): The executive summary presents a concise summary of the evaluation report and includes the key messages. The report also includes an extended executive summary in Spanish language (the official language of Bolivia).	6
Quality of the 'Introduction' Section Purpose: introduces/ <u>situates</u> the evaluand in its institutional context, establishes its main parameters (time, value, results, geography) and the purpose of the evaluation itself. To include: • institutional context of the project (sub-programme, Division, Branch etc) • date of PRC approval, project duration and start/end dates • number of project phases (where appropriate) • results frameworks to which it contributes (e.g. POW Direct Outcome) • coverage of the evaluation (regions/countries where implemented) • implementing and funding partners • total secured budget • whether the project has been evaluated in the past (e.g. mid-term, external agency etc.) • concise statement of the purpose of the evaluation and the key intended audience for the findings.	Final report (coverage/omissions): The introduction section includes all the required sections. Final report (strengths/weaknesses): The introduction section situates the evaluand within its institutional context and succinctly defines the parameters (time, value, results, geography). The introduction also includes the purpose of the evaluation.	6
Quality of the 'Evaluation Methods' Section Purpose: provides reader with clear and comprehensive description of evaluation methods, demonstrates the <u>credibility</u> of the findings and performance ratings. To include: • description of evaluation data collection methods and information sources	Final report (coverage/omissions): The evaluation methods section presents a detailed description of the evaluation process. All expected elements are included. Final report (strengths/weaknesses):	5

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- justification for methods used (e.g. qualitative/ quantitative; electronic/face-to-face) - number and type of respondents (see <i>table template</i>) - selection criteria used to identify respondents, case studies or sites/countries visited - strategies used to increase stakeholder engagement and consultation - methods to include the voices/experiences of different and potentially excluded groups (e.g. vulnerable, gender, marginalised etc) - details of how data were verified (e.g. triangulation, review by stakeholders etc.) - methods used to analyse data (scoring, coding, thematic analysis etc) - evaluation limitations (e.g. low/ imbalanced response rates across different groups; gaps in documentation; language barriers etc) - ethics and human rights issues should be highlighted including: how anonymity and confidentiality were protected. Is there an ethics statement? E.g. <i>'Throughout the evaluation process and in the compilation of the Final Evaluation Report efforts have been made to represent the views of both mainstream and more marginalised groups. All efforts to provide respondents with anonymity have been made.'</i>	The evaluation methods section passes the reproducibility test. It explains in sufficient detail how the evaluation was conducted including triangulation of the data sources while highlighting ethical considerations.	
Quality of the 'Project' Section Purpose: describes and <u>verifies</u> key dimensions of the evaluand relevant to assessing its performance. To include: 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) Results framework: 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: 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	Final report (coverage/omissions): This section of the report covers all the key dimensions of the evaluand as expected. Final report (strengths/weaknesses): The project section describes the key aspects of the evaluand in adequate detail. The report describes the context, results framework, stakeholders, project implementation structure and partners, changes in project design and project financing.	6
Quality of the Theory of Change Purpose: to set out the TOC at Evaluation in diagrammatic and narrative forms to support consistent project performance; to articulate the causal pathways with drivers and assumptions and	Final report (coverage/omissions): All expected sections are included in the section on the project theory of change.	5

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justify any reconstruction necessary to assess the project's performance. To include: • description of how the <i>TOC at Evaluation</i>²⁷ was designed (who was involved etc) • confirmation/reconstruction of results in accordance with UNEP definitions • articulation of causal pathways • identification of drivers and assumptions • identification of key actors in the change process • summary of the reconstruction/results re-formulation in tabular form. <i>The two results hierarchies (original/formal revision and reconstructed) 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> This table may have initially been presented in the Inception Report and should appear somewhere in the Main Evaluation report.	Final report (strengths/weaknesses): This section of the report presents a reconstructed theory of change (TOC at evaluation) in both diagrammatic and text form. The section also presents reconstruction of results in the prescribed format while providing justification for the reconstruction.	
Quality of Key Findings within the Report <u>Presentation of evidence:</u> nature of evidence should be clear (interview, document, survey, observation, online resources etc) and evidence should be explicitly triangulated unless noted as having a single source. <u>Consistency within the report:</u> all parts of the report should form consistent support for findings and performance ratings, which should be in line with UNEP's Criteria Ratings Matrix. <u>Findings Statements (where applicable):</u> The frame of reference for a finding should be an individual evaluation criterion or a strategic question from the TOR. A finding should go beyond description and uses analysis to provide insights that aid learning specific to the evaluand. In some cases a findings statement may articulate a key element that has determined the performance rating of a criterion. Findings will frequently provide insight into 'how' and/or 'why' questions.	Final report (strengths/weaknesses): The findings presented are evidence based and consistent throughout the report. The findings presented in the report provide deeper analysis and go beyond describing the "what" and tackle the "why" and "how".	5
Quality of 'Strategic Relevance' Section <u>Purpose:</u> to present evidence and analysis of project strategic relevance with respect to UNEP, partner and geographic policies and strategies at the time of project approval. To include: Assessment of the evaluand's relevance vis-à-vis: • Alignment to the UNEP Medium Term Strategy (MTS), Programme of Work (POW) and Strategic Priorities	Final report (coverage/omissions): This section of the report tackles all the dimensions strategic relevance as expected. Final report (strengths/weaknesses): The evaluation report presents a good analysis of the relevance of the evaluand to the strategic priorities of UNEP, GEF and the national priorities of Bolivia. Also included in the analysis is the	6

²⁷ During the Inception Phase of the evaluation process a *TOC at Evaluation Inception* is created based on the information contained in the approved project documents (these may include either logical framework or a TOC or narrative descriptions), formal revisions and annual reports etc. During the evaluation process this TOC is revised based on changes made during project intervention and becomes the *TOC at Evaluation*.

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- Alignment to Donor/GEF/Partners Strategic Priorities - Relevance to Regional, Sub-regional and National Environmental Priorities - Complementarity with Existing Interventions: complementarity of the project at design (or during inception/mobilisation²⁸), with other interventions addressing the needs of the same target groups.	complementarity of the evaluand with existing interventions.	
Quality of the 'Quality of Project Design' Section <u>Purpose:</u> to present a summary of the strengths and weaknesses of the project design, on the basis that the detailed assessment was presented in the Inception Report.	Final report (coverage/omissions): The evaluation report includes a section on Quality of Project Design as expected. Final report (strengths/weaknesses): The quality of project design section presents a balanced critique of both the strengths and weaknesses in project design.	6
Quality of the 'Nature of the External Context' Section <u>Purpose:</u> to describe and recognise, when appropriate, key <u>external</u> features of the project's implementing context that limited the project's performance (e.g. conflict, natural disaster, political upheaval²⁹), and how they affected performance. While additional details of the implementing context may be informative, this section should clearly record whether or not a major and unexpected disrupting event took place during the project's life in the implementing sites.	Final report (coverage/omissions): The evaluation report includes a section that analyses the nature of the external context. Final report (strengths/weaknesses): The report presents an excellent analysis of the project implementation context that covers the negative externalities that affected project implementation. The analysis also includes an analysis of the effects of these negative externalities (political instability and COVID-19 pandemic) and mitigations measures put in place by the project.	5
Quality of 'Effectiveness' Section (i) Availability of Outputs: <u>Purpose:</u> to present a well-reasoned, complete and evidence-based assessment of the outputs made available to the intended beneficiaries. To include: - a convincing, evidence-supported and clear presentation of the outputs made available by the project compared to its approved plans and budget - assessment of the nature and scale of outputs versus the project indicators and targets - assessment of the timeliness, quality and utility of outputs to intended beneficiaries - identification of positive or negative effects of the project on disadvantaged groups, including those with specific needs due to gender, vulnerability or marginalisation (e.g. through disability).	Final report (coverage/omissions): The report includes a section that analyses the availability of planned project outputs to targeted end users. Final report (strengths/weaknesses): The report presents an evidence-based analysis of the availability of outputs to the targeted end users by comparing targets with achievement. Also included is the analysis of the quality, timeliness of the delivery of the outputs.	5

²⁸ A project's inception or mobilization period is understood as the time between project approval and first disbursement. Complementarity during project implementation is considered under Efficiency, see below.

²⁹ Note that 'political upheaval' does not include regular national election cycles, but unanticipated unrest or prolonged disruption. The potential delays or changes in political support that are often associated with the regular national election cycle should be part of the project's design and addressed through adaptive management of the project team.

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ii) Achievement of Project Outcomes: Purpose: to present a well-reasoned, complete and evidence-based assessment of the uptake, adoption and/or implementation of outputs by the intended beneficiaries. This may include behaviour changes at an individual or collective level. To include: • a convincing and evidence-supported analysis of the uptake of outputs by intended beneficiaries • assessment of the nature, depth and scale of outcomes versus the project indicators and targets • discussion of the contribution, credible association and/or attribution of outcome level changes to the work of the project itself • any constraints to attributing effects to the projects' work • identification of positive or negative effects of the project on disadvantaged groups, including those with specific needs due to gender, vulnerability or marginalisation (e.g. through disability).	Final report (coverage/omissions): The report presents a section that analyses the achievement of project outcomes as compared to targets. Final report (strengths/weaknesses): The evaluation presents a well-reasoned analysis on the achievement of project outcomes compared to targets.	5
(iii) Likelihood of Impact: Purpose: to present an integrated analysis, guided by the causal pathways represented by the TOC, of all evidence relating to likelihood of impact, including an assessment of the extent to which drivers and assumptions necessary for change to happen, were seen to be holding. To include: • an explanation of how causal pathways emerged and change processes can be shown • an explanation of the roles played by key actors and change agents • explicit discussion of how drivers and assumptions played out • identification of any unintended negative effects of the project, especially on disadvantaged groups, including those with specific needs due to gender, vulnerability or marginalisation (e.g. through disability).	Final report (coverage/omissions): The evaluation report includes a section on the analysis of the likelihood of impact. Final report (strengths/weaknesses): The report includes a good analysis of the likelihood of impact. The analysis also includes the drivers, assumptions and actors involved the change process.	5
Quality of 'Financial Management' Section Purpose: to present an integrated analysis of all dimensions evaluated under financial management and include a completed 'financial management' table (may be annexed). Consider how well the report addresses the following: • <i>adherence</i> to UNEP's financial policies and procedures • <i>completeness</i> of financial information, including the actual project costs (total and per activity) and actual co-financing used • <i>communication</i> between financial and project management staff	Final report (coverage/omissions): The report includes a section on project financial management arrangements. Final report (strengths/weaknesses): The evaluation report presents an analysis of the project financial management. The analysis covers adherence to UNEP's financial policies and procedures, completeness of financial information, and communication between financial and project management staff.	5
Quality of 'Efficiency' Section Purpose: to present an integrated analysis of all dimensions evaluated under efficiency (i.e. the primary categories of cost-effectiveness and timeliness). To include:	Final report (coverage/omissions):	5

	UNEP Evaluation Office Comments	Final Report Rating
- time-saving measures put in place to maximise results within the secured budget and agreed project timeframe - discussion of making use, during project implementation, of/building on pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. - implications of any delays and no cost extensions - the extent to which the management of the project minimised UNEP's environmental footprint.	The report includes a section on measures by the project to ensure efficiency. Final report (strengths/weaknesses): This section of the report presents an analysis of the two dimensions of efficiency i.e. time and cost effectiveness. The analysis includes the cost effectiveness measures put in place by the project key of which include leveraging pre-existing institutions, agreements and partnerships for synergy. The report also includes an analysis of the project's efforts towards minimising UNEP's environmental footprint.	
Quality of 'Monitoring and Reporting' Section <u>Purpose:</u> to present well-reasoned, complete and evidence-based assessment of the evaluand's monitoring and reporting. Consider how well the report addresses the following: - quality of the monitoring design and budgeting (<i>including SMART results with measurable indicators, resources for MTE/R etc.</i>) - quality of monitoring of project implementation (<i>including use of monitoring data for adaptive management</i>) - quality of project reporting (e.g. <i>PIMS and donor reports</i>) \	Final report (coverage/omissions): A section of the quality pf monitoring and reporting is included in the evaluation report. Final report (strengths/weaknesses): The evaluation report presents a good analysis of the performance of the project in relation to the three dimensions of monitoring and reporting i.e. quality of the monitoring design and budgeting, quality of monitoring of project implementation and quality of project reporting.	5
Quality of 'Sustainability' Section <u>Purpose:</u> to present an integrated analysis of all dimensions evaluated under sustainability (i.e. the endurance of benefits achieved at outcome level). Consider how well the report addresses the following: - socio-political sustainability - financial sustainability - institutional sustainability	Final report (coverage/omissions): The report includes a section on sustainability. Final report (strengths/weaknesses): The report presents a well reason analysis of the three dimensions of sustainability i.e. socio-political, financial and institutional sustainability.	6
Quality of Factors Affecting Performance Section <u>Purpose:</u> These factors are not always discussed in stand-alone sections and may be integrated in the other performance criteria as appropriate. However, if not addressed substantively in this section, a cross reference must be given to where the topic is addressed and that entry must be sufficient to justify the performance rating for these factors. Consider how well the evaluation report, either in this section or in cross-referenced sections, covers the following cross-cutting themes: - preparation and readiness - quality of project management and supervision³⁰ - stakeholder participation and co-operation	Final report (coverage/omissions): The evaluation report includes a section that analyses each of the factors affecting project performance. Final report (strengths/weaknesses): The evaluation report includes an excellent analysis of the factors affecting project performance. These include: preparation and readiness, quality of project management and supervision, stakeholder participation and co-operation, responsiveness to human rights and gender equality, environmental and social safeguards, country ownership	5

³⁰ In some cases 'project management and supervision' will refer to the supervision and guidance provided by UNEP 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 UNEP. This includes providing the answers to the questions on Core Indicator Targets, stakeholder engagement, gender responsiveness, safeguards and knowledge management, required for the GEF portal.

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• responsiveness to human rights and gender equality • environmental and social safeguards • country ownership and driven-ness • communication and public awareness	and driven-ness, communication and public awareness.	
Quality of the Conclusions Section (i) Conclusions Narrative: Purpose: to present summative statements reflecting on prominent aspects of the <u>performance of the evaluand as a whole</u>, they should be derived from the synthesized analysis of evidence gathered during the evaluation process. To include: • compelling narrative providing an integrated summary of the strengths and weakness in overall performance (achievements and limitations) of the project • clear and succinct response to the key strategic questions • human rights and gender dimensions of the intervention should be discussed explicitly (e.g. how these dimensions were considered, addressed or impacted on)	Final report (coverage/omissions): The evaluation report includes a conclusions section which includes summative statements on the performance of the evaluand. Final report (strengths/weaknesses): The report presents concise summative statements on the performance of the evaluand as a whole. The report also includes human rights and gender dimensions of the intervention and clear and succinct responses to the key strategic questions.	6
ii) Utility of the Lessons: Purpose: to present both positive and negative lessons that have potential for wider application and use (replication and generalization) Consider how well the lessons achieve the following: • are rooted in real project experiences (i.e. derived from explicit evaluation findings or from problems encountered and mistakes made that should be avoided in the future) • briefly describe the context from which they are derived and those contexts in which they may be useful • do not duplicate recommendations	Final report (coverage/omissions): The report presents lessons learned in the prescribed format. Final report (strengths/weaknesses): The lessons learned section presents lessons derived from real project implementation experiences and have potential for wider application in similar contexts and interventions.	6
(iii) Utility and Actionability of the Recommendations: Purpose: to present 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. Consider how well the lessons achieve the following: • are feasible to implement within the timeframe and resources available (including local capacities) and specific in terms of who would do what and when • include at least one recommendation relating to strengthening the human rights and gender dimensions of UNEP interventions • represent a measurable performance target in order that the Evaluation Office can monitor and assess compliance with the recommendations. NOTES: (i) In cases where the recommendation is addressed to a third party, compliance can only be monitored and assessed where a contractual/legal agreement remains in place. Without such an agreement, the recommendation should be formulated to say that	Final report (coverage/omissions): The report includes recommendations aimed at addressing problems in project execution and proposed actions to ensure sustainability of project results. The recommendations are also presented in the prescribed format. Final report (strengths/weaknesses): The recommendations presented are actionable and are derived from actual project implementation challenges and desire to increase likelihood of sustainability of project results. A recommendation that relates to strengthening the human rights and gender dimensions of UNEP interventions was also included.	6

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UNEP project staff should pass on the recommendation to the relevant third party in an effective or substantive manner. The effective transmission by UNEP of the recommendation will then be monitored for compliance. (ii) Where a new project phase is already under discussion or in preparation with the same third party, a recommendation can be made to address the issue in the next phase.		
Quality of Report Structure and Presentation (i) Structure and completeness of the report: To what extent does the report follow the Evaluation Office structure and formatting guidelines? Are all requested Annexes included and complete?	Final report (coverage/omissions): The report is complete and follows the Evaluation Office structure and formatting guidelines.	5
(ii) 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?	Final report (strengths/weaknesses): The evaluation report is written in clear English language and uses visual aids (figures and tables) appropriately.	5
OVERALL REPORT QUALITY RATING	Satisfactory	5.4

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1. The overall quality of the evaluation report is calculated by taking the mean score of all rated quality criteria.