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IMPLEMENTATION COMPLETION AND RESULTS REPORT

LOAN NO. 8594-MX, LOAN NO.8844-MX, TFOA7062

ON A LOAN

IN THE AMOUNT OF US\$50.00 MILLION

AND A GRANT FROM THE GLOBAL ENVIRONMENT FACILITY (GEF)

IN THE AMOUNT OF US\$5.79 MILLION

TO THE

UNITED MEXICAN STATES

FOR THE

ENERGY EFFICIENCY IN PUBLIC FACILITIES PROJECT (PRESEMEH)

APRIL 29, 2024

Energy and Extractives Global Practice
Latin America and Caribbean Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective April 17, 2024)

Currency Unit = Mexican Peso (MXN)

MXN 17.02= US\$1

FISCAL YEAR

July 1 - June 30

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ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
BAU	Business as usual
CFE	Comisión Federal de Electricidad (Federal Electricity Commission)
CONUEE	Comisión Nacional para el Uso Eficiente de la Energía (National Commission for the Efficient Use of Energy)
CPS	Country Partnership Strategy
CURB	Climate Action for Urban Sustainability
EE	Energy Efficiency
EIRR	Economic Internal Rate of Return
ESA	Energy Service Agreement
ESMAP	Energy Sector Management Assistance Program
ESMF	Environmental and Social Management Framework
FIDE	Fideicomiso para el Ahorro de Energía Eléctrica (Energy Savings Trust Fund)
FIRR	Financial Internal Rate of Return
FM	Financial Management
FOTEASE	Fondo para la Transición Energética y el Aprovechamiento Sustentable de la Energía (Fund for Energy Transition and Sustainable Energy Use)
GEF	Global Environment Facility
GHG	Greenhouse Gas
GoM	Government of Mexico
ICR	Implementation Completion and Results Report
IMSS	Instituto Mexicano del Seguro Social (Mexican Social Security Institute)
IRI	Intermediate Results Indicator
ISR	Implementation Status and Results Report
LIC	Ley de Infraestructura de la Calidad (Quality Infrastructure Law)
M&E	Monitoring and Evaluation
MBs	Municipal Buildings
MGAS	Marco de Gestión Ambiental y Social
NAFIN	Nacional Financiera, S.N.C., I.B.D. (a national development bank)
NDC	Nationally Determined Contribution
NDP	National Development Plan
NES	National Energy Strategy
NPV	Net Present Value
O&M	Operation and Maintenance
PDO	Project Development Objective
POM	Project Operations Manual
PIU	Project Implementation Unit (UREP, as per acronym in Spanish)
PV	Photovoltaic
PRESEMEH	Energy Efficiency in Public Facilities Project
PRONASE	Programa Nacional para el Aprovechamiento Sustentable de la Energía (National Program for the Sustainable Use of Energy)
RF	Results Framework
SENER	Secretaría de Energía (Ministry of Energy)
TESOFE	Tesorería de la Federación (Treasury of the Federation)

TF	Trust Fund
ToC	Theory of Change
TRACE	Tool for Rapid Assessment of City Energy
TTL	Task Team Leader
UREP	Unidad Responsable de Ejecución del Proyecto (the project implementation unit)
VAT	Value Added Tax
WWF	Water and Wastewater Facility

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P149872	Energy Efficiency in Public Facilities Project (PRESEMEH)
Country	Financing Instrument
Mexico	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Related Projects

Relationship	Project	Approval	Product Line
Supplement	P160778-Additional Finance for Energy Efficiency in Public Facilities Project (PRESEMEH)	30-Mar-2018	Global Environment Project
Additional Financing	P165585-Additional Financing for Energy Efficiency in Public Facilities Project (PRESEMEH)	30-Mar-2018	IBRD/IDA

Organizations

Borrower	Implementing Agency
United Mexican States	Secretaría de Energía (SENER)



Project Development Objective (PDO)

Original PDO

<p>The objective of the project is to promote the efficient use of energy in the Borrower's municipalities by carrying out energy efficiency investments in selected municipal sectors and contribute to strengthening the enabling environment.</p>

Revised PDO

The objective is to promote the efficient use of energy in the Borrower’s municipalities and other eligible public facilities by carrying out energy efficiency investments in selected public sectors and to contribute to strengthening the enabling environment.

PDO as stated in the legal agreement

The PDO included in the Legal Agreement is the same than the one included in the Revised PDO

FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
P149872 IBRD-85940	100,000,000	39,396,240	39,396,240
P149872 IBRD-88440	50,000,000	6,678,362	6,678,362
P160778 TF-A7062	5,790,000	5,790,000	5,790,000
Total	155,790,000	51,864,602	51,864,602
Non-World Bank Financing			
Borrower/Recipient	7,000,000	2,450,000	3,450,000
Local Govts. (Prov., District, City) of Borrowing Country	49,000,000	14,910,000	16,810,000
Total	56,000,000	17,360,000	20,260,000
Total Project Cost	211,790,000	69,224,602	72,124,602

KEY DATES

Project	Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
P149872	08-Mar-2016	23-Sep-2016	07-Oct-2019	31-Oct-2021	28-Oct-2023



RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
30-Mar-2018	1.03	Additional Financing Change in Results Framework Change in Components and Cost Change in Financing Plan Change in Institutional Arrangements Other Change(s)
18-Dec-2020	14.80	Change in Results Framework Change in Components and Cost Change in Legal Covenants Change in Institutional Arrangements Change in Implementation Schedule
14-Oct-2021	20.85	Change in Results Framework Change in Loan Closing Date(s) Change in Implementation Schedule
26-Jan-2023	25.78	Change in Results Framework Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Satisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRS

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	11-Jun-2016	Satisfactory	Satisfactory	0
02	13-Dec-2016	Satisfactory	Satisfactory	0
03	16-Jun-2017	Satisfactory	Moderately Satisfactory	.09
04	21-Dec-2017	Satisfactory	Moderately Satisfactory	.51
05	20-Jun-2018	Moderately Satisfactory	Moderately Satisfactory	1.12
06	17-Dec-2018	Moderately Satisfactory	Moderately Satisfactory	6.90



07	12-Jun-2019	Moderately Satisfactory	Moderately Satisfactory	6.99
08	19-Dec-2019	Moderately Satisfactory	Moderately Satisfactory	9.00
09	26-Jun-2020	Moderately Satisfactory	Moderately Satisfactory	10.44
10	22-Jan-2021	Moderately Satisfactory	Moderately Satisfactory	14.80
11	11-Nov-2021	Moderately Satisfactory	Moderately Satisfactory	21.66
12	31-May-2022	Moderately Satisfactory	Moderately Satisfactory	23.43
13	06-Dec-2022	Moderately Satisfactory	Moderately Satisfactory	25.68
14	28-Jun-2023	Moderately Satisfactory	Moderately Satisfactory	30.90

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Energy and Extractives	100
Public Administration - Energy and Extractives	6
Other Energy and Extractives	94

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Urban and Rural Development	50
Urban Development	50
Urban Infrastructure and Service Delivery	50
Environment and Natural Resource Management	50
Climate change	50
Mitigation	50

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. At appraisal, structural reforms in the energy (and other key) sectors were being implemented. These reforms were expected to increase productivity and output over the medium to long term, with the opening of the energy sector to participation of private investors and operators. The 2014 energy reform also promoted the efficient use of energy with energy efficiency (EE). The National Energy Strategy (NES, 2014–2028) included EE as a policy area for reducing the country’s vulnerability, helping address the risk of becoming a net energy importer, and lowering greenhouse gas (GHG) emissions. Climate change action was a national priority, reflected in Mexico’s 2015 intended Nationally Determined Contribution (NDC)¹.
2. Economic growth in Mexico was mainly concentrated in urban areas, with growing urbanization. Urban populations accounted for 72 percent of the total population and were expected to increase to 88 percent by 2050. The significant demographic and economic growth were expected to put pressure on municipalities to expand and improve public services, although most were facing budgetary constraints.
3. Mexican municipalities’ highest expenses after salaries were street lighting (SL), water supply, and wastewater treatment. EE was considered a cost-effective way to manage energy consumption and lower operational expenditures, given the assessment of untapped energy savings opportunities. EE projects could free up a portion of municipal resources for other priorities, while helping modernize key energy-consuming public infrastructure. City governments were in a unique position to lead the transition to more EE cities, but they faced several barriers, and had limited borrowing and technical capacity.
4. Mexico had a number of institutions in place with mandates and competencies to promote EE. These included the Ministry of Energy (*Secretaría de Energía*, SENER), the entity responsible for planning and formulating national energy policies, supported by regulatory and technical bodies such as the National Commission for the Efficient Use of Energy (*Comisión Nacional para el Uso Eficiente de la Energía*, CONUEE), who drafts the National Program for the Sustainable Use of Energy (*Programa Nacional para el Aprovechamiento Sustentable de la Energía*, PRONASE) and is tasked with promoting the sustainable use of energy in all sectors and government levels by issuing guidance and providing technical assistance. The Electricity Energy Savings Trust Fund (*Fideicomiso para el Ahorro de Energía Eléctrica*, FIDE) – a private non-profit trust fund (TF) – provides technical and financial solutions for the deployment of EE actions. To support the transition to clean and sustainable energy use, SENER had created the Fund for Energy Transition and Sustainable Energy Use (*Fondo para la Transición Energética y el Aprovechamiento Sustentable de la Energía*, FOTEASE), a key instrument to finance renewable energy and EE investments.
5. The proposed new public-financed EE project was designed to address challenges to the implementation of EE initiatives in public facilities at the municipal level², integrating lessons from

¹ The intended NDC specified a GHG mitigation target of 25 percent reduction by 2030 below business-as-usual (BAU) levels (https://www.gob.mx/cms/uploads/attachment/file/162973/2015_indc_ing.pdf)

² These included (a) lack of information and awareness, (b) low technical and implementation capacity, (c) misaligned incentives, (d) restrictive budgeting and procurement procedures, and (e) lack of access to financing.

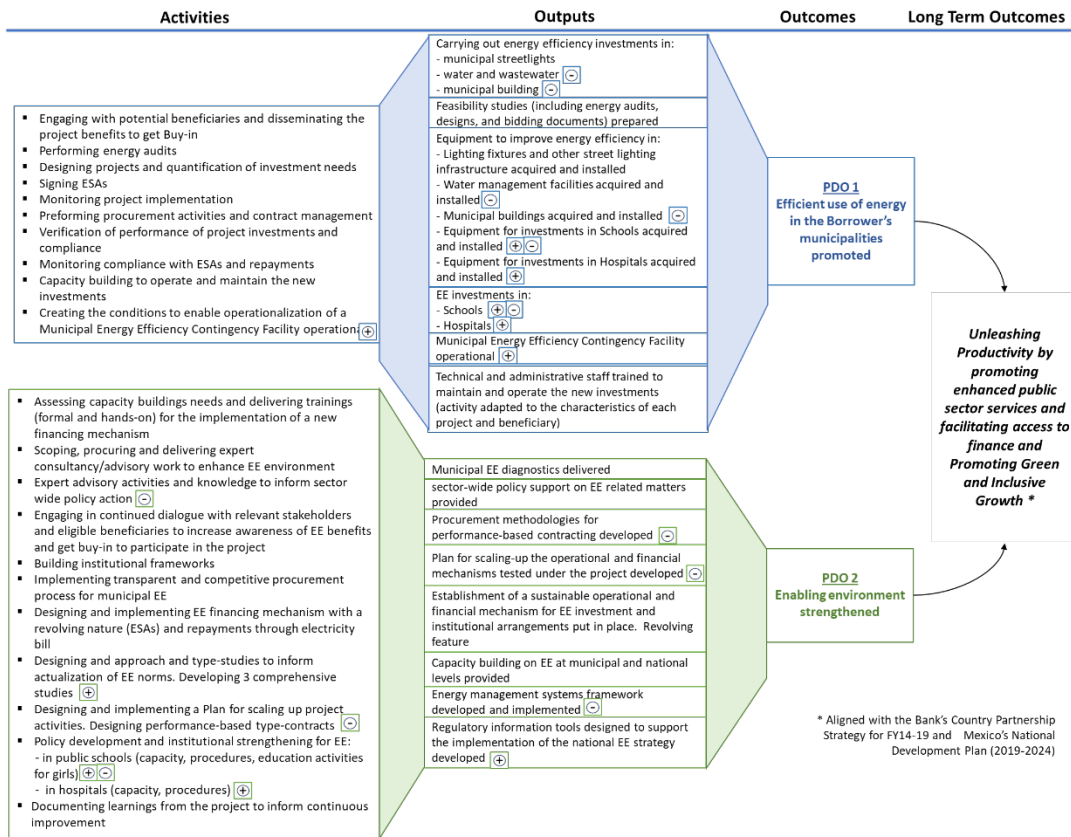


previous programs and designed with the strong involvement of its institutions, SENER, FIDE, along with the Federal Electricity Commission (Comisión Federal de Electricidad, CFE) and CONUEE. The FOTEASE would channel funds for the project. (See Figure 1 for a presentation of the Theory of Change).

6. At the appraisal stage, the project was aligned with the World Bank’s Country Partnership Strategy (CPS, Report No. 80800-MX) for FY14–19, supporting Pillar I, ‘Unleashing Productivity’, by promoting enhanced public sector services and facilitating access to finance and Pillar IV, ‘Promoting Green and Inclusive Growth’, by supporting efficient use of energy and natural resources. The project was aligned with Government’s NES and the National Development Plan (NDP).

Theory of Change (Results Chain)

Figure 1. Reconstruction of Theory of Change (ToC) (Results Chain) - at Time of Board Approval (2016)



Key Assumptions

- Municipalities agree to participate in the PRESEMEH and to the repayment of a portion of the EE investments funded under the PRESEMEH.
- Mexico has demonstrated (and continue to demonstrate) a deep commitment to sustainable development and the implementation of EE programs and strategies.
- SENER and the FIDE have proven their ability to implement Bank-financed operations.
- Strong ownership is expected given the benefits of potential savings and most participating institutions have appropriate capacities to implement the operation.
- Risk of Government Policy Changes in the Critical Assumptions.

* Aligned with the Bank’s Country Partnership Strategy for FY14-19 and Mexico’s National Development Plan (2019-2024)

Project Development Objectives (PDOs)

7. **PDO 1: To promote the efficient use of energy in the Borrower’s municipalities by carrying out energy efficiency investments in Selected Municipal Sectors and PDO 2: contribute to strengthening the enabling environment.**



Key Expected Outcomes and Outcome Indicators³

8. PDO1: the project expected to demonstrate the feasibility and impact of EE investments in municipalities across the country⁴, measured with the indicators ‘Projected lifetime energy savings’ and ‘Number of Energy Service Agreements (ESAs)’; PDO2: the project expected to establish and demonstrate a new financing mechanism for EE, with the indicator ‘Framework to scale up municipal EE in the country’⁵.

Components⁶

9. **Component 1 (C1) - Policy development and institutional strengthening.** Activities and expected outputs toward the PDO2 included building the capacity to implement the PRESEMEH EE financing and operational mechanism (see Annex 9), conduct competitive procurement processes, and design and implement financial structures that verify repayments through achieved savings and create trust in EE initiatives. Other specific activities under C1 at appraisal included:

- (a) Capacity building activities on EE at the municipal and national level, and contribution to the identification of potential sub-projects that could feed into a pipeline beyond the project’s life;
- (b) Sector-wide policy support, including: (i) the development of a plan for scaling-up the operational and financial mechanisms tested under the project which shall include, inter alia: relevant procurement methodologies for performance-based contracting; and (ii) the development and implementation of a framework for the establishment of energy management systems in selected municipalities; and
- (c) Support for the implementation, monitoring and evaluation of the project for eligible activities as set forth in the project operations manual (POM).

10. **Component 2 (C2) - Municipal EE investments.** Activities supported PDO 1, and included:

- (a) Carrying out of municipal EE subprojects, consisting of investments linked to acquisition and installation of, inter alia: (i) lighting fixtures and other street lighting infrastructure (e.g., poles, wiring, and control systems); (ii) pumps and motors and other auxiliary equipment; and (iii) lighting, air conditioning, photovoltaic systems in public buildings; and
- (b) Preparation of feasibility studies, including detailed energy audits and designs, and bidding documents, for the municipal EE subprojects.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

Revised PDOs and Outcome Targets

11. In the restructuring approved on March 30, 2018 (AF/R18), ‘Eligible Public Facilities’ was added to PDO1 and ‘Selected Municipal Sectors’ was replaced by ‘Selected Public Sectors’. The revised PDO statement was: **To promote the efficient use of energy in the Borrower's municipalities and other**

³ See Table 1 for an overview of outcome indicators and targets.

⁴ Subsequently also other public facilities (see paragraph 11).

⁵ Described in the Project Appraisal Document (PAD) as a framework to scale-up activities piloted under the operation with a view to transition to a more commercial, sustainable program, facilitating private sector investments.

⁶ See Annex 4 for details on financing.



Eligible Public Facilities by carrying out energy efficiency investments in *selected public sectors* and contribute to **strengthening the enabling environment**.

12. The AF/R18 brought an additional US\$50 million to the project and included modifications to PDO 1 outcome targets: (i) ‘Projected lifetime energy savings’ (O1-I1) was increased from 1,020,714 MWh to 1,735,000 MWh; and (ii) ‘Number of Energy Service Agreements (ESAs) signed’ (O1-I2) went from 23 to 40. The PDO1 outcome targets were further revised in the second restructuring approved on December 18, 2020 (R20) (which involved a partial loan cancellation), as well in the subsequent third restructuring approved on October 14, 2021 (R21): O1-I1 and the ‘Projected Lifetime GHG emission reductions’ (O1-I3) (added in R18⁷), were reduced. See Table 1 and Annex 8.

Revised PDO Indicators

13. As noted above, in the AF/R18, ‘Projected lifetime GHG emission reductions’ (O1-I3) was added to measure PDO 1. In R20, the indicator ‘Framework to scale up municipal EE in the country’ (O2-I1) for PDO 2 was replaced with the indicator ‘Number of regulatory information tools designed to support the implementation of the national energy efficiency strategy’ (see Table 1 and Annex 8).

Table 1. Summary of Outcome Indicators and Targets

Indicator	Original	AF/R18	R20	R21	R23
PDO 1. To promote the efficient use of energy in the Borrower's municipalities and other Eligible Public Facilities					
O1 - I1 Projected lifetime energy savings (MWh) - (Core)	1,020,714	1,735,000	603,504	290,000	290,000
O1 - I2 Number of ESAs signed (number)	23	40	21	21	21
O1 - I3 Projected Lifetime GHG emission reductions (tCO2) (Tones/year) <i>(Indicator introduced during AF/R18)</i>	-	810,000	306,122	145,000	145,000
PDO 2. To contribute to strengthening the enabling environment					
Framework to scale up municipal EE in the country <i>(Original indicator for PDO 2, dropped during R20)</i>	Framework accepted by the SENER	Framework accepted by the SENER	--	--	--
O2 - I1 Number of regulatory information tools designed to support the implementation of the national energy efficiency strategy <i>(Introduced during R20)</i>	-	-	3	3	3

Revised Components

14. **Component 1 (C1)** - Revised during the R20. With the partial loan cancellation, changes were made to the “sector-wide policy support” technical assistance activities. In particular, the activity on energy management systems was dropped⁸, as well as the activity to develop a framework for implementation scale-up that was to include procurement methodologies for performance-based contracting. These were replaced with activities focused on the development of regulatory information tools to support the implementation of the national energy efficiency strategy.

15. **New Component 3 (C3) – Incorporated during AF/R18. Subcomponent 3(a)** for ‘policy development and institutional strengthening for EE in public schools and hospitals’ included: (a) capacity building activities for EE at eligible public facilities; (b) development of policy, and monitoring, reporting

⁷ The indicator for GHG emissions (O1-I3) was added in the AF/R18 in line with the terms of the grant agreement with the Global Environment Facility (GEF) which funded the establishment of a Contingency Facility (Component, C4) described in later paragraphs. The target for O1-I3 was subsequently lowered in R21.

⁸ Another donor was providing technical assistance (TA) on energy management systems.



and verification procedures; and (c) targeted energy and science education activities mainly for girls. **Subcomponent 3(b)** for 'EE investments in schools and hospitals' to support cost-effective EE investments in public education and health facilities included EE audits, technical assessments, feasibility studies, bidding documents, and procurement of goods and works. In R20, investments in schools were cancelled.

16. **New Component 4 (C4)** - Incorporated during AF/R18 (with grant financing grant from the GEF): A **Municipal EE Contingency Facility** was established to partially cover the risk of default by Eligible Municipalities under their respective ESAs⁹. Upon project closing – and after completion of repayments from all beneficiaries of municipal EE subprojects–remaining proceeds in the Contingency Facility will be transferred to the FOTEASE¹⁰ to be used for other EE investments projects.

Other Changes

17. **Component financing and costs.** The project financing was increased in the AF/R18 with the additional financing (AF) of US\$50 million loan (IBRD) and US\$5.79 million grant (GEF) and was subsequently decreased in the R20 (during the COVID-19 pandemic) with the cancellation of US\$100 million (IBRD). Changes to financial allocations by components are shown in Annex 4.

18. **Closing date.** The closing date was extended twice, with a cumulative extension of 24 months: 18 months in the R21 (i.e., from October 31, 2021, to April 30, 2023), and six months in the fourth restructuring approved on January 26, 2023 (R23) (i.e., to October 28, 2023).

19. **Institutional arrangements.** Modifications were made to the institutional arrangements: (a) in the AF/R18, FIDE was assigned the responsibility of implementing the EE investments under the new C3 and managing the Contingency Facility (C4); and (b) in the R21, the responsibility of implementing activities from C1 was transferred to FIDE, under SENER's supervision.

20. **Results Framework.** The Results Framework (RF) was revised in AF/R18, R20, and R21. Indicators and targets were revised in accordance with activities added/dropped (Section IV and Annex 8).

21. **Subprojects selection and eligibility criteria.** The original eligibility criteria to participate in the project were modified in the AF/R18. In the R20, eligibility criteria for subprojects were further modified to better align with the new Government's priorities¹¹ and included meeting poverty, security, and/or climate zones criteria. In addition, the annual call for expressions of interest was eliminated¹²; instead, SENER became responsible for selecting subprojects that met the criteria and complied with financial discipline conditions¹³. See Annex 4.

22. **Beneficiaries.** Over the life of the project, some beneficiaries (e.g., hospitals) were added and others deleted (e.g., schools and water utilities), but municipalities remained constant (See Annex 4).

⁹ See ANNEX 9 for a presentation of the PRESEMEH model and the Energy Services Agreement (ESA).

¹⁰ i.e., The Energy Transition and Sustainable Energy Use Fund.

¹¹ See paragraph 26.

¹² With less financing available, it was not efficient to conduct broad calls for proposals.

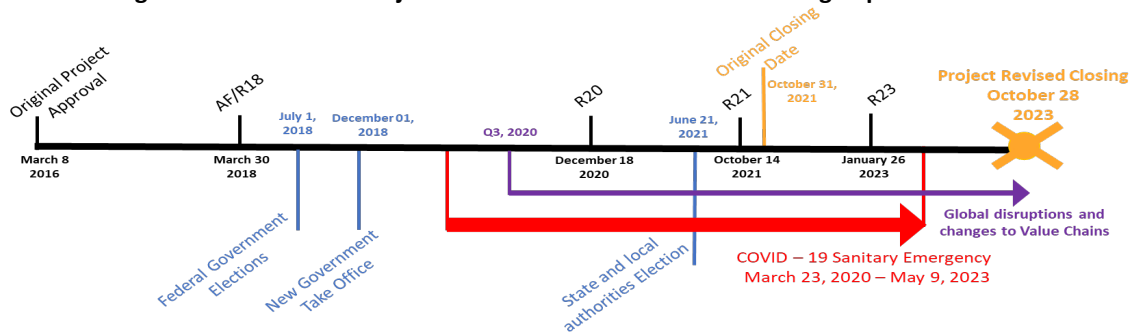
¹³ i.e., lack of debt with the CFE or an agreement on a debt reimbursement scheme.



Rationale for Changes and Their Implication on the Original Theory of Change (ToC)

23. The project was restructured four times (see Figure 2). It involved some changes in the ToC (Figure 1), in terms of the activities and outputs, but the expected outcomes and long-term outcomes remained constant, with main changes linked to the journey to achieve PDO2.

Figure 2. Overview of Project Timeline and main events affecting implementation



24. The AF/R18, with additional financing of US\$50 million (IBRD), was driven by the Government’s interest to scale-up EE, capitalizing on the efforts made to put in place an innovative operational and financing mechanism for EE in municipal facilities and to enable increasing the scope of the project and tap into the EE potential in two other categories of critical public facilities: health and education facilities. Moreover, the AF/R18 brought grant financing (from the GEF) for a Contingency Facility (under C4) to reduce non-payment risks from municipalities and help ensure the FOTEASE would receive the re-payments under the ESAs to support additional sub-projects. As per Figure 1, the AF/R18 affected the ToC.

25. R20 involved a partial loan cancellation (of US\$100 million) as well as modifications to components and activities. These were triggered by (i) the COVID-19 pandemic, hitting Mexico and the world in March 2020, and causing the Government to reallocate resources to respond to the health emergency¹⁴; and (ii) the 2018 national elections which brought in a new government¹⁵ with a different set of priorities¹⁶. See Figure 2 for an overview of the timeline.

26. The partial loan cancellation under R20 affected the IBRD-funded C1, C2, and C3, which were all downsized (see Annex 8). As a result, targets for key indicators (i.e., energy savings, GHG reductions and ESAs) were reduced. The following key changes affected the result chain linked to the PDO 1: (i) EE interventions in schools (under C3) were dropped as their operations were significantly affected during the COVID-19 pandemic; (ii) Municipal Buildings (MBs) interventions were also dropped given the need to prioritize and difficulties in identifying good candidates¹⁷ (Annex 4). There were also important changes linked to PDO 2. At the start of the project, activities included sector-wide policy support in the form of

¹⁴ It should be mentioned that this approach was encouraged and pursued throughout the Bank’s portfolio at the time.

¹⁵ On July 1, 2018, Andrés Manuel López Obrador, leader of the left wing Morena party won the Presidential election. On December 1, 2018, his administration took office, replacing the Institutional Revolutionary Party (PRI) administration (2012-2018) led by former President Enrique Peña Nieto.

¹⁶ The priorities of the new government included addressing inequality, improving the well-being of the population (especially the poor), strengthening the role of the public sector in the economy, including the role of the country’s large energy state-owned enterprises, and improving public finances (with austerity measures, elimination of corruption, reduced indebtedness, and fiscal discipline). For a full overview of the priorities, see National Development Plan 2019-2024.

¹⁷ e.g., the lengthy permitting processes as many buildings identified by municipalities were historical buildings.



development of a framework to scale-up activities and transition to a more commercial program¹⁸. This was changed to better align with the new government priorities – including strengthening the role of the public sector in the economy -, with activities contributing to strengthening the national EE capacity¹⁹, specifically updating three key national EE regulatory norms with broad nationwide reach and the potential to bring large EE improvements. The O2-I1 indicator “Framework to scale up municipal EE in the country” (initially proposed with the aim of enabling greater private sector investments) was replaced by a different indicator, but also a critical element for strengthening the enabling environment for EE in the country, i.e., “Number of regulatory tools designed to support the implementation of the national EE strategy”. This change was intended to enable the Government to operationalize its EE strategy.

27. R21 was prompted by (a) a lengthy transition period and decision-making process following national elections in 2018²⁰; (b) the impacts of COVID-19 restrictions in 2020/2021 on investments in hospitals and on the market of EE equipment (resulting from supply chain disruptions and significant decreases in market activity); and (c) municipal elections across the country in June 2021 which led to administrative transition periods, with delays in responsiveness of number of municipalities. With this, R21 included the extension of the closing date (by 18 months) given implementation delays. Linked to PDO 1, R21 eliminated EE interventions in water facilities (after a reduction in R20) due to difficulties in securing the required documentations and approvals²¹. In addition, targets for energy savings and GHG emissions reductions were reduced to reflect lower realized energy savings in recently completed subprojects in municipalities and lower than expected energy savings in selected hospitals based on the results of the energy audits. The eligibility and focus of targeted beneficiaries also changed to eliminate a minimum investment size criteria (see Annex 4), in line with the government interest to extend the reach – and bring the benefits – of the PRESEMEH to poor and vulnerable municipalities.

28. Linked to PDO2, modifications under the R21 s affected institutional arrangements to align with a new austerity decree, which restricted state institutions from accruing specific categories of expenditures, such as contracting consultancy services. As a result, the responsibility of contracting consultancy firms to provide expert services for delivering outputs under C1 and Subcomponent 3(a) was transferred from SENER to FIDE²² (under SENER’s supervision and guidance).

29. R23 extended the closing date by six months, to provide time for the investments to be completed and the policy development and institutional strengthening activities to be finalized to achieve the PDO.

¹⁸ At time of appraisal, the aim was to “create a transparent and conducive framework for private sector investment”.

¹⁹ The ‘Transition to Promote the Use of Cleaner Technologies’ (*Estrategia de Transición para Promover el Uso de Tecnologías y Combustibles más Limpios*), released in February 2020, affirmed the Government commitment towards EE.

²⁰ As shown in Annex 10, between October 2018 and June 2020, only one ESA was signed.

²¹ e.g., issues with regulatory compliance associated with water extraction/pumping.

²²The austerity decree did not restrict FIDE (a non-profit private trust fund) from performing these activities.



II. OUTCOME

A. RELEVANCE OF PDOs

Relevance Rating: High

30. The PDOs remained relevant for the World Bank strategy for Mexico, including the Bank's Country Partnership Framework (CPF) for Mexico (FY20–FY25) (Report No. 137429-MX) under focus area 'Enabling sustainable infrastructure and climate action', as well as 'Strengthening institutions for public finance, service delivery, and economic inclusion', and in particular the following objectives (i) enhance the management of public resources (#3); (ii) strengthen the institutional capacity to deliver inclusive social services (#6); and (iii) support achieving the government's climate change goals (#7). They also remained relevant to Mexico's national priorities, including Mexico's National Program for the Sustainable Use of Energy²³, derived from the Government's NDP (2019-2024)²⁴, and for Mexico's climate strategy²⁵. Despite significant events (the COVID-19 pandemic and change in government) affecting the project, the project demonstrated capacity to remain relevant and adapt to changing circumstances (see Section 1.B).

31. Indeed, the promotion of efficient use of energy (PDO 1), with its co-benefits of lower energy expenditures for municipalities and public hospitals, modernization of infrastructure, GHG reductions and improved energy services remained aligned with the government's priorities of sustainable development, improving public finances with austerity measures, as well as enhanced well-being (e.g. with added security brought by better quality and increased street lighting, and improved indoor comfort brought by the lighting and thermal improvements in hospitals). By modifying the selection criteria for beneficiary municipalities and hospitals (Annex 4) to also consider poverty and climate, it ensured the PDO 1 was also relevant in terms of the government's priorities regarding reducing inequalities and addressing poverty.

32. PDO 2 was focused on strengthening the enabling environment which is critical – and relevant- to make progress towards tapping into the country's EE potential and reap its associated benefits. The enabling environment for EE can have a number of elements (e.g., technical capacity, access to financing, policy and regulatory frameworks, quality information and data, and suitable administrative procedures). In the case of PRESEMEH's, the strengthening of the enabling environment was essentially carried out on two levels: (i) the design and establishment of a new mechanism and implementation model for financing EE investments in public facilities; and (ii) the support to broader national EE policy and regulatory frameworks. The activities under the latter changed (see Annex 8) - and the outcome indicator under C1 accordingly revised²⁶- to adapt to the change in focus from the private sector to the public sector (see paragraph 26), ensuring continued relevance of the PDO 2.

²³ Under the following priority objectives: VII 'Promote the application of technologies and the use of energy efficient equipment, appliances and vehicles'; VIII 'Promote the reduction of polluting emissions through energy efficiency'; and IX 'Develop standards for energy efficiency, supporting the development of Official Mexican Norms, and the evaluation of compliance against these norms'. See https://www.dof.gob.mx/nota_detalle.php?codigo=5679748&fecha=16/02/2023#gsc.tab=0

²⁴ Under a number of priority areas and objectives, including (i) to maintain country's healthy finances (under Economy); (ii) to develop the general well-being of the population (under Social Policy); and (iii) Sustainable development (under Social policy). See <https://www.planeandojuntos.gob.mx/>

²⁵ Mexico increased its GHG ambition in its revised NDC in 2022, to a 35 percent reduction by 2030 below business-as-usual levels.

²⁶ As shown in Table 1, the indicator O2-I1 changed from the initially proposed framework to scale up municipal EE in the country (which was



33. Albeit the changes in activities under PDO 2, the ambition for strengthening the enabling environment for EE is not deemed to have been diminished. The in-depth technical assessment and capacity developed under PRESEMEH, engaging closely with CONUEE – Mexico’s national EE agency – as well as SENER, to ensure that the opportunity provided under the law to update of EE norms is focused on three key nationally relevant energy-consuming sectors, is expected to set the stage for large scale EE improvements and generate associated co-benefits. This will be essential in the context of the country’s strategy to increase efficiency in the use of the resources and its climate change goals.

B. ACHIEVEMENT OF PDOs (EFFICACY)

PDO 2 with R20 targets: To contribute to strengthening the enabling environment Substantial²⁷

34. The project strengthened the enabling environment at the local and national levels in different ways to a substantial extent based on the evidence discussed below.

35. The PRESEMEH model enabled the implementation of municipal EE investments (and in other public facilities). The project demonstrated a new sustainable operational and financing mechanism and helped to strengthen the institutional framework, increase transparency, enhance procurement processes; as well as to design and implement financial structures that verify repayments through energy savings and create trust in EE initiatives. It built capacity and established institutional arrangements with different entities – SENER, FIDE, CFE, municipalities/ hospitals -, and adapted to changing circumstances on the ground. Despite the inherent challenges associated with putting in place such a new mechanism – which addressed key barriers that have plagued EE investments in public facilities, and especially municipalities -, along with the unforeseen challenges mentioned above, the project put in place a model that can work across the country beyond the Project’s timeframe. The effective operationalization of the revolving fund and payment discipline exhibited by the beneficiaries (next section) represent some of the project’s most outstanding achievements, revealing a successful story that could serve as an example for other projects. The client, as well the sub-national entities that have participated in the PRESEMEH, expressed their interest in exploring a continuation (or a potential “version 2.0”) of the PRESEMEH, signaling their satisfaction with the project’s performance²⁸.

36. Furthermore, the experience and knowledge acquired while delivering the investments also contributed to strengthening EE’s enabling environment, creating evidence-based cases and learnings. As a result, the country now has a sustainable and functional revolving fund model with tested instruments that SENER will continue to use for investments with FOTEASE²⁹ resources (accumulated from the repayments). With repayments channeled through the revolving fund, the Government of Mexico (GoM)

initially aimed at fostering greater private sector participation), to a different, but also critical element of strengthening the enabling environment for EE in the country: the capacity and technical work to updating and raising the ambition of three national norms for EE in important energy-consuming sectors across municipalities.

²⁷ The ICR assesses the PDO 2 based on the revised outcome indicator, i.e., number of regulatory information tools designed to support the implementation of the national EE strategy (O2-I1), as the government prioritized the activities outlined in paragraphs 37 and 38, along with the implementation of the PRESEMEH financing mechanism to achieve the PDO – all while maintaining the level of ambition of the PDO 2 (see para. 32 and 33).

²⁸ See World Bank PRESEMEH video (in Spanish) explain the project and its achievements: <https://www.youtube.com/watch?v=lKG4DjqPon4>

²⁹ Fund for Energy Transition and Sustainable Energy Use (*Fondo para la Transición Energética y el Aprovechamiento Sustentable de la Energía*, FOTEASE is the acronym in Spanish).



is able to fund six additional EE investment projects, which are currently being implemented after the closing of the project, using the PRESEMEH model and mechanism.

37. The project also contributed to strengthening the enabling environment for EE, creating the base to update three national EE norms with a high country-wide impact: (a) NOM-013-ENER-2013 related to EE in street lighting, (b) NOM-020-ENER-2011 related to EE in residential buildings, and (c) NOM-008-ENER-2001 related to EE in commercial buildings. The approval of the updated EE norms is expected, as stipulated by the Quality Infrastructure Law (LIC)³⁰ and thanks to the PRESEMEH, these will be based on/informed by robust technical country/subregion-specific research and data and sensitivity assessments. The impact of implementing the three national EE norms is expected to be significant: electricity savings could be in the order of 1,790 GWh and GHG reductions of 782,160 tCO₂ per year³¹.

38. In addition to the three regulatory tools informed, the project's EE knowledge and capacity building activities constituted the main outputs under PDO 2. They included a total of 13 capacity-building and awareness/dissemination activities delivered, with (i) 64 people benefiting from training on a tool to identify, assess, and plan municipal EE interventions with GHG benefits,³² (ii) 60 government officials benefiting from enhanced knowledge on EE, delivered through a four-course training package ('diplomado'), (iii) 88 staff members from the IMSS hospitals taking the complete EE online training designed under the project³³, and (iv) 51 hospital staff members and 60 employees from municipalities benefiting from strengthened capacity to operate and maintain EE systems and equipment (street lighting and hospitals investments). Details of outputs delivered can be found in Annex 1.

Original PDO 1 with original targets: To promote the efficient use of energy in the Borrower's municipalities: **Modest**

Revised PDO 1 with AF/R18 targets: To promote the efficient use of energy in the Borrower's municipalities and other eligible public facilities: **Modest**

Revised PDO 1 with R20 targets: **Substantial**

Revised PDO 1 with R21 targets: **High**

39. The project promoted EE in Mexico's municipalities and other eligible facilities through investments in modern EE technologies as well as critical complementary measures in 20 municipalities' street lighting systems and 17 hospitals located in different parts of the country.

40. The estimated 'Projected lifetime energy savings' (O1-I1 in Table 2), using the project's *original* parameter values, amount to 427,147 MWh, (42 percent of the original target, 25 percent of the AF/R18 target; 71 percent of the R20 target; and 147 percent of R21 target); and 715,002 MWh using *updated* assumptions³⁴. 'Projected lifetime GHG emission reductions are calculated (conservatively) to amount to

³⁰ Translation of name in Spanish '*Ley de Infraestructura de la Calidad* (LIC)', published in the Federal Official Gazette on July 1, 2020.

³¹ The impact of the updating of these 3 key energy performance norms could have a large impact at the level of the country, and could also have an impact beyond the Mexican borders, as other countries in the region, especially in Central America, often look to EE developments in Mexico to inform EE regulations and policy in their own domestic context.

³² Training was given on the Climate Action for Urban Sustainability (CURB) Tool which focuses on municipal-level energy using measures (<https://www.worldbank.org/en/topic/urbandevelopment/brief/the-curb-tool-climate-action-for-urban-sustainability>)

³³ The online training tool will be accessible to 350 hospitals and around 2,600 employees are expected to take the training annually.

³⁴ The original (more conservative) parameter values used to calculate the project's performance against PDO 1 targets likely under-estimate the actual impact of the project. With updated market and project information, key parameter values have been updated and are used to generate updated estimates of the project's performance. See Annex 4.



189,682 tCO₂ (23 percent of the target in the AF/R18, 62 percent in the R20, and 131 percent in the R21). In addition, the project’s investments in complementary infrastructure (e.g., cabling and posts) provide assurance that the energy savings and GHG reductions will be sustained over time. Thirty-six (36) ESAs were signed (23 with municipalities, 11 with IMSS for hospitals, and 2 with the State of Tabasco for hospitals³⁵) compared to 23 in the original target and the revised targets of 40 and 21 in the AF/R18 and R20, respectively. It is important to note that the projects also succeeded in generating co-benefits highly valued by end users and the beneficiary institutions (e.g., contributions to safety, economic activity, increased comfort levels, and budgetary savings that can be directed to support other priorities).³⁶ (See Section E).

Table 2. Achievement of PDO Indicator Targets

Indicator	Measurement Unit	Level of achievement in regards to Targets from								Actuals at Closure	
		Original	AF/R18	R20	R21						
PDO 1. To promote the efficient use of energy in the Borrower's municipalities and other Eligible Public Facilities											
O1 - I1	Projected lifetime energy savings	MWh	1,020,714	42%	1,735,000	25%	603,504	71%	290,000	147%	427,147
O1 - I2	Number of ESAs signed	number	23	157%	40	90%	21	171%	21	171%	36
O1 - I3	Projected Lifetime GHG emission reductions <i>(Indicator introduced during AF/R18)</i>	tCO ₂ Tones/year	N/A	-	810,000	23%	306,122	62%	145,000	131%	189,682
PDO 2. To contribute to strengthening the enabling environment											
O2 - I1	Number of regulatory information tools designed to support the implementation of the national energy EE <i>(Introduced during R20)</i>	number	N/A	-	N/A	-	3	100%	3	100%	3.0

41. The target for the municipalities’ payment discipline (avoidance of default) is on track, with the signed ESAs³⁷ expected to result in a 100 percent payment discipline by municipalities, as well as health facilities. So far, out of the US\$16.8 million expected to be repaid by the beneficiaries via the ESAs (representing 30 percent of the total EE investments), 37.8 percent has already been repaid and the remaining 62.2 percent is expected to be repaid within the next five years (as stipulated under the schedule of the respective ESAs).

42. As mentioned earlier, the GoM has decided to continue using the sustainable financing mechanism and is already preparing, with the repayments, six new street lighting subprojects to install 10,300 new light points which are expected to generate additional energy savings (35,844 MWh) and emission reductions (15,700 tCO₂)³⁸.

43. Throughout the project’s implementation, the minimum requirement of at least 20 percent energy savings from the baseline scenario was achieved, while maximizing the benefits to the beneficiaries. Instead of only seeking to maximize the direct energy savings, the project also ensured the sustainability of the achieved energy savings. The project thus supported the strengthening of the complementary infrastructure³⁹, bringing lighting to the level of national norms, as well as expanding

³⁵ Some ESAs for hospitals covered more than one health facility.

³⁶ For all indicators there were no changes in targets between the R21 and the R23, as these restructurings only extended the project’s closing date.

³⁷ Out of the 36 ESAs signed, only 3 (one street lighting, one water pumping, and one municipal building project) did not materialize into actual EE investments, for project and site-specific reasons. These three agreements were ultimately cancelled.

³⁸ See Annex 5.

³⁹ This includes cabling and posts for street lighting sub-projects, for example. As indicated in Annex 10, the project financed the installation of 15,350 posts.



street lighting coverage in some areas suffering from energy services (lighting) deficits. In addition, capacity has been built in each municipality to operate and maintain their new street lighting system. In the end, 20 municipalities benefited from the project, reaching around 1.7 million citizens.

44. Strengthening of complementary infrastructure was also implemented in some hospitals with energy service deficits (e.g., where illumination and space climatization needed to be expanded to meet national norms and comfort levels) in addition to replacing existing installations with more EE equipment - and saving grid energy costs with the installation of rooftop solar panels. A total of 17 hospitals⁴⁰ which provide services to around 1.1 million patients per year, benefited from the project EE investments. The main outputs delivered in the context of this PDO are detailed in Table 3⁴¹.

Table 3. Summary of the Project's Main Outputs

	Installed Equipment		Impacts and co-benefits
Street Public Lighting	# Light points = 127,987 # posts = 15,346 # m wired = 1,091 km # Km illuminated = 5,040 km	% replacement of outdated infrastructure = 89.33% % new infrastructure = 10.66%	Lifetime energy savings: Actuals ¹ = 288,013 MWh Updated ² = 575,868 MWh Lifetime emissions savings: Actuals ¹ = 128,741 tCO2 Updated ² = 253,683 tCO2
	1,394 streets, avenues and/or neighborhoods benefited. 1.7 million people benefited located in 20 municipalities.		Increased citizen security Increase economic activity benefiting local businesses Enabling of night time sports activity as outdoor sports fields (particularly important in hot climate areas) Promotion of tourism (through improvement of lighting in key municipal sites).
EE in Hospitals	# Light points: 13,242 luminaires # AC equipment= 181 equipment (chillers, module type, package type and mini-splits) # solar PV panels (kW installed)= 2.55 MW total installed capacity.	98% replacement / 2% new infra 100% replacement 100% new infrastructure	Lifetime energy savings = 139,134 MWh Lifetime emissions savings = 60,941 tCO2
	17 hospitals located in 16 municipalities benefited. 1.1 million patients per year in the 17 hospitals.		Increased energy security Increase in the quality of the health service Better lighting for doctors and nurses to carry out their activities. Enhanced indoor comfort levels
TOTAL			Lifetime energy savings: Actuals¹ = 427,147 MWh Updated² = 715,002 MWh Lifetime emissions savings: Actuals¹ = 189,682 tCO2 Updated² = 314,624 tCO2

¹Lifetime of 8 years for subprojects implemented in 20 municipalities

²Lifetime of 15 years for subprojects implemented in 20 municipalities plus 6 additional subprojects financed by repayments

Justification of Overall Efficacy Rating

45. The overall efficacy ratings are provided in Table 5.

⁴⁰ The 17 health facilities are located in 16 different municipalities.

⁴¹ See Annex 10 for a detailed list of the subprojects financed under the PRESEMEH.



C. EFFICIENCY

Efficiency Rating: High

46. An ex post economic and financial analysis of the project was conducted to assess the efficiency of PRESEMEH interventions. The assessment compared final outputs with the findings from the models used in the AF/R18 Project Paper⁴². The ex-post assessments used the same methodologies and assumptions—when applicable—, updating key variables based on implementation results. At both AF and ICR stages, the economic and financial cost-benefit analyses were done for relevant subsectors (only street lighting and hospitals in the ICR, while the AF had also considered WWFs, MBs, or schools). Costs were adjusted to reflect economic values, excluding taxes and subsidies, and benefits were estimated based on savings to users. The main (quantified) economic benefits from investments were the economic value of the saved energy and the associated GHG reductions (Annex 5). The main economic costs were the capital investments. The main financial benefits were the reduction in energy bills while financial costs consisted of capital investments. In the original AF assessment, all subprojects were economically viable; all interventions were also financially feasible once the direct support⁴³ was considered.

47. Table 4 summarizes the results of the economic and financial analyses at AF and ICR stages. Overall, at ICR stage, the project's economic and financial internal rates of return (EIRR and FIRR)—either including or excluding direct support—were better than those originally anticipated at the AF stage, particularly for street lighting subprojects – suggesting the operation was more efficient than originally expected. These positive outcomes are the result of lower costs for energy-efficient equipment, particularly for lighting. However, the net present value (NPV) when including the direct support, as well as the energy savings and GHG reductions were lower than originally anticipated at the AF stage. Key factors influencing this result compared to what was originally foreseen include (a) the decrease in project size; (b) changes in some of the originally planned technology investments; (c) the reduction in scope, resulting in a lower number of subprojects being supported; and (d) the inclusion of more complementary infrastructure (as mentioned in the section above), which are critical to enable delivering sustainable EE investment (and thus sustain EE and GHG gains) which also bring significant development and well-being benefits. Assumptions and information for each type of subproject supported are discussed in Annex 5.

48. Efficiency was also evidenced through the design, planning and execution of the operation. For instance, from the beginning, the project was efficient in its ability to identify and engage with municipalities, building on the city energy diagnostics that SENER had conducted in 32 municipalities across the country. The decision to add municipality liaison officers ("*gestores municipales*") within the Project Implementation Unit (UREP)⁴⁴ was also an efficient way to keep the momentum, provide necessary information and explanation on the PRESEMEH to facilitate municipalities' engagement and follow-up. The decision to include health facilities subprojects, starting with the IMSS-managed facilities, working with the administration of a broad network of hospitals, increased the efficiency of the process

⁴² The AF project paper included updated economic and financial models for the subsectors that were already covered under the original loan (i.e., street lighting, WWFs, and municipal buildings) and new models for the added sub-sectors (i.e., health and education facilities).

⁴³ The direct support (subsidy) was deemed necessary to start a new EE program, generate interest from beneficiaries, and to address one of a key barrier to the implementation of EE investments in Mexican municipalities, namely the political risk of changes in municipal administration every 3 years. The direct support would help reduce payback periods, and provide an incentive to invest in more advanced (and costly) technology and to carry out more integrated infrastructure works. It was set at 70% of the EE investment amount.

⁴⁴ *Unidad Responsable de Ejecución del Proyecto*, UREP as per the Spanish acronym.



of identifying suitable hospitals (especially during the pandemic), facilitated contacts with hospital managers and especially facilitated the drafting of ESA templates adapted to health facilities.

49. The project added new types of public facilities (schools and hospitals) where significant untapped EE potential existed when it had the opportunity to do so (AF/R18), but also swiftly readjusted to drop the types of facilities (MBs and WWF) where engagement efforts had not been successful. The project also had to react swiftly to better align with priorities of the new government (e.g., activities and indicators under PDO 2, and selection criteria for EE subprojects under PDO1) and the hard and sudden changes brought by the COVID-19 pandemic. This meant taking timely and informed decision to drop a type of facility that was not likely to be able to be suitable in the short term for delivering energy savings and GHG reductions (i.e., education facilities) and importantly adapting working procedures to pursue investments safely during the pandemic, as well as gathering intelligence on significantly affected markets and quickly reacting and adapting procurement processes to the reality on the ground.

Table 4. Economic and Financial Model Results Expected at AF and Found at ICR stage

	No. of Subprojects	Without Direct Support				With Direct Support				
		Economic NPV (US\$, millions)	EIRR (%)	Financial NPV (US\$, millions)	FIRR (%)	Direct Support (%)	Financial NPV (US\$, millions)	FIRR (%)	Direct GHG ERs (MtCO _{2e})	Indirect GHG ERs (MtCO _{2e})
Expected results at PRESEMEH AF	397 ⁴⁵	41.34	11	25.17	9	70	141.59	47	0.81	2.43
Actual results at PRESEMEH ICR	43	54.08	19%	40.41	14	70	83.31	51	0.31	0.94

Note: ER=emission reduction

50. Some restructurings affected efficiency. For example, the project initially included a minimum threshold size for sub-project investments, as means to optimize transaction cost. However, as noted above, in order to broaden the reach of the project beyond a few large municipalities, the threshold was reduced in AF/R18. Notwithstanding, the World Bank reacted efficiently in extending the project's closing date (R21 and R23) to enable the completion of project activities and the achievement of the key outcome indicators.

51. Furthermore, the project's model and institutional arrangements enabled the efficient delivery of EE investments to eligible public facilities at the local level, using a centralized structure combined with field-based focal points. This hybrid approach, provided by FIDE in coordination with SENER, enabled the efficient canalization of resources from the federal level to the local level. This approach, built on the institutions' prior experience with World Bank operations, allowed for delivering projects tailored to specific local needs, with robust governance and a 'check and balances' structure. It also overcame local

⁴⁵ This number reflects the total number of subprojects expected to be implemented at the time of the AF/R18 (AF incorporation). This number is especially affected by the expected interventions in schools, which were estimated at 350. Schools were later dropped from the eligible project beneficiaries.



knowledge and technical barriers. It enhanced the capacity of beneficiary public facilities to replicate or extend good practices⁴⁶ beyond the PRESEMEH investments.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

52. Based on the discussion in the sections above, the project ratings are summarized in Table 5.⁴⁷

Table 5. Summary of Split Rating Analysis

	Original outcomes	Revised outcomes AF/R18	Revised outcomes R20	Revised outcomes R21
Relevance of PDOs	High			
Efficacy (PDO)	Modest	Modest	Substantial	Substantial
PDO 1	Modest	Modest	Substantial	High
PDO 2	Substantial			
Efficiency	High			
Outcome ratings	Moderately Unsatisfactory	Moderately Unsatisfactory	Satisfactory	Satisfactory
Numerical value of the outcome ratings	3	3	5	5
Disbursements	1.28	15.07	11.84	23.41
Share of disbursement	2%	29%	23%	45%
Weighted value of the outcome rating	0.07	0.87	1.14	2.26
Final Outcome rating	4.34			

E. OTHER OUTCOMES AND IMPACTS

Gender

53. The project had planned (AF/R18) to generate gender benefits through the engagement of girls in education facilities, but education facilities were subsequently dropped. Nonetheless, the project has had a positive impact on women and children in beneficiary communities of street lighting projects (see Efficacy section). The perception of security is difficult to measure and attribute, but consulted female beneficiaries said they felt safer to go out and run errands when it was dark; and interviewees (men and women) reported there had been fewer—or no—incidents related to security or aggressions to females.

Mobilizing Private Sector Financing

54. While the extent of private sector mobilization was limited (and not well aligned with the new government’s priorities), the project nonetheless had noteworthy positive impacts linked to private sector engagement: (a) it contributed to demonstrating a financing mechanism for municipal EE investments with repayments by municipalities; and (b) the private sector gained experience in responding to

⁴⁶ For instance, the technical teams made significant strides in improving common operational practices when managing incidents in the street lighting system. They helped transition from a reactive approach of simply changing lights without performing verifications to a proactive methodology that tests various potential sources of failures triggering the incident. This shift in approach has not only reduced operation and maintenance costs but has also been extended to all circuits managed by the Municipality, showcasing the project’s potential for widespread impact.

⁴⁷ The split rating was analyzed and applied as follows: (a) PDO 1 was affected by AF/R18, the R20 and the R21 due to change in PDO statement, dropping of beneficiaries and cancellation of resources. No split evaluation is considered for PDO2 as the statement did not change and the ambition was not deemed to have decreased.



competitive procurement processes, aligned with World Bank standards. Furthermore, local production of some EE technologies was incentivized (e.g., some of the EE street lights were produced locally).

Poverty Reduction and Shared Prosperity

55. The project contributed to reducing inequality by bringing street lighting to communities that had previously been left behind. A total of 1.7 million citizens benefited from the coverage extension of street lighting. Improved street lighting also enabled increased economic activity. In addition, municipalities' energy cost savings resulting from the project's EE investment enable freeing up scarce budget resources to fund other priorities. Also, the expected implementation of updated EE norms based on assessments and capacity developed will bring energy savings to households and communities across the countries, with the potential to lower operational costs and to redirect these expenditures to meet other needs.

Other Unintended Outcomes and Impacts

56. The main unintended outcomes and benefits include (a) upgrading public facilities to the level of national norms and (b) helping gain experience with—and transition to—more efficient and modern technologies (for example, Oaxaca's investment in smart street lighting system and hospitals investing in distributed renewable energy generation), which provide good examples for others to emulate and future projects. The project also generated important non-tangible co-benefits, confirmed in interviews and surveys, and as mentioned earlier in Section II-A and highlighted in Table 3.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

57. Arguably one the most impactful aspects of the project was the design, socialization, and implementation of a new and sustainable mechanism to stimulate EE in municipalities (and later health facilities), working with several key stakeholders. This was made possible by a good assessment of the barriers for municipal (and public sector) EE investments in the past, including lessons and experience from experience gained through other WB projects. The World Bank brought EE expertise to help and advice with the consultations and design elements of the PRESEMEH mechanism, and also to strengthen the trust with clients at SENER. In addition, the Bank did not try to “reinvent the wheel”, building on experience and information from previously successful WB EE operations and analytical work and technical assistance in Mexico, including working through institutional arrangements that had been demonstrated to work well in earlier operations.

58. During preparation, it was determined that it would be important to design a new financing mechanism along with associated institutional arrangements, in such a way as to have it become operational and well-functioning in as short a time as possible. The preparation work thus focused on understanding and building on existing institutional mandates, existing regulatory and policy frameworks, and existing funds. Ensuring that the design of the new mechanism would “fit” within the existing frameworks and would not require any new law, policy, mandate or fund to be created was critical to ensure a workable/implementable mechanism.



59. SENER, the World Bank’s counterpart, was keen to work with the World Bank on an EE operation that would have an impact at the subnational level. Implementation readiness was supported through technical assistance for city energy diagnostics (during and prior to project preparation) in cities in all 32 Mexican states. This helped build interest and awareness of EE opportunities among municipalities and with it, accelerate the start of the project implementation. Had detailed energy audits been available, it would have been even better to provide more accurate estimates of actual EE potential.

60. Another important factor was the ability to combine IBRD financing and World Bank knowledge and expertise and the opportunity to secure grant funding from the GEF⁴⁸ for a Contingency Facility which helped build trust and confidence among federal government officials.

B. KEY FACTORS DURING IMPLEMENTATION

61. The project had a slow pace of disbursement in the early years of implementation, which was highlighted in the early Implementation Status and Results Reports (ISRs). It was to be expected that a project like the PRESEMEH, which needed some time to put in place institutional arrangements, and iron the operation of a new financing mechanism for EE, would require some time to reach its “cruising speed”⁴⁹, which was exacerbated by a somewhat lengthy government transition period following the 2018 national elections. Notwithstanding the slow disbursements, the work performed during this phase was critical to enable the necessary conditions for the model to properly operate and build trust for potential beneficiaries to engage in the project. However, when the GoM decided to look for unallocated project funds within its portfolio to help fund its response to the COVID-19 health emergency⁵⁰, the project’s still low disbursement rate made it a “good candidate” for the cancellation⁵¹ and reallocation of resources.

62. As the project involved a new mechanism, working across different levels of government and needing to address “force majeure” events, the close collaboration between SENER, UREP, FIDE (as the project operator) and the World Bank was critical. The ability to have regular – and increasingly frequent implementation support meetings virtually to complement in-person missions, in addition to the ability to connect on short notice to discuss issues as they arose, helped (i) provide momentum to accelerate the pace of implementation; and importantly enabled (ii) quick reactions to the many issues and challenges that surfaced. This was particularly critical to rapidly identify pragmatic procurement solutions to the challenging market environment during and in the aftermath of the pandemic.

(a) Factors Subject to the Control of the Government and Implementing Entities

63. **Commitment and leadership.** The change in the federal government, with different priorities⁵², through a lengthy transition period (in addition to the pandemic⁵³), had important effects on project implementation and slowed it down (see section I-B). However, after assessing the project’s merits and

⁴⁸ The groundwork was done during preparation although the grant was ultimately processed through the AF.

⁴⁹ As highlighted in the lessons learned, the slow start of disbursement per se was not so surprising. Any project involving designing and putting in place a new implementation model based on an innovative financing mechanism, involving different institutions at different levels of government, and in multiple municipalities inherently brings complexity to the project’s implementation and requires time for it to take off.

⁵⁰ It should be mentioned that this approach was encouraged and pursued throughout the Bank’s portfolio at the time.

⁵¹ This cancellation affected (lowered) the IBRD-funded Components (i.e., Components 1, 2 and 3).

⁵² See section II A.

⁵³ It is important to keep in mind that in the particular context of the COVID health emergency, GoM, like all governments around the world, had to shift its focus to respond to the crisis caused by the pandemic.



adapting it to its priorities, the new government got firmly behind the project and after the worse of the pandemic passed, the pace of implementation accelerated significantly (see share of ESAs signed in 2021-2023⁵⁴ in Annex 10). The project succeeded promoting the efficient use of energy – without creating additional debt - in different types of municipalities and regions, including those more vulnerable with higher poverty rates which were a priority for the government.

64. **Human resources.** The UREP housed at SENER was not fully staffed for a period (2019-2020)⁵⁵, including missing a procurement specialist (See Procurement section below). This caused delays which led to temporarily moving the rating from Moderately Satisfactory to Moderately Unsatisfactory (see the Fiduciary Compliance Section). The World Bank responded by intensifying supervision and helping find pragmatic solutions to encountered challenges.

65. **Legislation and regulations.** The new Government approved an austerity decree in 2020 (see paragraph 29), limiting SENER's ability to perform several project activities (especially related to procurement). A solution was found whereby the responsibility for some activities would be transferred to FIDE. The measure was approved in R21 and required an increase in incremental costs for FIDE.⁵⁶

66. **Governance and politics.** An important challenge faced by the project during implementation was linked to the short and different political cycles in municipalities, affecting the timetable of individual subprojects and also the selection of municipalities. The project timeline (administrative process, energy audit, and procurement process and execution) and the time to generate the energy cost savings to repay the municipality's portion of the investments was not well aligned with the municipal electoral calendar, and some municipal leaders found it difficult, politically, to commit expenditures during their administration when the benefits (and repayments) would fall on a subsequent administration. This made the process highly complex, requiring longer times and more engagement effort than initially envisioned. The World Bank responded to this reality by including in its communication and engagement efforts the project's non-tangible co-benefits, as evidenced by the first implemented subprojects, especially how positively community citizens and municipal leaders received the street lighting subprojects.

67. **Direct support (subsidy).** The availability of a subsidy (70 percent) for the EE investments – which the government decided not to lower⁵⁷ - was key to get buy-in, and limit the beneficiaries' repayment period to an acceptable 5 years.

68. **Bureaucracy.** The process and time to obtain the necessary information and approvals from municipalities to sign the ESAs differed from municipality to municipality. This had an impact on the execution of the project. As estimated by SENER, some approval and signature processes could take from

⁵⁴ Twenty-nine out of the 37 ESAs were signed between 2021 and 2023.

⁵⁵ Federal budgetary and administrative restrictions impeded the hiring of consultants and other contracts.

⁵⁶ Incremental cost was agreed to be covered by the government's resources.

⁵⁷ Building on insights from experience in different parts of the world, direct financial support (a subsidy) is often critical for a new EE program, especially at the beginning, in order to secure buy-in and participation, generate experience and confidence and accelerate implementation. As per the Project Paper of AF/RP18, it was envisioned that the level of direct support (subsidy) from the federal government would be lowered over time. But suitable circumstances did not materialize, especially during and after the pandemic which was a drain municipalities' public finance and health facilities' budgets.



a few months up to a year. This was one reason for the initial slow implementation and disbursements. But the project adapted to this reality and procedures were adjusted to make the process more agile.

69. **Entry conditions related to regulatory compliance.** Project implementation was also affected by unexpected regulatory noncompliance of infrastructure identified for EE improvements, especially in the case of street lighting infrastructure and WWFs. In the first case (street lighting subprojects), the situation was addressed with additional investments to bring the infrastructure to compliance levels. Water investments were finally removed from the project scope per the Government's decision.

70. **Operationalization of a novel revolving fund.** Putting in place all elements to operationalize the financial model (see Annex 9 for details on the model) and gaining the trust of stakeholders took longer than expected, but investing in this effort was critical to enable the capacity to deliver subprojects. This effort involved enhancing capacity and knowledge, engaging in dialogue and negotiation with counterparts and stakeholders, and fine-tuning legal aspects. It is also important to note that, as expressed by beneficiary institutions, these investments and associated benefits could not have been achieved without the PRESEMEH and financial model, as the budget constraints and many competing priorities severely limit municipalities and health institutions' capacity to allocate scarce financial resources toward EE investments.

71. **Multistakeholder management.** Channeling investments from the central to the local/municipal level is always complex. In the case of PRESEMEH, this complexity was increased exponentially by working with multiple local-level beneficiaries and a multistakeholder model. It was useful for SENER/UREP/FIDE to have the ability to engage with municipalities at the technical – as well as political level when needed.

(b) Factors Subject to World Bank Control

72. **Adequacy of supervision.** The level of challenges and complexity faced by the project during implementation required the World Bank to intensify supervision, monitoring, and control with respect to the project and maintain continuous monitoring and understanding of the country context and evolving political and local situation. High adaptability and flexibility capacity, especially on procurement issues, along with rapid reaction time and a well-crafted model were all important.

73. **Task Team Leader (TTL) turnover.** The project had four TTLs during its lifetime. Although there was a transition period in each case, the client noted the disruption such turnover had on a high-complex project that required constant engagement and responsiveness on behalf of the World Bank.

(c) Factors Outside the Control of the Government and Implementing Entities

74. **COVID-19 pandemic.** Shortly after hospitals and schools were incorporated as project's potential beneficiaries (AF/RP18) followed by the transition to a new government, the world entered the COVID-19 sanitary emergency. This triggered the cancellation of IBRD funds (R20) to respond to the pandemic and demanded re-prioritizing and re-dimensioning the project. The restrictions imposed by the emergency measures also significantly affected project implementation. For the hospitals, the rules and limitations lasted long after the peak of the sanitary crisis. Furthermore, market conditions changed significantly after the long pause imposed by the emergency. The World Bank had to implement adaptation measures to



cope with this situation, mainly problem solving while increasing the number of assessments and preparation of subprojects to have enough alternatives to build pipeline. It was also critical to have the capacity to adapt quickly procurement packages to the new market conditions (requiring testing different approaches to understand these new conditions).

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

Rating: Substantial

M&E Design

75. At appraisal, the definition of a ToC was not a requirement. Nonetheless, the logic between the activities, outputs, outcomes, and targets for the project was robust, anchored in previous analytical work, rooted in good understanding of the institutional ecosystem, and well structured (see Figure 1 in section A). A RF and a M&E plan for each indicator were prepared. The initial RF had adequate indicators to gauge progress toward achieving the project’s physical outputs, intermediary results, and outcomes. Most PDO and intermediate outcome indicators were designed to reflect the incremental results expected to be driven by the project. The three original PDO indicators were adequate and relevant to measure PDO outcomes as conceptualized at the appraisal stage. The ‘Projected lifetime energy savings’ indicator provided tangible evidence of the subprojects’ impact towards promoting the efficient use of energy in municipalities. In addition, ‘Number of ESAs signed’ provided clear evidence of the number of municipalities directly engaged in the project through its financing mechanism (with its revolving funds component) and ultimately promoting efficient use of energy. The second part of the PDO was initially measured by ‘Framework to scale up municipal EE in the country’; the indicator was considered adequate and relevant at the appraisal stage. The indicators had annual benchmarks for better progress tracking.

76. In retrospect, given that EE projects in developing countries usually need to be complemented with essential investments in enabling infrastructure and enhancing the level and quality of service (to meet national norms and address instances of suppressed demand), the project could have benefited from an indicator to measure this contribution and its relevance in promoting the efficient use of energy.

M&E Implementation

77. The RF was proactively adjusted during project implementation to ensure its adequacy in measuring progress toward expected outcomes. The indicator ‘Projected lifetime GHG emission reductions’ was reclassified from Intermediate Results Indicator (IRI) to PDO indicator, as per objective of the GEF grant added in the AF/R18. Furthermore, most of the indicators were modified during project implementation in response to changing conditions faced by the project. In addition, during the R20, the PDO2 indicator changed as the approach to contribute to improving the enabling environment evolved and the original indicator was not deemed relevant anymore. (See Section 1.B and Annex 7).

M&E Utilization

78. In line with the pro-activeness of the World Bank and SENER in following up closely on what was happening on the ground, the collected data and information through the RF were used to calibrate the



project restructurings and day-to-day decisions to overcome implementation challenges. The feedback from the teams on the ground regarding progress toward outputs and outcomes was crucial to processing project restructurings and updating the targets, particularly those that were adjusted with the approval of the AF and the subsequent cancellation of funds. Furthermore, the information and data collected informed the preparation of action plans that included commitments, an increase in the frequency and intensity of monitoring/supervision to rapidly resolve arising issues, and critical actions to accelerate progress at different momentums during implementation,⁵⁸ especially following the third and fourth restructurings. The RF was used to report on progress timely, as required by the loan agreements.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Social and Environmental Safeguards Compliance

79. At appraisal, the project was defined as environmental risk Category B. The project triggered the Environmental Assessment (OP/BP 4.01). As a result of the assessment, an Environmental and Social Management Framework (ESMF) was prepared by the SENER/FIDE and approved by the World Bank. It was disclosed in the country and on the World Bank's external website on September 4, 2015, after consultation with key stakeholders. Other safeguards policies triggered included (i) the Physical Cultural Resources (OP/BP 4.11) policy, given the possibility of investments in historical municipal buildings under C2; and (ii) Projects on International Waterways—OP/BP 7.50, as it was assessed that subprojects might use water from international waterways to meet the water supply needs of the subproject's works. In this regard, an exception was granted to the riparian notification on September 28, 2015, as the project would not finance any works or activities that exceed the original scheme, change its nature, or alter or expand its scope and extent to make it seem like a new or different scheme.

80. The ESMF served as a detailed instrument to guide implementation. Still, through the supervision activities carried out during the project implementation, some aspects were subject to improvement:

- **Management of residues from works.** The quantity of residues was initially underestimated. The World Bank required the borrower to develop more detailed guidance on how the subcontractors should manage and dispose of these residues, incorporating the requirement to document all details in the ESMF (*Marco de Gestión Ambiental y Social* (MGAS)) reports produced by FIDE.
- **Work conditions at heights.** Further guidance was incorporated to ensure that workers received training from the Ministry of Labor and proper measures were taken during the performance of the activities, using the necessary protective equipment.
- Initially, more guidance was required to clarify which institution was responsible for requesting the necessary permits for the subprojects. This created some delays but was subsequently clarified.
- For the activities carried out from 2020 to 2022, contractor companies were asked to develop safety protocols to work in environments with risk of contagion by COVID-19, in accordance with the provisions of emerging national standards. The development and application of these protocols for COVID-19 was a mandatory requirement for the implementation of each subproject and the World Bank's specialists advised on its preparation and application. FIDE included the compliance report and evidence in the reports of each subproject.

⁵⁸ Two critical action plans for accelerating implementation and delivering the project outputs and outcomes were defined during the restructurings and one was agreed on in October 2022, as reflected in the Aide Memoire of supervision.



81. The project could have benefited from more guidance on communication and consultation plans, as during implementation, the communication and awareness actions varied, with different level of effectiveness. Guidance on minimum actions was subsequently included during project implementation.

82. Overall, the project complied with the applicable safeguard policies. Performance was rated Satisfactory during the project implementation and compliance with the ESMF was adequately documented for each subproject in the corresponding MGAS report.

Fiduciary Compliance

Financial Management

83. Throughout implementation, financial management (FM) requirements were generally complied with in a timely manner. FM performance ranged generally from Moderately Satisfactory to Satisfactory. At one time during implementation, FM performance was Moderately Unsatisfactory, reflecting considerable delays in the process of capitalizing the Contingent Facility financed under C4. GEF proceeds were disbursed as an advance to the project's Designated Account on February 4, 2021, but were not documented until January 26, 2022, only after the funds were transferred to FIDE's Designated Account to capitalize the Contingent Facility on January 18, 2022. After the initial advance, GEF proceeds were transferred to the Treasury of the Federation (*Tesorería de la Federación*, TESOFE) and remained there for over 11 months, pending the Ministry of Finance's approval to transfer funds from the TESOFE to FIDE.

84. Audit reports were generally submitted in due time, including unmodified (clean) opinions. As a result of these audits, there were some findings and internal control recommendations related to weaknesses in administrative processes and planning, which were assessed as resulting in low implementation and disbursement progress, particularly during the first half of the implementation period. SENER satisfactorily implemented additional controls to address administrative weaknesses (administrative controls regarding project and procurement process files and archives, control over consultant's contract payment management). During the second half of the implementation period, financial execution, planning, and disbursement estimates were revised to reflect the reduction of IBRD financing in the R20, also considering the extension of the project's closing date in the R21 and the R23.

Procurement

85. Procurement performance was generally found to be compliant with World Bank requirements. The World Bank delivered several procurement-related trainings to SENER/UREP and FIDE during the project implementation period. The project rating for procurement evolved throughout the implementation period from Satisfactory to Moderately Satisfactory in May 2018 and to Moderately Unsatisfactory by December 2018, mainly due to the absence of a procurement specialist since December 2017 and weaknesses detected in the decision-making process during procurement processes. By June 2020, the rating was revised upward to Moderately Satisfactory, after intensified follow-up from the World Bank over several months and improved project performance, including acceleration of the implementation through successful procurement processes.



C. BANK PERFORMANCE

Quality at Entry

Rating: Satisfactory

86. **Technical aspects and readiness.** From a technical perspective, several prior interventions informed project preparation. The project design usefully incorporated insights and lessons from the Bank's prior EE experience in Mexico⁵⁹, as well from global EE program experience gathered by the Bank. Readiness and pipeline development usefully built on the technical assistance (TA) engagements for the deployment of ESMAF-supported city energy diagnostics in over thirty municipalities. This helped generate interest and a pipeline. The first completed municipal EE project, a street lighting investment in León based on such earlier TA engagement, served as the showcase project, providing evidence of the benefits, and thus encouraging other municipalities to participate in the PRESEMEH. All this contributed positively to high quality at entry. (A key challenge to which the project needed to adapt was the need for complementary infrastructure investments beyond what had initially been contemplated⁶⁰.)

87. **Strategic relevance and project approach.** As noted above, the project design was aligned with the World Bank and GoM strategic documents. The World Bank carefully designed a model that enabled the implementation of a revolving fund, allowed beneficiary institutions to keep the energy cost savings after repayment of a portion of the investment costs⁶¹ and did not require any modification to the legal and regulatory framework. **Policy and institutional aspects** were well analyzed and considered during project design, which was key for the deployment of a complex multistakeholder model, understanding relevant country and municipal challenges, and for proposing a model addressing critical barriers to EE.

88. **M&E arrangements and risk assessment.** As discussed in the 'quality of monitoring and evaluation' section, the M&E arrangements were deemed adequate at the time of the appraisal. The main risks were, in general, well identified, and mitigation measures put in place were appropriate. The 2 risks that stood out as having been challenging to mitigate and potentially needing further mitigation were (i) the political and governance risk which had been identified but proved more challenging, as described in this ICR; and (ii) changing market conditions (as a result of the COVID-19 pandemic) which was not identified, but nonetheless was addressed and mitigated satisfactorily.

89. **Realistic objectives and targets.** Aspects of the initial project design revealed to be overoptimistic, in particular with respect to the magnitude of influence the project could have in improving the private sector market for EE. (This was especially relevant as the government priorities changed from focus on supporting development of the private sector to a more public sector approach). Target indicators were developed using assumptions reflecting best knowledge at the time and it was to be expected that the detailed energy audits during implementation would refine estimates of expected performance (in terms of MWh and GHG), but these discrepancies, in the end, were not negligible.

⁵⁹ For instance, the World Bank Mexico Energy Efficient Lighting and Appliances (P106424) project provided critical insights.

⁶⁰ However, as mentioned in previous section, this also had to do with the shift in targeted beneficiaries.

⁶¹ See Annex 9.



Quality of Supervision

Rating: Satisfactory

90. To adapt to prevailing conditions on the ground and remain on target toward PDOs' achievement, the World Bank restructured the project four times, adapting activities and RF as necessary. It acted decisively and proactively to implementation obstacles, integrating lessons learned and focusing on achieving the PDO, as evidenced by the adaptations throughout the implementation. First, the World Bank took the opportunity to scale up the project when conditions were favorable and then resize when required by the evolving situation. To accelerate project effectiveness, the World Bank implemented short-term measures to facilitate project management. It strengthened and streamlined procurement and fiduciary management procedures in coordination with SENER and FIDE and proactively engaged to remedy the lengthy approval processes. It also proactively took measures to build up enough pipeline to provide alternatives given restrictions caused by the COVID-19 emergency⁶².

91. In reaction to the shock caused by the COVID-19 pandemic and associated market implications, the Bank intensified supervision activities to respond to day-to-day issues and was quick and responsive whenever needed. As procurement reactivated after the peak of the COVID-19 health crisis and the market revealed significant changes that required testing several alternatives to contract the products and services required for the subprojects, the Bank's intensive and timely implementation support was instrumental to find pragmatic procurement solutions to address the new and evolving realities.

Justification of Overall Rating of Bank Performance

Rating: Satisfactory

D. RISK TO DEVELOPMENT OUTCOME

92. A number of achievements contribute to the sustainability of the strengthening of the enabling environment for EE (PDO 2). Solid progress was gained in successfully testing the financial mechanism, building experience among stakeholders involved in the implementation model, and providing evidence of successful results. Furthermore, FIDE gained additional robust experience in deploying EE investments, market references were set for the type of subprojects financed, and the sustainability of the financing mechanism is being demonstrated by already recovering 37.8 percent of the amount expected to be repaid (zero default rate) at the time of the closing. A further 6 street lighting projects will be implemented after the project closing and these will follow the PRESEMEH model and procedures. The client has expressed interest in continuing with the mechanism through a potential subsequent operation.

93. Another key element that is critical to the sustainability of the DPO 2 is the development of the 3 comprehensive technical studies on key EE sectors in the country in close collaboration with CONUEE. Through this activity, CONUEE has a more robust and well-informed foundation, including rich knowledge on the best international practices, which will strengthen its capacity to engage with technical authority with the sector stakeholders on the updates to the EE norms. However, as noted earlier, the actual *decision* to adopt the country's three EE norms follows a preestablished process outlined in the country's

⁶² See procurement section.



Quality Infrastructure Law⁶³ and was outside the scope of the project and its lifetime. Nonetheless, the technical studies provide critical, customized knowledge to produce updated norms that (a) are feasible to implement, (b) fit Mexico's needs, and (c) instrumental in increasing the country's EE performance to achieve its emissions reductions targets. SENER has continued working with CONUEE after the project closing, defining an action plan for the approval of the norms.

94. Regarding the sustainability of PDO1, EE investments were achieved and are fully operational and the eligible public facilities are paying the energy bill on time. With respect to the actual achievement of the estimated lifetime GHG reductions and MWh, these are expected – and even greater than originally estimated, as per updated assumptions (see Annex 5) - but will ultimately depend on adequate operations and maintenance of the assets. O&M of the investments can be affected by budget allocations, limited technical knowledge, rotation of technical staff, and managerial decisions. Beneficiary institutions could face challenges in the event of having to replace investments not covered under the warranty⁶⁴ due to (a) budget constraints and costs higher than prices they are used/allowed to pay; and/or (b) limited knowledge of technical specifications and market availability at the local level. To address those risks, FIDE engaged with asset managers of each sub-project, providing O&M capacity building, information on the warranty, some additional lights adapted to each system in the event of a needed replacement. FIDE has a commitment to remain engaged with each sub-project until the end of the repayment period.

95. Also, the sustainability of the energy savings (and associated GHG reductions) has been enhanced with the complementary infrastructure installed, positively affecting the likelihood of realizing the estimate outcome indicated targets under C1.

96. It should be noted that the street lighting sub-projects have been highly welcomed by the end beneficiary communities. Due to their popularity among the communities, these subprojects are likely to continue to receive the necessary support and funding to operate satisfactorily. In addition, IMSS has informed the World Bank that it is integrating the PRESEMEH-supported investments in its O&M strategy. In addition, SENER is following up with each beneficiary to ensure O&M plans are being defined and followed and technical staff is adequately trained to manage the investments appropriately (in fact, a specific online capacity-building training on EE in hospitals has been developed under the C3).

V. LESSONS AND RECOMMENDATIONS

97. **It is critical to consider the gaps in level and quality of pre-project (baseline) energy services.** The idea behind EE investments is that they can be repaid with energy savings from replacing inefficient equipment with efficient alternatives. But in the case of Mexico—and in many countries—EE investments need to be accompanied by critical complementary infrastructure to bring it to the level of national norms and to ensure that the whole system (e.g., including cabling and posts) is made robust to sustain the achieved energy savings. Investments are also needed to address energy service (e.g., lighting) deficits (i.e., addressing suppressed energy demand). A balance is needed between maximizing actual energy

⁶³ According to the provisions of the LIC (Article 32), Mexican Official Standards must be reviewed at least every five years after their publication in the Official Gazette of the Federation or that of their last modification, through a systematic review process that complies with the provisions of the Regulations of this Law, and the report must be notified to the Executive Secretariat of the Commission with the results of the review, within 60 days after the end of the corresponding five-year period.

⁶⁴ PRESEMEH investments are covered under product warranties.



savings and the need for infrastructure investments to ensure sustainability and minimum levels and quality of services. These key EE “co-benefits” are important and should be recognized in project development objectives and results frameworks of future operations.

98. **An EE revolving fund mechanism (even if the repayment is only a portion of the cost—with the remainder provided as a grant) enables cost-sharing and increasing the impact and sustainability of a public-financed EE project, but significant effort and time is required.** It is important to consider in the planning process that this can delay the preparation and implementation of the project. **Early and good communications, including clarifying the benefits of the project (i.e., energy savings, budgetary savings, improved service quality and other benefits), is also important.**

99. **Working with different levels of government and in multiple municipalities inherently adds complexity to the implementation of a project. The larger the number of municipalities, the greater the complexity, but there are also benefits.** The design and planning need to consider local capacity/resource limitations and decision-making processes as well as factor-in the political context. The design of EE operations in municipalities should build on existing structures as much as possible and balance the trade-off between speed (which would be facilitated by making fewer larger investments in fewer municipalities and thus favoring larger municipalities) and coverage and inclusiveness (i.e., spreading the investments to a larger number of municipalities, including smaller ones, with each investment of smaller size).

100. **Designing and putting in place a new implementation model involving different institutions in an innovative financing mechanism takes time to take off; it is important to consider options for leveraging the effort and scaling-up.** In addition to streamlining administrative and approval processes, this might entail training and enabling the engagement of energy service companies. In the case of Mexico, the implementation model is now tested and FIDE’s capacity is strengthened. This capacity could be leveraged to help develop the Mexican EE services sector to enable the multiplication of the types of EE investments that were led by FIDE under the PRESEMEH.

101. **It is important to get a good understanding of the market, monitor it, provide information and training on procurement processes and be ready to adapt procurement to the market circumstances.** The World Bank’s capacity to be in regular contact with the client during the procurement process is critical to support transparent and competitive procurement processes (to maximize value for money for the client) and to offer pragmatic procurement advice adapted to the local context and to the changing market conditions (as was the case during and after the COVID pandemic).



Annex 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Promote the efficient use of energy

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Projected lifetime energy savings (Megawatt hour(MWh))	Megawatt hour(MWh)	0.00	1,020,714.00	290,000.00	427,147.00
		31-Jul-2016	07-Mar-2016	29-Oct-2021	28-Oct-2023

Comments (achievements against targets):

This result reflects energy savings from 20 municipal street lighting subprojects considering 8 years lifetime and 17 hospitals. The reported energy savings result achieved at completion is derived using a conservative approach based on the same parameter values used for calculating the target at the start of the project. As a result, the reported result underestimates the impact of the project given that actual performance of the street lighting technology has evolved and improved during the implementation of the project. In particular, the lifetime of street lights increased significantly: while a lifetime of 8 years was used to estimate the target and the reported result, an updated lifetime value would be in the range of 11-22 years (depending of the rated useful life). Adjusting the parameter values to better reflect current performance, using an average lifetime of 15 years, means that the actual (adjusted) lifetime energy savings should be 715,001 MWh. (See Annex 4 of the ICR for a more detailed explanation)



Objective/Outcome: Promote the efficient use of energy

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of ESAs signed (Number)	Number	0.00	23.00	21.00	36.00
		31-Jul-2016	07-Mar-2016	29-Oct-2021	28-Oct-2023

Comments (achievements against targets):

The target of this indicator was defined considering that one ESA would be signed per municipality and just one ESA would be signed per institution managing several public facilities, for instance all hospitals of IMSS (Mexican Institute of Social Security) would be integrated in one single ESA. However, in the case of IMSS one ESA had to be signed per State, accounting for 11 ESAs, and in the case of the State of Tabasco, one ESA was signed per hospital, adding 2 more.

Objective/Outcome: Promote the efficient use of energy

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Projected Lifetime GHG emission reductions (tones/year)	Tons/year	0.00	810,000.00	145,000.00	189,682.00
		31-Jul-2016	10-Aug-2018	29-Oct-2021	28-Oct-2023

Comments (achievements against targets):

As explained for the energy savings indicator, and for the same reasons, the reported result for the lifetime GHG reductions is derived using a conservative approach and is thus also underestimated. Adjusting the parameter values to better reflect current lighting technology performance means that the actual (adjusted) lifetime GHG reductions should be 314,624 tCO₂. (See Annex 4 of the ICR for a more detailed explanation)



Objective/Outcome: Strengthening the enabling environment

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of regulatory information tools designed to support the implementation of the national energy efficiency strategy (number)	Number	0.00	3.00	3.00	3.00
		31-Jul-2016	30-Dec-2020	30-Mar-2021	28-Oct-2023

Comments (achievements against targets):

The approval of the updated EE norms NOM-008, NOM-013, and NOM-020 is expected as outlined in CONUEE's work plan, in compliance with the Quality Infrastructure Law (LIC) mandate and informed by robust country/subregion-specific research and data contributed by the project. The impact of implementing the three norms is expected to be significant: electricity savings of 1,798 GWh and GHG reductions of 782,159 tCO2 per year, since new EE requirements will be mandatory for all new buildings and street light systems.

A.2 Intermediate Results Indicators

Component: Policy development and institutional strengthening

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Participants in engagement	Number	0.00	1,000.00	300.00	692.00



activities during project implementation (number)		01-Feb-2016	03-Mar-2016	03-Mar-2021	28-Oct-2023
Participants in engagement activities during project implementation – female (Number)	Number	0.00	400.00	100.00	114.00
		01-Feb-2016	06-Mar-2016	03-Dec-2020	28-Oct-2023
Comments (achievements against targets):					

Component: Municipal energy efficiency investments

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average of payment discipline per municipality (avoidance of default)	Percentage	0.00	90.00	90.00	100.00
		01-Feb-2016	03-Dec-2020	04-Oct-2021	28-Oct-2023
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of Street light interventions (number)	Number	0.00	9.00	16.00	20.00
		01-Feb-2016	06-Mar-2016	10-Aug-2018	28-Oct-2023



Comments (achievements against targets):

Component: Public Facility Energy Efficiency Investments

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Capacity building, outreach and training activities implemented (number)	Number	0.00	25.00	12.00	13.00
		01-Feb-2016	06-Mar-2016	03-Dec-2020	28-Oct-2023

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of Sub-projects designed (number)	Number	0.00	28.00	22.00	47.00
		01-Feb-2016	03-Mar-2016	03-Dec-2020	28-Oct-2023

Comments (achievements against targets):

The number of subprojects designed, meaning energy audits carried out, is higher than the target because, in order to avoid potential restrictions derived from the COVID-19 pandemic, it was decided to have a bigger pipeline of investment-ready hospitals, which could go through procurement quickly if EE interventions in any other hospital were canceled (as it happened in the 6 hospitals of Tabasco in 2020-2021). So the design of a higher number of sub-projects (i.e., the number of energy audits) was essentially a strategy to try to manage the hospital closure risks associated with the COVID pandemic.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Public Facility interventions (number)	Number	0.00 07-Feb-2018	8.00 10-Aug-2018	1.00 03-Dec-2020	2.00 28-Oct-2023

Comments (achievements against targets):
Public facilities were consider as the institutions participating in the Project, not the number of buildings/facilities managed by them. The Project anticipated that just one institution, IMSS, will be part of the pipeline, setting the target as 1. However, the State of Tabasco also joined the Project, adding another institution, so the value of the indicator at completion was above the target.



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1	
Outcome Indicators	<p>1. Projected lifetime energy savings Actual = 427,147 MWh (see Annex 4 for calculation details) Updated = 715,002 MWh (see Annex 4 for calculation details)</p> <p>2. Number of ESAs signed (36): 21 street lighting (one of them was not implemented) 1 water pumping (no implemented) 1 municipal building (no implemented) 11 hospitals of IMSS 2 hospitals of Tabasco</p> <p>3. Projected lifetime GHG emission reductions (145,021 tCO₂) Actual = 189,682 tCO₂ (see Annex 4 for calculation details) Updated = 314,624 tCO₂ (see Annex 4 for calculation details)</p>
Intermediate Results Indicators	<p>1. Average of payment discipline per municipality (100%)</p> <p>2. Number of street light interventions (20)</p> <p>3. Number of subprojects designed (47)</p> <p>4. Public facility interventions (2)</p>
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	<p>Street lighting subprojects in 20 municipalities:</p> <p>a) Number of light points = 127,987</p> <p>b) Number of posts = 15,346</p> <p>c) Km wired = 1,091 km</p> <p>d) Km illuminated = 5,040 km</p> <p>e) 1,394 streets, avenues, and/or neighborhood benefited</p> <p>f) 1.7 million people benefited</p> <p>g) Increased citizen security</p> <p>h) Increased sales of local business</p> <p>i) Promotion of night-time sports</p>



	<ul style="list-style-type: none"> j) Promotion of tourism k) New subprojects implemented after the closing date of the project using resources from repayments = 6 municipalities/10,300 light points <p>Subprojects in 17 hospitals:</p> <ul style="list-style-type: none"> a) Number of light points = 13,242 b) Number of AC equipment = 181 (chillers, module type, package type, and mini-split) c) Number of solar panels = 2.55 MW total capacity installed d) Increased energy security e) Increase in quality of the health service f) Better lighting for 11,171 doctors and nurses to carry out consultation activities g) 17 hospitals located in 16 municipalities benefited h) 1.1 million patients benefited per year in the 17 hospitals
Objective/Outcome 2	
Outcome Indicators	1_ Number of regulatory information tools designed to support the implementation of the national energy efficiency strategy (3)
Intermediate Results Indicators	<ul style="list-style-type: none"> 1_ Participants in engagement activities during project implementation (692) 2. Capacity building, outreach and training activities implemented (13) 3. Females participating in capacity building and awareness/dissemination activities (114)
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	<p>Outputs derived from the implementation of the three NOMs supported by the project:</p> <ul style="list-style-type: none"> a) Projected energy savings per year = 1,798 GWh b) Projected CO₂ savings per year = 782,159 tCO₂ <p>Capacity building and awareness/dissemination activities:</p> <p><i>Capacity building (8 activities):</i></p> <ul style="list-style-type: none"> a) CURB training: 64 (25 women) b) 4 modules of the Municipal EE Diploma: 60 (22 women) c) 1 online platform for EE and RE in hospitals: 88 people took the course as a pilot (17 women) and 2,600 people are expected to take the course per year a) O&M training of efficient equipment and solar PV systems in beneficiary hospitals: 51



b) O&M training of efficient luminaires in beneficiary municipalities: 60

Dissemination (5 activities):

a) 2 press conferences to promote the project (one in Oaxaca, one in Culiacán): 297 (30 women)

b) 2 videos with interviews with residents and authorities of León and Miguel Hidalgo: 25 (10 women)

a) 1 workshop organized by the International Energy Agency: 47 (10 women)



Annex 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Janina Andrea Franco Salazar, Karen Bazex	Task Team Leader(s)
Gabriel Penalosa	Procurement Specialist(s)
Daniel Chalupowicz	Financial Management Specialist
Juan Carlos Serrano Machorro	Financial Management Specialist
Todd M. Johnson	Team Member
Feng Liu	Peer Reviewer
Carlos Ignacio Aguilar Delfin	Team Member
Nora Elizabeth Sanchez Guzman	Team Member
Ivan Jaques Goldenberg	Team Member
Cesar Adrian Arreola Croda	Team Member
Abel Lopez Dodero	Team Member
Megan Meyer	Team Member
Elena Segura Labadia	Counsel
Iris Del Valle Oliveros	Team Member
Karen Bazex	Team Member
Jasneet Singh	Team Member
Martina Bosi	Team Member
Angelica Nunez del Campo	Team Member



Claudia Ines Vasquez Suarez	Peer Reviewer
Roberto Gabriel Aiello	Peer Reviewer
Jose Luis Calderon Bartheneuf	Social Specialist
Alonso Zarzar Casis	Social Specialist
Supervision/ICR	
Martina Bosi	Task Team Leader(s)
Santiago Rene Torres	Procurement Specialist(s)
Luis Barajas Gonzalez	Financial Management Specialist
Beatriz Rocio Montana Novoa	Team Member
Cynthia Margarita Arevalo Rincon	Team Member
Agostina Signorini	Team Member
Diacono Raul Vera Hernandez	Environmental Specialist
Maria Rodriguez De La Rubia Gassol	Team Member
Karim Omar Lara Ayub	Team Member
Rosa Maria Martinez	Social Specialist
Andrea Maria Castro Astudillo	Team Member
Manuel Luengo	Team Member
Angelica Calderon	Procurement Team
Melisa Gaitan Fanconi	Team Member

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY14	1.981	25,335.27
FY15	44.100	302,898.02



FY16	29.326	388,265.15
Total	75.41	716,498.44
Supervision/ICR		
FY15	.775	3,764.95
FY16	0	702.00
FY17	19.912	242,061.22
FY18	22.772	206,700.53
FY19	21.629	233,216.98
FY20	15.819	193,964.82
FY21	24.826	156,500.50
FY22	21.225	187,424.61
FY23	27.194	270,348.35
FY24	2.630	110,187.82
Total	156.78	1,604,871.78



Annex 3. PROJECT COST BY COMPONENT

Components	Amount at Approval* (US\$, millions)	Actual at Project Closing (US\$, millions)	Actual at Project Closing as Percentage of Amount at Approval (%)
Policy Development and Institutional Strengthening	6.00	2.40	40.0%
Municipal Energy Efficiency Investments	93.75	36.72	39.17%
Public Facility Energy Efficiency Investments	49.88	6.55	13.13%
Municipal Energy Efficiency Contingency Facility	5.79	5.79	100%
Total**	155.79	51.86	33.29%

*Amount at approval considers the resource allocation at the time of the AF/R18 approval. Only IBRD and GEF resources are included here. For details on other sources per component (government and beneficiaries' contributions) see main text Table 2.

** Difference between the sum of the component's allocations (for column "Amount at Approval" and column "Actual at Project") and the total due to the front-end fees included in IBRD loans which are not assigned to any component of the project. Resources to cover Front-end fee amount US\$0.375 million.



Annex 4. FINANCIAL ALLOCATION, EVOLUTION OF BENEFICIARIES AND SUBPROJECT SELECTION MODIFICATIONS

- The project financing was increased in the AF/R18 and was subsequently decreased in the R20 (during the COVID-19 pandemic). Changes to financial allocations by components are shown in Table 4.1

Table 4.1. Summary of Financial Resource Allocation and Actual Use per Component⁶⁵

Component	Source of financing	US\$ million					Actual at closing
		Original	AF/R18	R20	R21	R23	
Total IBRD Allocation		100.00	150.00	50.00	50.00	50.00	50.00
Total GEF Allocation		-	5.79	5.79	5.79	5.79	5.79
1 Policy development and institutional strengthening	IBRD	6.00	6.00	2.10	2.10	2.10	2.40
	Government	1.00	1.00	0.02	0.02	0.02	0.15
2 Municipal EE investments	IBRD	93.75	93.75	40.95	40.95	40.95	36.72
	Government	6.00	4.82	1.71	1.71	1.71	2.31
	Municipalities	49.00	35.25	12.53	12.53	12.53	14.27
3 Public Facility Energy Efficiency Investments *	IBRD	-	49.88	6.575	6.575	6.575	6.55
	Government	-	3.18	0.43	0.43	0.43	0.70
	Public Facilities	-	17.64	2.38	2.38	2.38	2.54
4 Municipal Energy Efficiency Contingency Facility *	IBRD	-	-	-	-	-	-
	Government	-	0.29	0.29	0.29	0.29	0.29
	GEF	-	5.79	5.79	5.79	5.79	5.79
Resources to cover Front-end		0.25	0.38	0.38	0.38	0.38	0.38
Total Combined Financing		156.00	217.98	73.15	73.15	73.15	72.10

* Components incorporated during the first restructuring with the additional financing.

- Table 4.2 presents the evolution of beneficiaries and types of public EE investments supported throughout the life of the project, with municipalities and street lighting, respectively, **remaining constant**.

Table 4.2. Evolution of beneficiaries and types of EE investments

Categories of Direct Beneficiaries of EE investments ⁶⁶	Original Project	Revised Project
EE in Municipal facilities	-Municipalities (street lighting and municipal buildings) - WWF (water pumping)	-Municipal buildings were dropped (R20) -Smaller municipalities became eligible, in addition to the large municipalities already eligible (R20) -WWF was dropped (R21)
EE in (non-municipal) Public Facilities	None	-Public Schools: added in AF/R18 and dropped in R20 -Health Facilities (IMSS ⁶⁷ network) added in AF/R18 -Health Facilities (administered at State-level) added in R21

⁶⁵ Differences between the estimated financing at R23 and the actual financing at closing are mainly driven by investments that were not committed due to delays in the procurement and administrative processes because the sub-project implementation period would go beyond the project closing date. The respective subprojects were finally dropped.

⁶⁶ It should be noted that the beneficiaries of the eligible EE investments were much broader than the administrators of the municipal and other public facilities. Beneficiaries included, for example, citizens (including women and children) benefitting from well-lit and safer streets, patients and personnel of hospitals benefitting from improved indoor comfort levels and more productive working environments, as well as the municipalities and health networks benefitting from lower energy costs, enabling the reallocation of these resources to fund other priorities.

⁶⁷ Mexican Social Security Institute (translation from Spanish: *Instituto Mexicano del Seguro Social* – IMSS).



3. Changes to the selection and eligibility criteria for subprojects are outlined in Table 4.3

Table 6.3. Modification of subproject selection and eligibility criteria

Original eligibility criteria for sub-projects (2016)	Eligibility criteria modifications in the AF/R18
Completion of municipal EE diagnostic analysis using the TRACE-based tool with sufficient data input and identified EE potential in SL, municipal buildings (MBs), or water pumping.	Provision of (or facilitating access to) required data and information (for example, electricity bills) and identified EE potential ⁶⁸ .
A letter of intent from the mayor, and at least 2 years left in the mandate of the municipal administration, and a commitment to secure state or municipal approval (if applicable).	A letter of intent from the head of the beneficiary institution and a commitment to secure any approval (if applicable).
[no specific criteria for health and education facilities]	Specific new criteria incorporated to guide the selection of schools and hospitals.
Minimum subproject cost of US\$1 million; and maximum cost of US\$15 million for SL, US\$4 million for water waste and water management facilities (WWF), and US\$2 million for MBs.	Minimum investment cost threshold changed from US\$1 million to US\$0.2 million (enabling smaller subprojects to be eligible to benefit from the project).
The direct support (subsidy) could reach 70% of the investment costs for investments over \$2 million (and 40% for investments of up to \$2 million).	Harmonizing the level of direct support to 70 percent of the investment cost for all subprojects.

⁶⁸ This was deemed sufficient (without the need to conduct a complete municipal EE diagnostic that considered every sector). Once it was determined that the proposed sub-project met eligibility criteria, an Initiation Activity Agreement was signed with the relevant beneficiary, followed by the signing of ESAs (after completion of energy audits and sub-project design).



Annex 5. EFFICIENCY ANALYSIS

1. An ex post economic and financial analysis of the project was conducted to assess the efficiency of interventions supported. The assessment compared final outputs with the findings from the models used in the Project Paper for the AF loan (for hospitals and schools - at that stage) and the GEF grant (contingency facility for municipal interventions), which included new and updated models for the subsectors that were already covered under the original loan (that is, street lighting, WWFs, and municipal buildings).
2. The ex-post assessments used the same methodologies —when applicable—as the AF stage assessments, updating key variables based on implementation results – such as the lifetime of the technologies procured. At both AF and ICR stages, the economic and financial cost-benefit analyses were done for relevant subsectors (only street lighting and hospitals in the ICR, while the AF had also considered WWFs, municipal buildings, or schools). Costs were adjusted to reflect economic values, excluding taxes and subsidies, and benefits were estimated based on savings to users. The main (quantified) economic benefits from investments were the economic value of the saved energy and the associated reductions in carbon emissions, updated as per the results achieved, subprojects implemented – including the six street lighting subprojects financed with repayments channeled through the revolving fund – and as per the adjusted or “virtual” baseline discussed below. The main economic costs were the capital investments. The main financial benefits were the reduction in energy bills while financial costs consisted of capital investments. In the original AF assessment, all subprojects were economically viable; all interventions were also financially feasible once the direct support was considered.

General Assumptions

3. Both the ICR and AF stage economic and financial analyses utilized similar general assumptions:
 - Costs and revenues, as well as the discount rate, were net of inflation.
 - The social cost of carbon used was US\$30 per tCO₂eq (included in the economic analysis but not considered in the financial analysis, given that no monetization of emission reductions happened or was envisioned).
 - The financial analysis included taxes and direct support; the economic analysis excluded taxes and direct support (that is, subsidies).
 - The discount rate used was 6 percent, assumed to represent the opportunity cost of capital in Mexico.
 - Project incremental costs (the administrative costs charged by FIDE and CFE) were excluded.
 - The technology lifetime period was set at 8 years for lighting in buildings, at 10 years for air conditioning interventions in hospitals, and at 20 years for PV interventions also in hospitals.
 - Value added tax (VAT) was 16 percent (only considered for the financial analysis).
 - The default direct support (subsidy) level was set at 70 percent (for the financial analysis only).



4. Besides these general assumptions, the models also relied on additional key variables that have changed at the ICR stage as new data or conditions changed. These include the following:

- The assessment period for street lighting was increased to 15 years (up from the 8 years originally considered in the AF models), based on the equipment actually procured.
- Annual inflation was originally estimated at 3 percent; actual prices have been incorporated in the ICR but the same rate was maintained for estimating future outcomes.
- The power grid emissions factor was originally estimated at 0.45 kg CO₂/kWh; applicable grid emissions factors were used for each subproject for this ICR depending on the year in which each intervention became operational; the weighted averages have been included in tables 4.1 and 4.2.
- The foreign exchange rate at the AF stage was MXN 18.28 per US\$; an average rate of MXN 17.01 per US\$ was observed throughout implementation.
- The price of electricity (between US\$0.12 and US\$18 per kWh at the AF stage) was slightly higher at the ICR stage, depending on the subproject type.

Subproject Assumptions

5. In addition to the general assumptions and variables discussed above, the AF models relied on a series of values extracted from energy audits or similar projects implemented in Mexico. In the case of the ICR, some of these values have been updated based on the actual performance and characteristics of the subprojects supported. A few of the variables considered at the AF stage are no longer relevant as certain technologies and strategies were ultimately not pursued. Key subprojects variables are shown in tables 5.1 and 5.2.

6. Furthermore, in the case of the ICR stage economic analysis, savings have been adjusted to reflect the suppressed energy demand. Indeed, throughout the project’s execution, the implementing team noticed that there were several instances where energy services were lacking or did not comply with relevant national regulations. The adjusted – or “virtual” baseline – helps better measure the efficiency of the operation as it allows a more appropriate comparison of the actual results. Measuring results without such an adjusted baseline would unfairly tax the operation, distort findings, and mask the actual success and relevance of EE subprojects. Including such an adjusted baseline had been discussed at the AF stage, but not pursued as it was believed that there would not be such suppressed demand, except in the case of schools (these were deemed as the only targeted facilities with deficient services); thus, there was no adjusted baseline in the AF stage models for street lighting and hospitals. The results below showcase updated scenarios including both the adjusted baseline as well as any other relevant changes discussed elsewhere in this section.

Table 5.1. Street Lighting Assumptions and Key Values for the AF and ICR Stage Models

Street Lighting Assumptions and results		At AF	At ICR
Subprojects	#	16	26
Luminaries replaced	#	160,000	138,287
Lifetime	yrs	8	15
Total investment costs (w/o VAT)	US\$	69,645,514.22	48,591,765
Total investment costs (w/ VAT)	US\$	80,788,796.50	56,366,447



Street Lighting Assumptions and results		At AF	At ICR
Average energy cost	US\$/kWh	0.18	0.25
Weighted power grid emissions factor	kg/kWh	0.45	0.441
Updated savings	MWh	493,478	575,868
Actual savings	MWh	493,478	288,013

Table 5.2. Hospital Assumptions and Key Values for the AF and ICR Stage Models

Hospitals Assumptions and Results		At AF	At ICR
Subprojects	#	15	17
Lighting interventions lifetime	yrs	8	8
Air conditioning interventions lifetime	yrs	10	10
Generation interventions lifetime	yrs	20	20
Fuel-switching interventions lifetime	yrs	20	n.a.
Total investment costs (w/o VAT)	US\$	25,234,093	7,413,736
Total investment costs (w/ VAT)	US\$	29,271,547	8,599,934
Average energy cost	US\$/kWh	0.09	0.15
Weighted power grid emissions factor	kg/kWh	0.45	0.438
Updated savings (lighting)	MWh	52,229	10,481
Updated savings (A/C)	MWh	139,126	43,099
Updated savings (PV)	MWh	195,418	85,554
Updated savings (fuels)	l.	635,569	n.a.
Actual savings (lighting)	MWh	52,229	10,481
Actual savings (A/C)	MWh	139,126	43,099
Actual savings (PV)	MWh	195,418	85,554

7. In addition to the adjusted baseline discussed above, key divergences in the values/assumptions used at the AF stage and those found or used when drafting the ICR include (a) the overall size of the investments and (b) the range of technology interventions pursued. This is particularly relevant in the health sector interventions, as hospital subprojects ended up not pursuing fuel-switching efficiency opportunities due to greater implementation complexities and uncertainties and instead concentrated on simplifying implementation by focusing on electricity-based solutions that could generate energy savings and also bring existing services up to standard.

Results

8. The aggregate results of the operation were directly affected by changes in implementation and in the technologies supported. However, despite the project’s reduction in size and scope, results were positive and aligned with—and slightly improved from—those expected at the AF stage, particularly for street lighting subprojects, demonstrating the relevance of—and opportunity for—EE interventions in Mexico, especially at the subnational level. Expected results at the AF and ICR stages are summarized in Table 5.3.

9. Overall, the project’s EIRR and FIRR (including or excluding direct support) – as well as the NPV (when excluding the direct support) – were greater than those originally expected at the AF stage, and payback periods were shorter, suggesting the operation was more efficient than originally expected. These positive outcomes are the result of lower costs for energy-efficient equipment, particularly for lighting, as well as the latter’s technology extended lifetime and the use of more accurate adjusted consumption baselines in the analyses which better reflected the conditions under which the Project was



deployed. However, the financial NPV (when including the direct support), energy savings and GHG reductions were lower than originally anticipated at the AF stage. This was affected mainly by the decrease in project size; changes in originally planned technology investments; the reduction in scope, resulting in a lower number of subprojects being supported; and the inclusion of more complementary non-energy saving investments (for example, improvements in lighting infrastructure and increases in levels of service to meet regulatory norms and/or to provide service where there was none), which were critical for sustainability and had significant development and well-being benefits. Additional details for each type of subproject supported are discussed below.⁶⁹

Street lighting

10. In the case of street lighting subprojects, overall results were better than those expected at the AF stage as shown by the improved rates of return and payback periods. The lower costs and longer lifetimes of procured and installed equipment observed during implementation were key factors. Although the number of luminaries replaced was lower than originally expected and average subprojects were smaller than planned at the AF stage, the project was able to support more municipalities. These changes resulted in a 30 percent reduction in the overall value of street lighting replacement investments, but only a 15 percent reduction in the number of streetlights installed. And after considering the project had to bring targeted facilities services up to the level of national norms, the EE savings potential was found to be quite similar at both AF and ICR stages (around 40 percent at AF stage and closer to 50 percent at ICR when using the “virtual” baseline⁷⁰). Finally, the decreased size of the operation did affect its climate benefits. However, even if total emissions reductions were lower than expected at AF stage, these were higher per US\$ invested.

Hospitals

11. The story for the interventions in the health sector actually improved from those originally expected at the AF stage when using the virtual baseline. Overall, the number of subprojects was similar—and slightly surpassed original plans— though average interventions size was smaller than expected at the AF stage. Rates of return and payback periods were better than at the AF stage, yet the economic and financial NPVs were below original prospects, though still reasonably positive. These deviations are explained by two key factors: (a) the need to focus on investments in electricity services (and dropping more complex—and not always feasible—fuel switching and cogeneration measures) due to the reduced budget available and (b) the need to invest in non-energy savings measures to ensure electricity services comply with national norms. These factors meant the savings potential was around 20 percent for overall health sector interventions (below the originally expected 30 percent savings potential) and emissions reductions were lower than expected as diesel-powered, emission-intensive technologies were no longer targeted.

⁶⁹ If the analysis had considered an 8-year lifetime for street lighting – as originally expected, at the beginning of the project – energy savings and emission reductions would have been roughly 40 percent lower.

⁷⁰ In some municipalities (especially the poorer municipalities) and hospitals, there were energy service deficits, whereby the infrastructure was below the relevant lighting standards (i.e., insufficient, or in some cases lacking). A “virtual” baseline was developed representing the inefficient technology that would have been used (as in other parts of the same municipality/hospital) had they met the relevant lighting norms. This approach is typically used in internationally-recognized GHG methodologies for carbon markets and also EE projects in developing countries to address suppressed energy demand, even though in practice, these “virtual” *energy savings* obviously do not generate “actual” *energy cost savings* (i.e., that can be seen on the electricity bill) for the respective municipality or hospital.



Table 5.3. Economic and Financial Model Results Expected at AF and Found at ICR Stage

Subproject Type	No. of Subprojects	Without Direct Support								With Direct Support					Direct GHG ERs (MtCO _{2e})	Indirect GHG ERs (MtCO _{2e})
		Economic NPV (US\$, millions)	EIRR (%)	Payback (Years)	Total Cost (US\$, millions)	Financial NPV (US\$, millions)	FIRR (%)	Payback (Years)	Total Cost (US\$, millions)	Direct Support (%)	Financial NPV (US\$, millions)	FIRR (%)	Payback (Years)	Total Cost (US\$, millions)		
Expected Results at PRESEMEH AF																
Street lighting	16	5.04	8%	5.77	69.65	(1.49)	6%	6.98	80.79	70%	51.86	48%	2.09	24.24	0.22	0.67
Water utilities	8	17.80	18%	4.45	28.80	15.24	15%	5.61	33.41	70%	37.30	62%	1.68	10.02	0.23	0.69
Municipal buildings	8	0.31	8%	7.99	2.85	0.14	7%	10.24	3.30	70%	2.32	34%	3.07	0.99	0.02	0.06
Schools	350	7.00	10%	6.67	25.45	0.18	6%	11.74	29.52	70%	19.67	30%	3.52	8.86	0.13	0.38
Hospitals	15	11.20	13%	6.14	25.23	11.09	11%	7.81	29.27	70%	30.42	45%	2.34	8.78	0.21	0.64
TOTAL	397	41.34	11%	5.66	151.97	25.17	9%	7.31	176.29	70%	141.59	47%	2.19	52.89	0.81	2.43
Actual Results at PRESEMEH ICR																
Street lighting	26	47.11	19%	4.79	48.59	32.56	14%	7.23	56.37	70%	69.78	49%	2.17	16.91	0.25	0.76
Water utilities	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Municipal buildings	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Schools	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Hospitals	17	6.98	20%	4.50	7.41	7.85	18%	5.50	8.60	70%	13.53	63%	1.65	2.58	0.06	0.18
TOTAL	43	54.08	19%	4.75	56.01	40.41	14%	6.94	64.97	70%	83.31	51%	2.08	19.49	0.31	0.94

Note: ER = Emission reduction.



Annex 6. BORROWER'S REPORT

Machine Translation of the Executive Summary of the Borrower's Project's Closing Report

PRESEMEH - Borrower's Report (SENER)

A. Objectives of the Project

1. The objective of the project is to promote the efficient use of energy in municipalities and hospitals, by making investments in EE and contributing to strengthening the enabling environment. Support was given to activities to improve the capacity of municipalities and hospitals in the sectors with significant EE potential. This involved focusing on the public lighting sector in municipalities and in lighting, air conditioning, and PV systems interconnected to the grid in hospitals.
2. The project was one of the most important actions for the country in EE for municipalities and hospitals, achieving its objectives without generating public debt and at the same time freeing up fiscal resources to expand social and economic programs. In most cases, these were the only actions undertaken in energy efficiency. The project presented several problems in its implementation, which made it necessary to carry out a restructuring to reduce the loan resources, adjust the indicators, change the operating model of Subcomponents 1(a), 1(b), and 3(a), modify the eligibility criteria and include hospitals managed by states, and improve the mechanisms for implementing the project. Due to various benefits obtained, it is in the interest of the federal government to continue this project.

B. Main Results and Benefits of the Project

3. With the PRESEMEH, 20 municipalities located in nine states (representing 28 percent of the national territory) were supported for installation of efficient luminaires. In the case of hospitals, the project intervened in 17 health facilities in 12 states (representing 37 percent of the national territory) where EE was improved through the installation of efficient lighting, air conditioning, and PV systems interconnected to the electricity grid.
4. In the country, there is no program that supports EE in these sectors. Thus, with the resources obtained from the repayment of the first projects, work is already being done on public lighting in the following municipalities: Minatitlán, Veracruz in a second phase with 2,800 luminaires; Chinameca, Veracruz with 1,900 luminaires; Soconusco, Veracruz 2,000 luminaires; Pajapan, Veracruz 1,200 luminaires; Jáltipan, Veracruz, 1,200 luminaires; and Tatahuicapan, Veracruz, 1,200 luminaires. Support is being provided to the poorest and most remote municipalities, most of which are rural communities.



Table 6.1. Results of EE Investments

	Installed Equipment		Impacts and co-benefits
Public lighting (20 municipalities)	# luminaires = 127,987 # posts = 15,346 # m cabling = 1,091 km # Km iluminated = 5,040 km	% replacement = 89.33% % new infra = 10.66%	Lifetime energy savings: Actuals1: 288,013 MWh Updated2: 575,868 MWh Lifetime emission reductions: Actuals1: 128,741 tCO2 Actualizados2: 253,683 tCO2 Enhanced citizen security Increase in local businesses' sales Promotion of night-time sports activity (replacement of lights in sports fields) Promotion of tourism (improvement of lighting levels on the Minatitlán boardwalk).
Hospitals (17)	# luminaires: 13,366 98% replacement / 2% new infrastructure # ACEquipment: 100% replacements = 181 equipment (chillers, module type, package type and mini-splits) # solar PV panels (kW installed): 100% new Infrastructure = 2.55 MW total installed capacity.		Lifetime energy savings: 139,134 MWh Lifetime emission reductions: 60,941 tCO2 Enhanced energy security (energy supply) Enhanced quality of health services Better lighting for doctors and nurses to carry out their consultation activities
TOTAL			Lifetime energy savings: Actuals1: 427,147 MWh Updated 2: 715,002 MWh Lifetime emission reductions: Actuals1: 189,682 tCO2 Updated2: 314,624 tCO2

1 Lifetime of 8 years for subprojects implemented in 20 municipalities.

2 Lifetime of 15 years for subprojects implemented in 20 municipalities and 6 additional subprojects financed by repayments



	Installed Equipment		Impacts and co-benefits
Lighting Public (20) municipalities	# luminaires = 127,987 # posts = 15,346 # m wired = 1,091 km # Km illuminated = 5,040 km	% replacement = 89.33% % new infra = 10.66%	Lifetime energy savings: Actuals ¹ = 288,013 MWh Updated ² = 575,868 MWh Lifetime emissions savings: Actuals ¹ = 128,741 tCO2 Updated ² = 253,683 tCO2 Increased citizen security Increase in sales to local businesses Promotion of night-time sports activity (replacement of luminaires in sports fields). Promotion of tourism (improvement of lighting levels on the Minatitlán boardwalk).
Hospitals (17) hospitals)	# Luminaires: 13,366 luminaires 98% replacement / 2% new infra # AC equipment: 100% replacement = 181 equipment (chillers, module type, package type and mini-splits) # solar PV panels (kW installed): 100% new infrastructure = 2.55 MW total installed capacity.		Lifetime energy savings = 139,134 MWh Lifetime emissions savings = 60,941 tCO2 Increased energy security Increase in the quality of the health service Better lighting for doctors and nurses to carry out their consultation activities.
TOTAL			Lifetime energy savings: Actuals ¹ = 427,147 MWh Updated ² = 715,002 MWh Lifetime emissions savings: Actuals ¹ = 189,682 tCO2 Updated ² = 314,624 tCO2

¹Lifetime of 8 years for subprojects implemented in 20 municipalities

²Lifetime of 15 years for subprojects implemented in 20 municipalities plus 6 additional subprojects financed by repayments

Table 6.2. Disbursements and Repayments of Investments in EE and RE

	Disbursements	Repayment of Investments by Municipalities and Hospitals
Lighting Public (20 municipalities)	US\$, millions = 32.6	US\$, millions in repayments = 14.3 % already repaid = 44.57 % to be repaid in the next 5 years = 55.43
Hospitals (17 hospitals)	US\$, millions in lighting = 1.3 US\$, millions in efficient AC = 1.8 US\$, millions in solar PV= 2.7	US\$, millions in repayments = 2.5 % already repaid = 0.0% % to be repaid in the next 5 years = 100%
Total	US\$, millions = 38.4 (% in project monitoring and implementation costs). The total incremental cost of municipalities and hospitals is US\$4.7 million. On this amount the following % were determined. Energy Audit = 39.52% Project E. = 15.49% Technical follow-up = 26.12% Monitoring, reporting, and verification = 18.88%	US\$, millions in repayments = 16.8 % already repaid = 37.82% % to be repaid in the next 5 years = 62.18%



Table 6.3. Project Beneficiaries: Total Number of People

	Direct Beneficiaries of Investments	Beneficiaries of Institutional Training	O&M Technical Staff Training Recipients	
Lighting Public (20 municipalities)	No. of communities = 1,394 streets, avenues and/or neighborhoods intervened No. people = 1.7 million people benefited	<ul style="list-style-type: none"> - Municipal Manager Course - CURB Workshop - EE Diploma - Bidding Process Clarification Boards - EE Workshop in Schools and Hospitals - People = 493 	60 (considered director of public lighting and 2 collaborators on average per municipality)	Upon completion of the installation of the public lighting system, FIDE trains those in charge of public lighting in the O&M of the luminaires.
Hospitals (17 hospitals)	No. of communities = 17 hospitals located in 16 municipalities benefited No. of patients = 1.1 million patients per year in the 17 hospitals No. of employees = 11,171 doctors and nurses.	Online platform for EE and RE in hospitals. Installed on servers of CONUEE, IMSS and the Ministry of Energy of Tabasco No. of hospitals with access = 350 hospitals (IMSS has a free platform so that any hospital that accesses the courses can do so). No. of estimated people who will take the course annually = 2,600 people.	51 (Considered head of maintenance and 2 collaborators per hospital)	

Table 5.4. Estimated Impact of the Implementation of the Updated Mexican US Standards with Respect to Current Standards

	Energy Savings (GWh)	Reduction of Emissions (tCO₂)
NOM-008	205	89,175
NOM-013	1,229	534,644
NOM-020	364	158,340
Total	1,798 per year	782,159 per year

5. With the result obtained, all the established indicators were successfully met, and 92.91 percent of the total project was disbursed. Hence, the Secretary of Energy concludes that the established objectives were achieved. Various challenges had to be overcome to attain the objectives—such as the change of the federal administration, a restructuring and redefinition of the project, changes in the selection processes of the beneficiaries and in the selection criteria of the beneficiaries, and the impact of the COVID-19 pandemic—which was possible due to proper coordination between the parties involved.



C. Sustainability

6. To ensure the sustainability of the project, FOTEASE authorized SENER to monitor the PRESEMEH for five years, until 2028, when the repayment of all subprojects supported within the framework of operations with the World Bank will end.
7. Through the establishment of the Protocol of Guarantees—a procedure by which the municipality informs FIDE of any inconvenience regarding the operation of the luminaires so that it can be attended to immediately as well as the useful lifespan of the installed equipment (public lighting in municipalities and EE investments in hospitals)—it is guaranteed that even when there is a change of administration, investments persist.
8. With respect to NOMs, CONUEE proposes holding technical committee meetings during the first and second half of 2024 for presenting results, so that the Official Standards are published during 2025, for their timely application.

D. Self-evaluation

9. SENER concludes that the project was relevant in terms of EE in municipalities and hospitals, due to the innovative approach of support through repayment with the electricity savings generated, which will allow more municipalities and hospitals to continue receiving support. Moreover, the project was successful due to the joint work of all the participating entities (SENER-UREP, World Bank, FIDE, *Nacional Financiera* [NAFIN], and CONUEE), who contributed their technical, administrative, and legal expertise for the implementation of EE actions.
10. Among the barriers overcome because of the implementation of the PRESEMEH are the shortening of implementation time of the project due to the strengthening of the link with the beneficiary municipalities and hospitals. The experience of SENER and FIDE derived from the implementation of the initial subprojects helped make the timing of the bidding processes more efficient. Furthermore, establishing a socialization scheme with the municipalities allowed the subprojects to be implemented without setbacks, leaving the beneficiary population satisfied. Finally, the experience gained from the PRESEMEH yielded a valuable collection of technical specifications for public lighting, air conditioning, and PV systems equipment that, if required, can be shared with other authorities undertaking similar projects.



Annex 7. SUPPORTING DOCUMENTS

List of Supporting Documents

- Aide Memoires of Project Supervision, 2016–2023
- Project’s Implementation Status and Results Reports (ISRs), 2016–2023
- Project Appraisal Document, Report No.: PAD1193 and legal agreement
- Restructuring Paper and Additional Financing, Report No: PAD2674 (referred in the ICR as AF/R18), and legal agreement
- Restructuring Paper, Report No: PAD2674 (referred I the ICR as R20), and amendment letters
- Restructuring Paper, Report No.: RES54391, (referred in the ICR as R23), and amendment letter
- Restructuring Paper, Report No.: RES46856, (referred in the ICR as R21)
- GEF Grant Agreement TFOA7062, and Legal Agreement
- PRESEMEH - Borrower's Report (SENER) - Executive Summary (machine translation)
- Lessons learned report prepared by the Borrower.

The information was complemented with interviews during the Supervision Mission to the project before the closing date and virtual interviews with key stakeholders, which included the following:

a. During Supervision Mission

- Community members from Mineral de la Reforma (Hidalgo) - 3 community members visiting businesses in project areas.
- Technical and administrative teams from the Mineral de la Reforma Municipality.
- Community members from the city of Nanchital (Veracruz) - 3 community members in focus group.
- Technical and administrative teams from Nanchital.
- Community members from the city of Minatitlán (Veracruz)- 5 community members in focus group.
- Technical and administrative teams from the Minatitlán Municipality.
- Juan Graham Hospital (Tabasco), State hospital - Interview with 2 medical staff members.
- Hospital de Gineco Pediatría (Mexico City), IMSS hospital - Interview with 3 hospital employees: 1 medical, 1 administrative, 1 from social services.
- Discussions with representatives from the Borrower and counterparts during the mission (SENER, FIDE, CONUEE, and NAFIN).

b. Virtual Meetings

- Meeting with IMSS representative.
- Meeting with 2 representatives from Tabasco State.
- Meeting with 3 representatives from Tuxpan (Veracruz).
- Meeting with 2 representatives from the technical teams managing the street lighting system in Oaxaca de Juarez (Oaxaca).
- Meeting 2 representatives from FIDE.
- Meeting with 2 representatives form NAFIN.
- Meeting with technical officer from the project design stage.
- SENER Representative.

Video. Produced by the World Bank (2024): <https://www.youtube.com/watch?v=IKG4DjqPon4>



Annex 8. CHANGES TO COMPONENTS DESCRIPTIONS AND HISTORY OF CHANGES TO THE RESULTS FRAMEWORK

Color code: “Red” text eliminated during first restructuring; “Blue” text incorporated during the first restructuring. “Orange” text eliminated during second restructuring; “Green” text incorporated during second restructuring.

Table 8.1. Changes to Components Descriptions and History of Changes to the Results Framework

Component	Restructuring	Component Description
Component 1 Policy Development and Institutional Strengthening	Original	Strengthening the enabling environment for energy efficiency at the municipal level through, inter alia: <ul style="list-style-type: none"> (a) (i) the carrying out of municipal energy efficiency diagnostics to assess energy use and identify energy saving in priority areas in sectors such as street lighting, water and wastewater, and municipal building; and (ii) the provision of capacity-building activities on energy efficiency at the municipal and national level; (b) Provision of sector-wide policy support, including: (i) the development of a plan for scaling up the operational and financial mechanisms tested under the project which shall include, inter alia: relevant procurement methodologies for performance-based contracting; and (ii) the development and implementation of a framework for the establishment of energy management systems in selected municipalities to facilitate the incorporation of energy efficiency considerations into the municipal planning, including the provision of required technical support; and (c) The provision of support for the implementation, monitoring and evaluation of the project for eligible activities as set forth in the project operational manual (POM).
	AF/R18	Strengthening the enabling environment for energy efficiency at the municipal level through, inter alia: <ul style="list-style-type: none"> (a) (i) the carrying out of municipal energy efficiency diagnostics to assess energy use and identify energy saving in priority areas in sectors such as street lighting, water and wastewater, and municipal building; and (ii) the provision of capacity-building activities on energy efficiency at the municipal and national level; (b) Provision of the carrying out of sector-wide capacity-building activities policy support, including: (i) the development of a plan for scaling up the operational and financial mechanisms tested under the project which shall include, inter alia: relevant procurement methodologies for performance-based contracting; and (ii) the development and implementation of a framework for the establishment of energy management systems in selected municipalities to facilitate the incorporation of energy efficiency considerations into the municipal planning, including the provision of required technical support; and (c) The provision of support for the implementation, monitoring and evaluation of the project for eligible activities as set forth in the project operational manual (POM).
	R20	Strengthening the enabling environment for energy efficiency at the municipal level through, inter alia: <ul style="list-style-type: none"> (a) (i) the carrying out of municipal energy efficiency diagnostics to assess energy use and identify energy saving in priority areas in sectors such as street lighting, water and wastewater, and municipal building; and (ii) the provision of capacity-building activities on energy efficiency at the municipal and national level; (b) Provision of the carrying out of sector-wide capacity-building activities policy support, including: (i) the development of regulatory information tools designed to support the implementation of the national energy efficiency strategy; and a plan for scaling up the operational and financial mechanisms tested under the project which shall include, inter alia: relevant procurement methodologies for performance-based contracting; and (ii) the development and implementation of a framework for the establishment of energy management systems in selected municipalities to facilitate the incorporation of energy efficiency considerations into the municipal planning, including the provision of required technical support; and (c) The provision of support for the implementation, monitoring and evaluation of the project for eligible activities as set forth in the project operational manual (POM).



Component	Restructuring	Component Description
Component 2 Municipal Energy Efficiency Investments	Original	Provision of support for: (a) The carrying out of Municipal Energy Efficiency Subprojects, considering of investments inter alia: (i) acquisition and installation of lighting fixtures and other street lighting infrastructure such as poles, arms and wiring, and management and control systems; (ii) acquisition and installation of pumps and motors and other auxiliary equipment for extracting, transporting, distributing and treating water and wastewater; and (iii) acquisition and installation of, among others, lighting, air conditioning, windows, insulation, white roofs, solar water heaters, and photovoltaic systems in public buildings; and (b) Preparation of feasibility studies, including detailed energy audits and designs, and bidding documents, for the Municipal Energy Efficiency Subprojects.
	AF/ R18	Provision of support for: (a) The carrying out of Municipal Energy Efficiency Subprojects, considering consisting of investments on inter alia: (i) acquisition and installation of lighting fixtures and other street lighting infrastructure such as poles, arms and wiring, and management and control systems; (ii) acquisition and installation of pumps and motors and other auxiliary equipment for extracting, transporting, distributing and treating water and wastewater; and (iii) acquisition and installation of, among others, lighting, air conditioning, windows, insulation, white roofs, solar water heaters, and photovoltaic systems in public buildings; and (b) Preparing Preparation of feasibility studies, including detailed energy audits and designs, and bidding documents, for the Municipal Energy Efficiency Subprojects.
	R20	No Further Changes
Component 3 Public Facility Energy Efficiency Investments	Original	N/A – Component was incorporated in first restructuring (AF/R18)
	AF/ R18	Public Facility Energy Efficiency Investments (a) Strengthening capacities and the enabling environment for energy efficiency at Eligible Public Facilities through, inter alia: (i) the carrying out of capacity-building activities for energy efficiency at Eligible Public Facilities; (ii) supporting the development of policy and of monitoring, reporting and verification procedures; and (iii) the carrying out of targeted energy and science education activities mainly for girls. (b) (i) Carrying out Public Facility Energy Efficiency Subprojects, consisting of investments on inter alia: (1) acquisition and installation of lighting fixtures and wiring, including the installation of managements and control systems; and (2) acquisition and installation of, among others, electrical wiring, lighting, air conditioning, windows, insulation, with roofs, solar water heaters and photovoltaic systems, all in Eligible Public Facilities; and (ii) Preparing feasibility studies, including detailed energy audits and designs, structural safety assessment and bidding documents, for the Public Facility Energy Efficiency Subprojects.
	R20	No Further Changes
Component 4 Municipal Energy Efficiency Contingency Facility	Original	N/A – Component was incorporated in first restructuring (AF/R18)
	AF/ R18	Financing the Capitalization of the Contingency Facility to: (a) partially cover the risk of default by Eligible Municipalities or Eligible Water Operators under their respective Energy Service Agreements; or (b) as set forth in the Operational Manual and if applicable, further support the carrying out of Municipal Energy Efficiency Subprojects.
	R20	No Further Changes

No changes were made to the component descriptions during the R21 and R23.

Table 8.2. History of Changes to the Results Framework

	Indicators	Original	AF/R18	R20	R21	R23	Actuals at Closure
PDO 1. To promote the efficient use of energy in the Borrower's municipalities and other Eligible Public Facilities							
O 1 - 11	Projected lifetime energy savings (MWh) - (Core)	1,020,714	1,735,000	603,504	290,000	290,000	Actuals : 427,147



	Indicators	Original	AF/R18	R20	R21	R23	Actuals at Closure
							Updated: 715,002
01-12	Number of ESAs signed (number)	23	40	21	21	21	36
01-13	Projected Lifetime GHG emission reductions (tCO2) (Tones/year) <i>(Indicator introduced during AF/R18)</i>	---	810,000	306,122	145,000	145,000	Actuals: 189,682 Updated: 314,624
Reason for changes: The indicator allows measuring (from the environmental perspective and NDC targets) the project contributions to promote efficient use of energy (PDO 1).							
PDO 2. To contribute to strengthening the enabling environment							
02-11	Framework to scale up municipal EE in the country <i>(Original indicator for PDO 2, dropped during R20)</i>	Framework accepted by the SENER	Framework accepted by the SENER	--	--	--	--
	Number of regulatory information tools designed to support the implementation of the national energy efficiency strategy <i>Introduced during R20)</i>	---	---	3	3	3	3
Reason for changes: The context and Government focus changed (mainly COVID-19 and a new Government with different priorities), and the actions and contributions to enhance the enabling environment changed from the policy advice and setting the basis for scaling up the project to contributing to updating, strengthening, and tailoring three key energy efficiency norms, that would be applicable nationwide.							
Intermediate Results Indicators							
	Projected lifetime GHG emission reductions – (tCO2) (Tons/year)	463,405	---	--	--	--	--
<i>The indicator was moved from "intermediate" to PDO during AF/R18</i>							
	Original: Default rate of municipalities (% average rate of non-payment over total outstanding loan balance)	10	10	--	--	--	--
	<i>Revised during R20</i>						
	Revised: Average of payment discipline per Municipality (% avoidance of default)	---	---	90%	90%	90%	100%
Reason for changes: in coordination with the Government, the decision was made that changing from measuring the non-payment to measuring the payment discipline would reflect better project achievements.							
	Subprojects designed (number)	28	44	22	22	22	47
	Street light interventions (number)	9	16	16	16	16	20
	Water and wastewater interventions (number)	8	8	1	--	--	--
<i>Dropped during R21</i>							
Reason for changes: the water subprojects faced challenges at entry conditions, and the Government decided to drop these types of projects.							
	Municipal building interventions (number)	6	8	--	--	--	--
<i>Dropped during R20</i>							
Reason for changes: The Municipal building subprojects encountered issues related to lengthy procedures to obtain permits to perform work in historic buildings, and the Government decided to drop these types of projects.							
	Original: Capacity building, and outreach and women in STEM activities implemented (number)	25	30	--	--	--	--
<i>Revised during R20</i>							



	Indicators	Original	AF/R18	R20	R21	R23	Actuals at Closure
	Revised: Capacity building, outreach and training activities implemented (number)	---	---	12	12	12	13
Reason for changes: In discussions with the Government and the context for implementation, the indicator was changed to better reflect the type of interventions that could be delivered.							
	Design of energy management systems (EnMS) for street lighting, water and wastewater, and municipal buildings and public facilities (number)	3	5	--	--	--	--
	<i>Dropped during R20</i>						
Reason for changes: as informed by the Government, another international cooperation institution was supporting a similar activity, therefore it was decided to drop this activity.							
	Original: Participants in consultation activities during project implementation (number)	1,000	1,000	--	--	--	--
	<i>Changed during R20</i>						
	Revised: Participants in engagement activities during project implementation (Number)	---	---	300	300	300	692
Reason for changes: In discussions with the Government and the context for implementation, the indicator was changed to better reflect the type of interventions that could be delivered.							
	Original: Participants in consultation activities during project implementation – female (Percentage - Subtype: Supplemental)	40	400	--	--	--	--
	<i>Revised during R20</i>						
	Revised: Participants in engagement activities during project implementation – female (Number)	---	---	100	100	100	114
Reason for changes: In discussions with the Government and the context for implementation, the indicator was changed to better reflect the type of interventions that could be delivered.							
	New: Public facility interventions (number)	---	8	2	2	2	2
	<i>Included during AF/R18, to measure EE interventions delivered under C3</i>						



Annex 9. OVERVIEW OF PRESEMEH MODEL

The project developed a sustainable operational and financial mechanism for the implementation of public EE investments (in municipalities and other public institutions) which would address the main barriers to EE in municipalities and the public sector and would also have the potential to be continued beyond the time frame of the operation. Institutional arrangements were put in place that involved a number of institutions, as outlined below:

- The FOTEASE, which had experience with the financing of EE projects, is the trust fund through which funds (IBRD loan and repayments from beneficiary public institutions) were/are channeled.
- SENER is responsible for the implementation of the project; it was supported by a Project Implementation Unit. SENER was responsible to ensure that all appropriate implementation arrangements are in place.
- FIDE was the “operator” and executed the activities under C2 and C3(b)⁷¹. It entered into an agreement with SENER. (The World Bank provided capacity building to FIDE on procurement and financial management). FIDE also entered into an agreement with the utility, CFE.
- CFE supported the execution of the project by validating selected municipalities’ street lighting census, recognizing the energy savings, recovering the ‘repayment’ from municipalities (and later from health facilities) through the electricity bills and transferring those resources (i.e., the ‘repayments’) to FIDE.
- Eligible municipalities and health facilities enter in an agreement with FIDE and SENER to accept the project and to agree to a schedule for the repayment of part of the EE investment cost.
- Private sector technology and service providers enter into a contractual arrangement with FIDE to carry out the works to implement the EE investments.

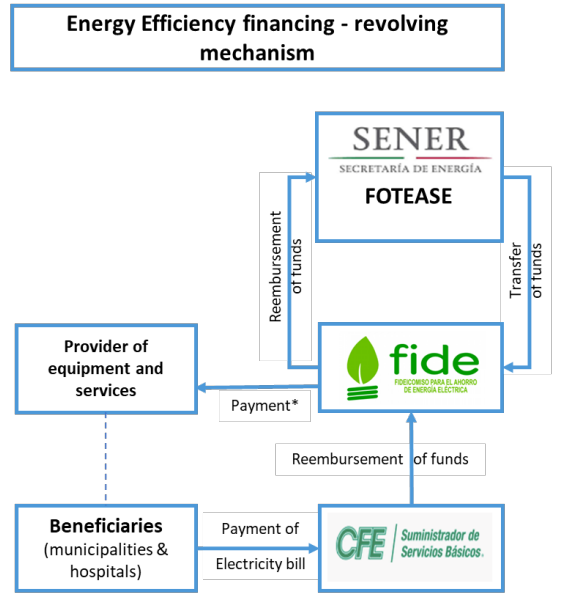
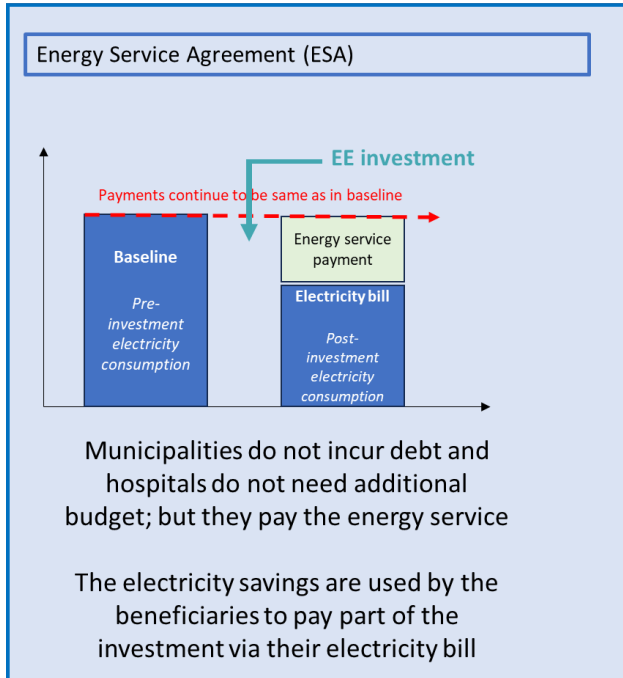
An innovative mechanism to finance EE investments in public facilities (including municipalities), called “Energy Services Agreement (ESA)” was introduced through the PRESEMEH:

- FIDE and the SENER enters into an ESA with a public entity (municipality of health facility), where it agrees to continue paying its energy bills (a reduced amount due to the impact of the EE investment), plus a contribution to partially repay EE investment costs. The payment is made through the electricity bill to CFE. Both payments (i.e., the reduced energy bill plus the ‘repayment’) would equal the pre-PRESEMEH electricity bill the entity was paying.
- FIDE prepares and bids out the EE project on the beneficiary’s behalf.
- CFE continues collecting the energy bill (a reduced amount due to the savings achieved through EE investments) plus the contribution or repayment agreed amount.
- The CFE sends the beneficiary entities’ contributions (or partial repayment amount) to FIDE, who transfers the funds received from the CFE to the FOTEASE
- The FOTEASE can then reinvest the funds (‘repayments’) in additional EE investments – the revolving nature of the financing mechanism.
- Through this scheme the public entity does not incur debt, as it continues paying what it used to pay, and the implementation is outsourced to a competent entity (FIDE).
- Upon completion of repayment, the public entity (i.e. municipality or health facility) retains the energy savings.

⁷¹ Through the R21, the GoM decided to allocate to FIDE also the responsibility to execute technical assistance activities under C1 and C3(a).

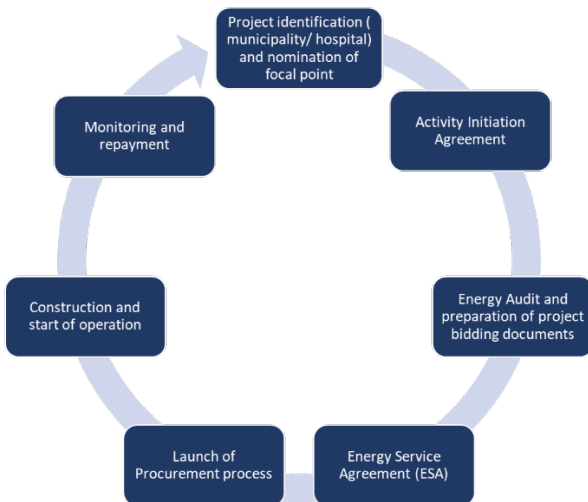
The PRESEMEH model is illustrated below:

Sustainability of financing mechanism for PRESEMEH EE investments



*Part of the investment is covered by a subsidy from the federal government (World Bank loan of US\$ 50 million)

EE Investments – Subproject cycle and Components





Annex 100. SUMMARY OF SUBPROJECTS FINANCED BY PRESEMEH

Table 10.1 Street Lighting Sub-Project

No.	Hospital	State	ESA's signing date	Areas of Intervention			Total Investment (US\$)
				Air Conditioning (Number of equipment)	Solar PV (Installed capacity)	Lighting (Number of lights)	
IMSS Hospitals							
1	Pediatric Gynecology Hospital	Ciudad de México	Feb, 11-2022	---	134.22	1,602	331,370.66
2	General Hospital	Hidalgo	Feb, 11-2022	---	81.44	---	100,201.51
3	General Hospital	Colima	Jul, 7-2022	---	52.78	---	86,072.87
4	General Hospital	Guanajuato	Jul, 7-2022	---	270.73	---	459,311.06
5	General Regional Hospital	Michoacán	Jul, 7-2022	---	153.79	---	314,960.54
6	General Hospital	Jalisco	Jul, 7-2022	---	206.57	---	303,401.24
7	Regional General Hospital	Guerrero	Oct, 31-2022	89	161.53	3,581	1,596,477.68
8	Family Medicine Unit	Guerrero	Oct, 31-2022	38	83.72	501	656,113.81
9	General Hospital for Family Medical Care	Oaxaca	Oct, 31-2022	24	123.31	488	625,134.71
10	General Hospital	Oaxaca	Oct, 31-2022	30	81.54	1,134	365,632.18
11	Gynecology-Obstetrics and Family Medicine Hospital	Baja California	Oct, 31-2022	---	99.64	522	245,981.69
12	General Hospital	Baja California Sur	Oct, 31-2022	---	93.73	---	128,346.62
13	Subzone General Hospital and Family Medicine	Baja California Sur	Oct, 31-2022	---	108.29	---	147,656.32
14	Pediatric Gynecology Hospital	Sinaloa	Oct, 31-2022	---	122.85	433	225,423.83
15	Family Medicine Unit	Sinaloa	Oct, 31-2022	---	139.69	464	264,157.82
State of Tabasco Hospitals							
16	Juan Graham Hospital	Tabasco	Oct, 31-2022	1	359.00	2,800	1,877,075.06
17	Comalcalco Hospital	Tabasco	Oct, 31-2022	1	265.70	1,717	871,330.65
TOTAL				183	2,538.53	13,242	8,598,648.26
*Exchange rate 17.01 Mexican Peso per US Dollar							



Table. 10.2 EE investment in Hospital Sub-Projects

EE investment in Hospital Sub-Projects							
No.	Hospital	State	ESA's signing date	Areas of Intervention			Total Investment (US\$)*
				Air Conditioning (# equipment)	Solar PV (Installed capacity)	Lighting (# lights)	
IMSS Hospitals							
1	Pediatric Gynecology Hospital	Ciudad de México	Feb, 11-2022	---	134.22	1,602	331,370.66
2	General Hospital	Hidalgo	Feb, 11-2022	---	81.44	---	100,201.51
3	General Hospital	Colima	Jul, 7-2022	---	52.78	---	86,072.87
4	General Hospital	Guanajuato	Jul, 7-2022	---	270.73	---	459,311.06
5	General Regional Hospital	Michoacán	Jul, 7-2022	---	153.79	---	314,960.54
6	General Hospital	Jalisco	Jul, 7-2022	---	206.57	---	303,401.24
7	Regional General Hospital	Guerrero	Oct, 31-2022	89	161.53	3,581	1,596,477.68
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13	Subzone General Hospital and Family Medicine	Baja California Sur	Oct, 31-2022	---	108.29	---	147,656.32
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State of Tabasco Hospitals							
16	Juan Graham Hospital	Tabasco	Oct, 31-2022	1	359.00	2,800	1,877,075.06
17	Comalcalco Hospital	Tabasco	Oct, 31-2022	1	265.70	1,717	871,330.65
TOTAL				183	2,538.53	13,242	8,598,648.26

*Exchange rate 17.01 Mexican Peso per US Dollar