Terminal Evaluation

“Rural Electrification with Renewable Energies in Isolated Areas of Ecuador” Project

IDB Project ID: EC-G1001; GRT/FM-13784-EC

GEF ID: 5029

Product 3

Terminal Evaluation Final Report

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ACRONYMS

ARCONEL	Spanish acronym for Agency for Regulation and Control of Energy and Non-Renewable Natural Resources
IDB	Inter-American Development Bank
CC	Climate Change
CONELEC	Spanish acronym for National Electricity Council
DIM	Direct Implementation
EUC	Electric Utility Company
EEASA	Empresa Eléctrica Ambato (han EUC)
EERCS	Empresa Electrica Regional Centro Sur (an EUC)
EERSSA	Empresa Electrica Regional del Sur (an EUC)
TE	Terminal Evaluation
RE	Renewable Energy
FEDETA	Fundacion Ecuatoriana de Tecnologia Apropiada (Ecuadorian Appropriate Technology Foundation)
FERUM	Spanish acronym for Rural and Marginal Urban Electrification Program
GEF	Global Environment Facility
IRENA	International Renewable Energy Agency
MAE	Spanish acronym for Ministry of Environment
MEER	Spanish acronym for Ministry of Electricity and Renewable Energy
MERNNR	Spanish acronym for Ministry of Energy and Non-Renewable Natural Resources
MICSE	Spanish acronym for Strategic Sectors Coordinating Ministry
MM	Management Model
M&E	Monitoring and Evaluation
WHO	World Health Organization
NGO	Non-Government Organization
PIR	Project Implementation Report
PME	Spanish acronym for Electricity Master Plan
PMR	Progress Monitoring Report
ProDoc	Project Document
PV Systems	Photovoltaic Systems
SDCEE	Spanish acronym for Undersecretariat for Distribution and Commercialization of Electric Power
SENPLADES	Spanish acronym for National Planning and Development Secretariat

SEREE	Spanish acronym for Undersecretariat for Renewable Energies and Energy Efficiency
SGTEE	Spanish acronym for Undersecretariat for Generation and Transmission of Electric Power
ToR	Terms of Reference
CU	Coordinating Unit

1 EXECUTIVE SUMMARY

Project Title	Rural Electrification with Renewable Energies in Isolated Areas of Ecuador			
GEF Project ID:	5029	PIF approval date	November 4, 2013	
GEF Agency Project ID:	EC-G1001	CEO approval date	April 17, 2013	
Evaluation term	3 months	Date of the Evaluation Report	December 30, 2021	
GEF Agency(ies):	IDB	PRODOC execution date		
Country(ies)	Ecuador	Expected completion date	June 2, 2020	
Region	Latin America	Financing		
Executing partner(s):	Ministry of Energy and Non-Renewable Natural Resources (MERNNR) with support of the National Electricity Council (CONELEC)		Approved by GEF	Executed
		GEF Financing (USD)	909,909	826,585
		Co-financing (USD)	3,790,000	3,601,330
		Project Amount (USD):	4,699,900	4,427,915
Evaluator	Jose Galindo			

Project Description

1 This Project has been implemented by the Inter-American Development Bank and executed by the Ministry of Energy and Non-Renewable Natural Resources (MERNNR), which was in charge of the whole project coordination. The Project also had an Advisory Committee, which comprised the two aforementioned entities and the former National Electricity Council (CONELEC).

2 The objective of the Project was to increase and improve the rural population's access to electric power. To achieve this goal, the Project had three components: if) Improving local capacity to design, evaluate, implement, and manage projects using RE; ii) Implementation of RE projects; and iii) Monitoring, Impact Assessment, and Dissemination of Results.

3 The Project started operating in 2015 with an expected duration of four years, but was finally completed in 2020 after two term extensions. The total cost was USD 4,427,915, the amount of the GEF funds executed was USD 826,585 (of USD 909,090), and co-financing amounted to USD 3,601,330.

Evaluation Table

Project performance rating	
Criteria	**Rating**
Monitoring and Evaluation	
M&E design at project start	4 (Moderately Satisfactory)
Execution of the M&E Plan	3 (Moderately Unsatisfactory)
Overall quality of M&E	3 (Moderately Unsatisfactory)
Execution by the IA and EA	
Execution by the Implementing Agency	4 (Moderately Satisfactory)
Execution by the Executing Agency	4 (Moderately Satisfactory)
Overall quality of project implementation and execution	4 (Moderately Satisfactory)
Outcomes	
Relevance	5 (Satisfactory)
Effectiveness	4 (Moderately Satisfactory)
Efficiency	4 (Moderately Satisfactory)
Overall quality of project outcomes	4 (Moderately Satisfactory)
Sustainability	
Overall likelihood of risks to sustainability	3 Moderately Likely
Overall project results	4 (Moderately Satisfactory)

Rating Scales

Ratings for Progress towards Results, Effectiveness, Efficiency, M&E, and execution by the IA and EA	Sustainability
6. Highly satisfactory (HS): The level of the results achieved/M&E/quality of implementation and execution clearly exceeds expectations and/or there have been no shortcomings.	4. Likely (L): Negligible risks to sustainability.
5. Satisfactory (S): The level of the results achieved/M&E/quality of implementation and execution meets expectations and/or there have been no or minor shortcomings.	3. Moderately likely (ML): Moderate risks to sustainability.
4. Moderately satisfactory (MS): The level of the results achieved/M&E/quality of implementation and execution more or less meets expectations and/or there have been some shortcomings.	2. Moderately unlikely (MUl): Significant risks to sustainability.
3. Moderately unsatisfactory (MU): The level of the results achieved/M&E/quality of implementation and execution is somewhat below expectations and/or there are significant shortcomings.	1. Unlikely (Ul): Severe risks to sustainability.
2. Unsatisfactory (U): The level of the results achieved/M&E/quality of implementation and execution is substantially below expectations and/or there have been major shortcomings.	Unable to Assess (U/A): Unable to assess the expected incidence and magnitude of risks to sustainability.
1. Highly unsatisfactory (HU): The level of the results achieved/M&E/quality of implementation and execution is insignificant and/or there have been severe shortcomings.	
Unable to Assess (U/A): Available information does not allow an assessment of the level of achievement of results.	

Summary of Conclusions

4 This Project is highly relevant to Ecuador, it responds to the national policy priorities and addresses an issue of high social sensitivity, since it provides electricity access to families and communities which in the 21st century were still not served. The design is well balanced, as it incorporates institutional capacities, the installation of PV solutions, and impact monitoring.

5 The project demonstrated adaptive capacity to take advantage of opportunities and expand its scope of action, incorporating outcomes and outputs that were not originally included. Such adaptive management capacity was also reflected in the ability to advance the execution of components in spite of the complex political, institutional, and economic context which prevailed during their development.

6 Overall, the Project succeeded in meeting the expected objectives and targets, although due to the lack of a monitoring system results cannot be checked in terms of the Project's impact indicators (impact of the Project on the beneficiary families and communities).

7 A critical aspect in terms of sustainability is the lack of a management model that would ensure the operation and maintenance of the equipment installed over time.

Summary of Recommendations

8 It is necessary to find management models that engage other institutions in order to share the burden of logistics and maintenance. Such institutions could include, for example, the army, Petroecuador and, also in some cases, religious missions and schools present in isolated areas. This will enable cutting maintenance and planning costs.

9 Consideration should be given to the possibility of influencing other cooperation projects so that, regardless of their main objective (conservation, climate change, bioeconomy, food security, etc.), they include the installation of solar panels as part of their comprehensive assistance package for the communities in which they work.

10 It is recommended that funds be made available to hire technical assistance aimed at formulating new projects of national scope intended to close the electricity coverage gap through financing to be obtained from international cooperation and/or development banks.

11 It is recommended that the pending impact assessment of this Project be carried out in order to strengthen the positioning and attractiveness of the topic of rural electrification in isolated areas of Ecuador. In addition to increasing the attractiveness of this topic to decision makers, the information from the impact assessment could be used to justify new investments to reduce the service coverage gap.

12 The monitoring of the installed systems should be undertaken by the electric utilities, so it is necessary to implement a management model linked to a financial sustainability strategy which proposes permanent sources and alternative mechanisms to finance the maintenance of the equipment.

2 INTRODUCTION

2.1 BACKGROUND

13 On November 4, 2013, the Republic of Ecuador, through the former Ministry of Electricity and Renewable Energy (MEER, by its Spanish acronym), now the Ministry of Energy and Non-Renewable Natural Resources (MERNNR, by its Spanish acronym), and the Inter-American Development Bank (IDB) signed the Global Environment Facility (GEF) Investment Grant Agreement No. GRT/FM-13784-EC for the execution of the Project entitled “Rural Electrification with Renewable Energies in Isolated Areas of Ecuador”.

14 The objective of the Project is to support the Government of Ecuador in increasing electricity coverage in isolated rural areas using renewable energies. The Project had three components:

a. Component 1: Improving local capacities for designing, evaluating, implementing, and managing projects with RE.
b. Component 2: Implementation of RE projects.
c. Component 3: Monitoring, impact evaluation, and dissemination of results.

15 In the energy sector, the IDB helps countries in Latin America and the Caribbean expand access to efficient, sustainable, reliable, and affordable energy in a diversified and safe way, while contributing to reducing poverty, promoting a better standard of living, encouraging competitiveness, and driving development and economic growth.

2.1.1 Purpose of the Evaluation

16 The Terminal Evaluation (TE) seeks to evaluate the progress towards the objectives and results as specified in the Project Document (ProDoc), with a view to identifying potential recommendations and lessons learned for future projects.

17 This TE is considered a great opportunity to provide the donors, the Government, and the Project partners with an independent evaluation of the relevance and the achievement of results.

18 The specific objectives of the TE are the following:

19 To evaluate the Project outputs and outcomes considering their relevance, effectiveness, and efficiency, as well as the feasibility of sustainability of results at project closure, assigning the applicable rating to each criterion using the GEF rating scale and according to the “Guidelines for GEF Agencies in Conducting Terminal Evaluations”.

20 To provide a detailed assessment of the parties involved in the Project implementation phase and their impact on the Project results, as well as assess the performance of the institutions involved in the Project execution and the support and oversight provided by the Inter-American Development Bank in its capacity as GEF implementing agency.

21 To evaluate the sustainability of the Project and its Components in terms of institutional, financial, environmental, and sociopolitical risks (as well as the level of ownership by users/target groups, through a retrospective analysis of the Project stakeholders' involvement).

22 To identify lessons learned that can improve the selection, design and execution of future activities financed by the GEF, especially to support rural electrification projects in isolated areas.

23 To evaluate the use and level of disbursement of resources from both the GEF grant and the identified parallel co-financing or counterpart contribution.

2.1.2 Main Stakeholders

Actor	Roles and responsibilities
Ministry of Electricity and Renewable and Non-Renewable Energy (MERNNR).	The execution of the GEF Project was led by the MERNNR, with technical support of the CONELEC project team. The Coordination Unit (CU) was located within the Undersecretariat of Renewable Energies and Energy Efficiency (SEREE), which, according to the Project Document, would be responsible for overall coordination *vis-a-vis* the IDB and GEF.
Inter-American Development Bank	The IDB acted as the Implementing Agency (IA) of the Global Environment Facility. The IDB was ultimately responsible for delivering the results, also subject to their certification by the MERNNR as the main executing entity.
Former National Electricity Council (CONELEC)	The responsibility of the former CONELEC - now the Agency for Regulation and Control of Energy and Non-Renewable Natural Resources (ARC) - was to review the technical reports prepared by the distribution companies, and to evaluate and prioritize projects using its own economic methodologies. The technical team of CONELEC was also responsible for technical supervision during project execution.
National Planning and Development Secretariat (SENPLADES)	It validated the Project, which had already been approved by CONELEC, and prioritized it at the national level.
Distribution Companies	The distribution companies were in charge of proposing and executing the projects financed under Component 2 of the GEF Project. The distribution companies prepared technical monitoring reports that were submitted to the CU, and they were in charge of reviewing technical aspects and providing their technical input during the execution period.
Communities and Families	They were the Project beneficiaries. The implementation of the rural electrification pilot projects included a prior consultation with rural communities and indigenous peoples, which took place before the implementation of project activities. In addition, they were trained in the use of PV systems and in operation and maintenance requirements. Their involvement in the operation and management of the PV systems was critical. These responsibilities were

	analyzed during the definition of the Management Model (MM) to guarantee the community's right to participate and receive training.

2.2 Project Description

24 This Project implemented rural electrification projects in isolated areas using renewable energies (ER) that have been included in the Rural and Marginal Urban Electrification Program (*Programa de Electrificacion Rural y Urbano Marginal*, or FERUM by its Spanish acronym). This electrification process used only off-grid PV systems. The Project defined a Management Model (MM) that sought to expand low-income populations' access to energy in a sustainable manner, and increase local capacities for implementing and managing decentralized energy generation projects.

25 Therefore, this GEF Project is consistent with the overall objectives of the Climate Change (CC) focal area, which include supporting developing countries in introducing low-carbon technologies and energies. More precisely, this Project is aligned with objective number 3 of the CC focal area, which is to promote investments in RE technologies. This Project had three main results, which focused on providing inputs to improve the existing regulatory capacity, seeking mechanisms to develop management models, and implementing projects, conducting evaluations and disseminating results.

26 Based on the Project Document, the following Components, Outcomes, and Outputs were established:

Component 1. Improving local capacities for designing, evaluating, implementing and managing projects with RE.

Activity 1.1. - Methodology improvement.

Activity 1.2 - Review of documentation from existing projects.

Activity 1.3 - Definition of a Management Model.

Activity 1.4 - Training activities.

Component 2. Implementation of RE projects

Activity 2.1 – Installed / improved capacity.

Activity 2.2 – Households access to electricity.

Activity 2.3 – Households access to improved electricity.

Activity 2.4 – Schools in rural areas with access to electricity.

Component 3. Monitoring, Impact Evaluation, and Dissemination of Results.

Activity 3.1 – Monitoring and Evaluation Protocol.

Activity 3.2 – Definition and implementation of an (experimental) Impact Evaluation Methodology for assessing the main social and economic impacts of the Project.

Activity 3.3 – Verifying the assumptions made regarding household consumption, the value of social benefits, payment capacity, and the technical performance of the systems implemented, so as to update the methodology.

Activity 3.4 - Dissemination activities.

2.3 Evaluation Methodology

2.3.1 Design/general approach

27 The methodology sought to meet the objectives set in the Terms of Reference (ToR). During the evaluation process, there was interaction between the evaluator, the project team, the MERNNR, the IDB and other stakeholders in order to accelerate the evaluation process, which enabled a timely sharing of findings.

28 An inclusive and participatory approach based on data sourced from programmatic, financial and monitoring documents was used at all times, and there has been a reasonable level of direct participation of the involved parties. As a result of the evaluation process, conclusions have been derived about the activities done and their contribution to the Project's main objective and three Components.

29 On October 7, 2021, a kickoff meeting was held between project team representatives and the evaluator. The objective was to present the Project to the evaluator and define turnaround times for deliverables. Also during the meeting, communication channels were designated, the delivery of information and products was coordinated, and mission details were defined (dates and places to visit).

30 On November 11, 2020, the World Health Organization (WHO) declared a global COVID-19 pandemic due to the fast dissemination of the disease across all regions worldwide. As a result, restrictions were established for international and domestic trips. In this context, the Terminal Evaluation was affected by some limitations resulting from the new normality that prevailed as a result of the pandemic.

31 The evaluation was conducted both virtually and in-person. Interviews with staff members of the Ministry, the IDB and the electric utilities, and with former coordinators were conducted virtually, with the mission focusing exclusively on visiting the installed solutions and obtaining the beneficiaries' impressions.

32 To reduce risks related to the pandemic and ensure the evaluation is feasible, credible and useful, the different evaluation methodologies were reviewed.

2.3.2 Sources of Data

Review of Secondary Information

33 As a first task in the evaluation process, a list of key documents was requested (Annex 1). The requested information included, but was not limited to, the Project Document (ProDoc), adjustments to the results framework, reports on Steering Committee meetings, yearly, four-monthly, and semi-annual reports, project implementation reports, and financial and expense reports. Other requested documents include reports on completed and ongoing consultancies, co-financing information, operating and work plans, audit reports, communication material about the Project, national legislation relevant to the Project, and country reports. The gathering of secondary information was affected but some limitations like the lack of a repository of information, an unsuitable arrangement of information, and the incompleteness of information.

34 Based on the review of said documents, a detailed description of the Project was made covering the identified problem, intended objectives, components, and their respective activities. Afterwards, an evaluation framework was established. It combined the guiding questions for the five key criteria and the four Project performance assessment categories (project formulation and design, project execution, results, monitoring and evaluation). This initial task defined the scope and criteria to evaluate the relevance, efficiency, effectiveness, impact, and sustainability of the Project interventions.

Information Gathering: Interviews and Field Visits

35 In the second stage of the TE, primary information was gathered through in-depth interviews to key stakeholders (Annex 7.2) and a mission to the Project intervention area (Annex 7.4). The mission enabled confirming the installation of the equipment and interviewing key stakeholders and beneficiaries to get their views and get a better picture of the Project context.

Table 1. Methodologies used for the interviews and field visits

Interviews	Visits to project implementation sites
They are a means for obtaining information and perceptions from the people who manage, implement, or are the beneficiaries of the Project.	They allow a better understanding of the environment in which the various Project activities are being implemented at the territorial level.
Questions are clear and to the point, making it easier to get useful information.	Carrying out field visits improves the level of transparency of the evaluation.
Organizing the interviews according to the evaluation criteria enables classifying the answers to facilitate the drawing of conclusions.	The visits to the intervention areas will provide opportunities to conduct a technical evaluation of the work carried out, as well as the capacities

	developed and existing resources to meet the Project objectives.
They are a means for obtaining information that can be compared with the findings of the document review.	

Prepared by: Jose Galindo

2.3.3 Instruments

Interviews

36 The consultative approach of the evaluation contemplated conducting interviews with representatives of various sectors (governmental, non-governmental, cooperation agencies and other key stakeholders). This resulted in reflections, conclusions, and other insights around the stages of the Project, providing the evaluation process with a comprehensive view of the Project.

37 Given the prevailing context and the fact that the mission was mostly devoted to paying a visit to the implementation sites, during the week from November 15 to 19, 15 interviews were carried out with key stakeholders virtually (Annex 2). The approximate length of the interviews was 30 to 60 minutes. At the beginning of each meeting, participants were informed about the confidentiality of the information they would share, so the project team was not present during the interviews, which were conducted both individually and in small groups with people from the same institution. The interviews included the questions attached as Annex 3, contemplating enough flexibility for the interviewees to provide any information that seemed relevant to them.

Visits to the Project Implementation Sites

38 In addition to the interviews, visits were made to several locations where Project activities had been carried out in order to compare actual versus planned implementation of the activities. The mission was carried out from November 22 to 25, 2021. During the mission, visits were made to the locations where solutions for the Pindal, Zapotillo 2, Lorocachi and Wasakentsa communities had been installed, as described in Annex 4 Mission Agenda. In addition, interviews were conducted with beneficiaries at each location. Annex 5 provides a report on the mission.

2.3.4 Limitations

39 The main limitation lied in the delivery of the information package required for the evaluation. To begin with, there were difficulties accessing the repository because the Project did not have a digital storage site. On top of that, when the repository was created, the information was not arranged according to the list requested by the evaluator.

40 And, finally, throughout the process there were information gaps between the information that was requested and what was actually received (Annex 1). The evaluator requested the information on several occasions and, based on the information reviewed by the Ministry and the IDB, the evaluator was provided with the information that was available.

41 There were also limitations related to the COVID-19 pandemic. For the evaluation to be feasible, credible, and useful, attention was paid to the different methods applied to reduce information gaps, so the combination of face-to-face and online interviews required more time for planning.

3 PROJECT DESIGN

42 The Project design was aligned with the country needs and policy priorities, so both the intervention components and the proposed implementation strategy are considered to be appropriate. The Project was designed with the participation of technical experts and authorities from the sector.

43 The Project was proposed in a political and institutional context which was very different from the one it had to face during implementation; consequently, the original assumptions turned out to be too optimistic and underestimated the complexity of maintaining institutional commitment and response capacity over time.

44 At the time of Project design, it was mentioned that the country was seen as an example in the region for considering a shift in its energy mix a matter of priority, which was underpinned by a strong institutional framework comprising the Ministry of Electricity and Renewable Energy, which at that time had a National Directorate of Renewable Energy staffed with 12 technical experts, with 4 being devoted to rural electrification. The Ministry came to have a team of 25 technical experts exclusively devoted to renewable energy. In addition, there was capacity to size renewable energy projects, which enabled submitting projects to the GEF, the International Renewable Energy Agency (IRENA), and other international cooperation agencies for financing. Also, the country had a fund called FERUM designed to finance access to energy in the rural sector.

45 This capacity no longer exists as a result of the successive institutional changes - the Directorate staff was reduced to 3 people (including the director), who were also entrusted with new tasks that they did not have before. Consequently, the existing capacity to handle projects like this has practically been dismantled.

46 The design was balanced and responds in general terms to what is considered as a comprehensive intervention for the sector. It is concerned with improving institutional capacities in terms of both technical training and tools, and public policies aimed at expanding coverage in remote places, distant from the grid. In addition, apart from installing electricity solutions in isolated areas, the design contemplated monitoring the impact of the intervention.

47 The design leverages the experience and capacities developed through a number of projects and interventions financed by the IDB, such as EC-L1070 Rural and Marginal Urban Electrification (Phase I) and EC-L1128 of the same name (Phase II), whose objective was to implement grid-extension projects and projects in isolated areas. Consequently, given the long history working in this sector, this type of interventions pose a relatively low risk to the IDB. The GEF resources complement the financing for these interventions, they enable expanding their coverage and favor innovation in terms of management models, operating standards, and the use of technologies for remote monitoring of equipment operation.

48 As regards the formulation of indicators, it should be noted that they are not SMART, especially in terms of their being specific and timely. However, in general terms the impact indicators are appropriate, measurable and within what is normally expected for this type of intervention. The outcome indicators stand out for their practicality, although in some cases, such as dissemination and training, they are not specific enough.

4 PROJECT IMPLEMENTATION

4.1 Approach and Project execution mechanisms

49 The Project was executed by the Coordinating Unit (CU), which was formed by one manager and technical experts specialized in issues related to PV systems. During the implementation there were 3 managers. The last manager was hired in 2017 and his contract ended due to the expected results not being achieved. Due to a lack of financial resources, no manager was hired since 2018 and the coordination was assumed by the Ministry.

50 According to the Ministry, to identify the project portfolio, the MERNNR requested a list of communities from each of the electric utility companies. Afterwards, the CU selected seven communities based on a selection process that followed the criteria-based methodology developed by *Fundacion Ecuatoriana de Tecnologia Apropiada* (FEDETA, by its Spanish acronym). The identification was based on social, geographical, and topological criteria. As regards the identification of the locations to

install the remote monitoring systems, the communities that had PV systems in place were prioritized. Other factors were also considered, such as being certain that the monitoring system with the LORA protocol would work. However, the identified communities maintained a fairly high delinquency rate, which situation was reported to the IDB and the MERNNR.

51 The Project experienced delays in the signing of the agreement with Empresa Electrica Regional Centro Sur (EERCS), due to certain conditions of the specifications for the installation of the remote monitoring systems not being clear. According to the company, this situation was not resolved promptly because they ignored what was the equipment stored at the Ministry's warehouses, which they had to install. In this regard, the MERNNR points out that the responsibility for the equipment was part of the agreement between FOMIN and FEDETA, and the Ministry supported customs procedures to bring the equipment into the country. They also point out that they shared the relevant information with EERCS, and collaboration was provided for the preparation of ToRs and the contracting process.

52 During execution, two types of agreements were executed with the electric utilities. On the one hand, the remote monitoring agreement with EERCS provided that a consultant hired by the IDB would hold two training sessions on the operation of the equipment, and one training session in the field during installation. In practice, only a quick primer was given at the EERCS offices.

53 In addition, the agreements related to the implementation of the PV systems executed with EEASA and EERSSA included training to the community managers on maintenance and basic notions of electricity for individual systems. In addition, out of Project resources, the staff of the Ministry and of the electric utilities in charge of the PV systems was trained in the design and operation of those systems.

54 In spite of this, some testimonials point to the fact that the training was limited - for example, for the remote monitoring systems, it was focused on the LORA protocols and the theory of data transmission.

55 The GEF resources were executed through direct implementation (DIM), so for the funds to be transferred to the Ministry, an exclusive transfer account was opened with the Central Bank of Ecuador (Special Transactions Account - ST). The process to open the account took eleven days (between August 14 and 25, 2014). Through the ST account, the MERNNR executed USD 561,979.74. There were expenses associated to the transfers to EEASA, EERSSA and EERCS, and other expenses.

56 The balance of the GEF resources (USD 264,605) was executed by the IDB in coordination with the MERNNR following the IDB policies. This decision was made to

streamline procurement processes, thus avoiding complications derived from going through the government accounting process.

57 For procuring the PV systems, corporate purchases were made. To shorten timeframes, Empresa Electrica Ambato (EEASA) led the procurement of equipment and materials, and then a second process was carried out to hire the installation of the equipment. Within the IDB, it was difficult to run standardized processes for the procurement of works, whether involving large or small amounts of money. Due to the simplification of processes, the amounts involved were small, so there was little interest from potential vendors.

58 The consultancies for the PV systems design and management model, monitoring and supervision that had to be hired by the Ministry were finally hired by the IDB. This is a demonstration of adaptive management and also shows the systematic inability of the Ministry to deliver on its contractual commitments. According to MERNNR officials, this was due to the time-consuming processes established in government policies for the hiring of consultancies – and due to the short time left before the Project closure, assistance was requested from the IDB to speed up procurement processes. However, the Ministry delivered the ToRs and pro forma invoices for the implementation of remote monitoring.

59 As regards logistical and operational issues, Component 2 had to overcome challenges related to logistics and transportation to and within the communities. This was evidenced in the first trips made to identify the Project beneficiaries, and afterwards to deliver heavy material like the batteries. While according to the ToRs the proposed price contemplates transportation, several interviewees mentioned that in some cases the installation of equipment was affected by technical, weather, and logistical constraints.

4.2 Engagement of stakeholders and the public in general

60 To engage beneficiaries, the Project implemented a participatory methodology based on workshops to collect information and learn about the needs of the beneficiaries, which enabled implementing an innovative input called “social mapping”. This decision made by the MERNNR aimed at securing the sustainability of the Project. According to the Ministry, sustainability would not be achieved without community engagement.

61 The beneficiaries’ engagement varies depending on their location. For example, in the Amazonian communities, where EEASA installed PV solutions, there was initially an agreement in force providing that the community technical experts would be in charge of taking the readings and reporting them in a form. The renewable energy division of

EEASA would then carry out checks and perform maintenance every 4 months. Although the communities' participation was evident at the beginning, it diluted over time, possibly due to the absence of a management model defining differentiated roles and responsibilities.

62 In relation to the involvement of civil society, Fundacion Ecuatoriana de Tecnologia Apropiada participated in the Project acquiring the remote monitoring equipment and delivering it to the MERNNR. This was done as part of a different project that had been awarded to said foundation by the IDB.

Execution by the Executing Agency	4 (Moderately Satisfactory)

63 The MERNNR had a leading role since the Project inception and supported all phases of the Project life cycle. Its participation was aimed at providing technical advice and it was in charge of coordinating the actions with the electric utilities. The MERNNR, through the SEREE and the SGTEE, coordinated the Project actions with the different areas of the Ministry. Under the direction of those two undersecretariats, it coordinated actions with the Financial Directorate to address administrative aspects and the financial execution, managing the budgetary resources for the different processes, including procurement. The Legal Department supported the internal coordination with the different Ministry areas, apart from reviewing the agreement.

64 During project execution, the Ministry went through a restructuration which resulted in the removal of the Undersecretariat of Energy Efficiency and Renewable Energy (SEREE). As a result of this, the competences of the National Directorate of Renewable Energy were transferred to the Undersecretariat of Generation and Transmission. As provided by its institutional policy, the Undersecretariat of Generation and Transmission prioritized large-scale generation plants, so, according to the interviewees, smaller projects with a social vision lost strength. Afterwards, the MERNNR was merged once again with another agency and the pilot projects lost even more ground.

65 The electric utilities were engaged through a successful process carried out by the Ministry for the execution of Component 2. The MERNNR called on all the electric utilities to propose renewable energy projects in hardly accessible areas. Successful proposals were obtained from Ambato, Centro Sur, and Regional del Sur, so they executed agreements with the MERNNR providing that the latter would deliver the resources and the utilities would pay the local taxes.

66 At the time of starting the activities, the electric utilities did not have a specific area for renewable energies, which affected the operation of the systems and then the timely monitoring of the installations.

Execution by the Implementing Agency	4 (Moderately Satisfactory)

67 As regards the IDB, stakeholders recognize its long history of cooperation with the Ecuadorian electricity sector through a number of technical and financial assistance packages. Such experience translates in high exposure to the national sphere, which also entails knowledge of the context and a relationship of trust forged over many years with the electricity sector.

68 The articulation with other IDB-financed projects allowed greater agility during the design phase and significant expectations in terms of the aggregate impact of the entire portfolio of projects deployed by the IDB in the country.

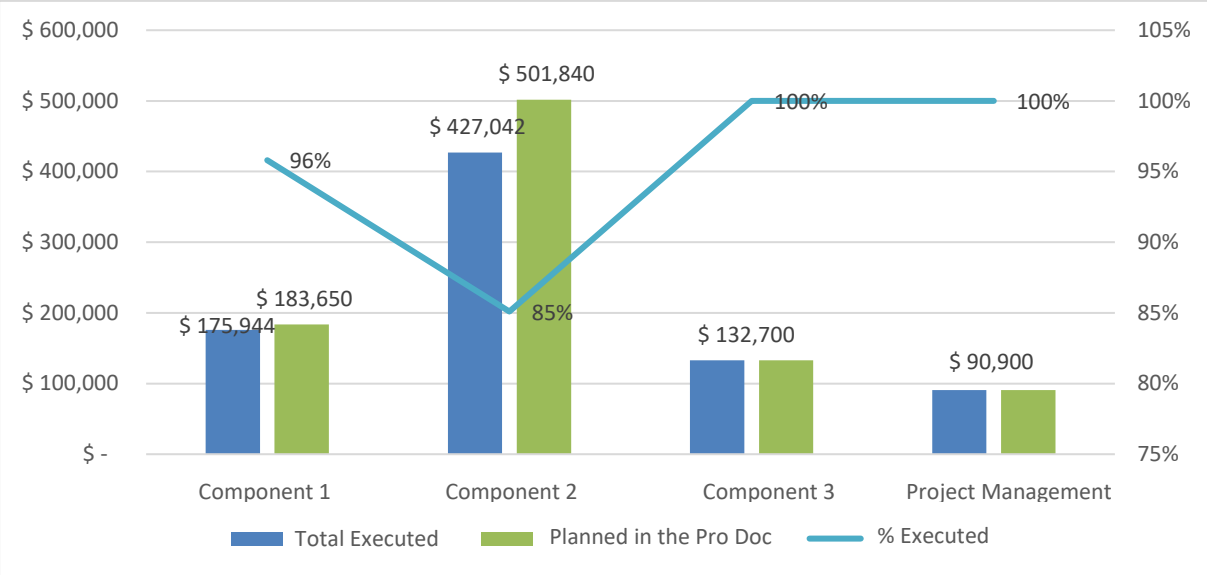
69 The IDB played a key role in keeping the Project alive and not losing the strategic direction throughout the institutional reform process that affected the sector. It kept the Project memory and actively sought the commitment and engagement of technical experts and authorities in a context of uncertainty due to the institutional reform of the sector.

70 According to the interviewees, the IDB's decisive management allowed the Project to be executed in an unfavorable institutional context. Its adaptive management capacity is worth noting; it directly funded studies and consultancies that were originally to be funded by the MERNNR - which was affected by the prevailing austerity policies and time constraints related to the expiration of the agreement.

4.3 Project Financing

71 The Project budget amounts to USD 909,090, which accounts for the GEF grant. The execution period was 4 years. Until 2021, the Project disbursed USD 826,585, i.e. 91% of the total available budget. Based on the Project reports, Component 1 had a better performance (96%) in terms of budget execution than Component 2, which executed 71% of the budget, and Component 3 exceeded the planned execution by 406%, as shown in the Figure below.

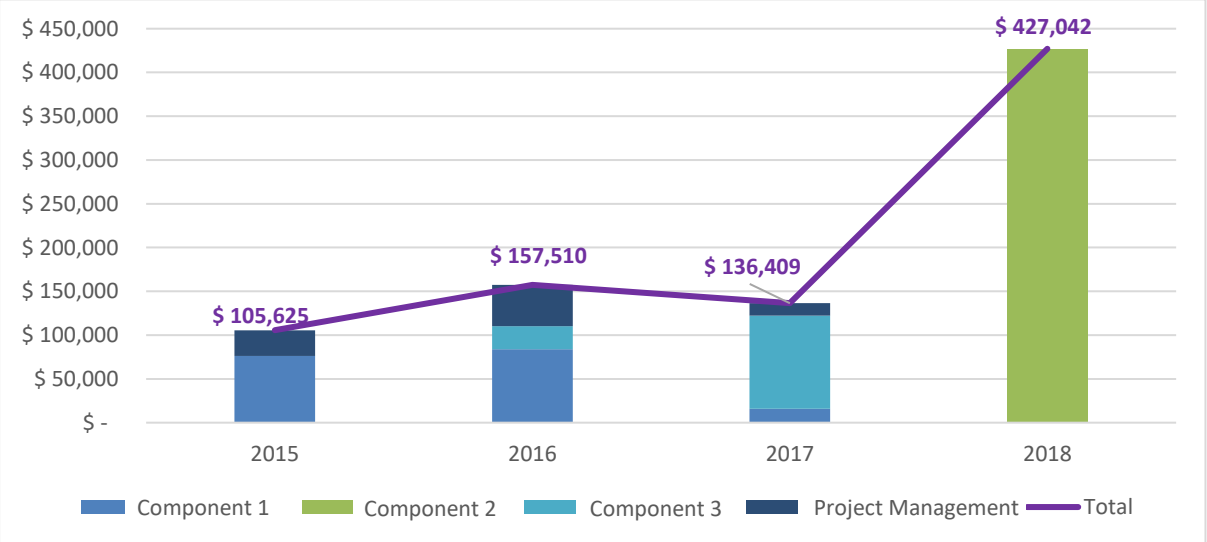
Figure 1 Planned Budget v. Executed Amount by Outcome



Source: Disbursement form, 2021

72 During 2015, the execution was low considering that disbursements were made only to fund Component 1 and project management. Afterwards, in 2016 and 2017, disbursement flows increased and included Component 1 and 3. Later in 2018, the Project made the only and considerable investment for Component 2 (Figure 2).

Figure 2. Budget Execution by Outcome and Year



Source: Disbursement form, 2021

4.3.1 Co-financing

73 As regards co-financing, the Project reported a 100% success in terms of the resource mobilization target. The Project initially expected co-financing for USD 3.16 million. According to the MERNNR, said amount accounted for the resources executed within the IDB FERUM program, which involved the installation of off-grid projects in the

concession areas of the Ambato, Regional del Sur, and CNEL Sucumbios electric utilities. Based on the information received, the amount of co-financing obtained was USD 3,601,330 - which is more than planned - as the Project had more contributors than initially expected.

74 As shown in Table 2, there is no information on the actual final contribution of the IDB in relation to Technical Cooperation ATN/OC-13089-EC and Investment Loan 2608/OC-EC under the Rural and Marginal Urban Electrification Program.

75 The MERNNR made contributions in cash, in the form of a loan, and in kind by allocating technical experts of its own to activities related to the Project and contributing to the Project in different ways. For example, they devoted time and dedication to attend workshops and meetings, and also provided their input on Project documents and reports.

Table 2. Co-financing

Type/Source	Expected Co-financing (USD)				Actual Co-financing (USD)				Total	
	Cash	Loans/ Concessional Financing	In kind	Other	Cash	Loans/ Concessional Financing	In kind	Other	Planned	Actual
MERNNR	3,160,000				380,000.00		149,366.85		3,160,000	3,550,085.66
IDB Financing (ATN/OC-13089-EC)	180,000								180,000	-
Investment Loan (2608/OC-EC)	450,000								-	-
Empresa Electrica Regional Centro Sur					3,655.15				-	3,655
Empresa Electrica Regional del Sur					8,697.03					8,697
Empresa Electrica Ambato					38,892.83					38,893
Total	3,790,000				431,245.01		149,366.85		3,340,000.00	3,601,330.54

Source: Co-financing Report, 2021

Table 3. Confirmed Co-financing Sources as of the Terminal Evaluation Phase

Source of co-financing	Name of Co-Financier		Type of co-financing	Mobilized Investment	Amount (USD)
Government Institution	MERNNR		Loan		3,020,718.66
Government Institution	MERNNR		Cash	Recurring expenses	380,000.00
Government Institution	MERNNR		In kind	Recurring expenses	149,366.85
Non-Government Organization	IDB Financing (ATN/OC-13089-EC)		Cash	Recurring expenses	-
Non-Government Organization	Investment Loan (2608/OC-EC)		Cash	Recurring expenses	-
Private	Empresa Electrica Regional Centro Sur		Cash	Recurring expenses	3,655.15
Private	Empresa Electrica Sur		Cash	Recurring expenses	8,697.03
Private	Empresa Electrica Ambato		Cash	Recurring expenses	38,892.83
Total		**3,601,330.54**			

Source: Co-financing Report, 2021

4.4 Project Monitoring & Evaluation

Overall quality of M&E	3 (Moderately Unsatisfactory)

76 The ProDoc included a section on monitoring activities. In general, the proposed activities are not detailed; they include monitoring by an energy specialist of the IDB and from the Local Office (ENE/CEC), as well as energy specialists from the headquarters (INE/ENE). The Coordinating Unit, based in the MERNNR, would be responsible for monitoring and drawing up the different related reports.

77 The ProDoc provides for the preparation of two semiannual monitoring reports to be submitted to the Advisory Committee during its sessions, as well as a yearly monitoring report. Said reports would assess the overall level of achievement of the Project goals and outcomes, as well as the progress made in the activities under each Component. In addition, it was proposed to carry out an audit and a terminal evaluation two years after the installation of 90% of the systems.

78 Also, the project design included Component 3: Monitoring, Impact Evaluation, and Dissemination of Results, which contemplated the definition of a protocol for monitoring the implementation and performance of the installations. This protocol proposed a number of activities to monitor the progress of indicators, establish a baseline, and assess the progress made until the Project completion in order to establish the social and economic impact of the Project.

79 According to testimonials, what is established in Component 3 is indeed contemplated in a Monitoring and Evaluation Plan, but the existence of such document could not be confirmed. There is no evidence either of a detailed plan setting forth the methodology, frequency, assumptions, means of verification and people in charge of monitoring the indicators of each component. And there is no evidence either of a budget having been allocated to the monitoring activities.

80 There is no evidence that M&E was conducted during Project implementation based on a plan or a system that defined the methodology or the people responsible for monitoring the Component and Impact indicators. This resulted in several indicators not being reported, including impact indicators. Possibly, if budget had been allocated for M&E in addition to the budget for Component 3, there would have been appropriate monitoring.

81 No reports on activities or on monitoring conducted by the local IDB energy specialist at the Local Office (ENE/CEC) have been identified, nor is there a means of verifying the monitoring conducted by energy specialists at the headquarters (INE/ENE).

82 As regards the reports defined in the ProDoc, the Project prepared two Project Implementation Reports (PIRs) for the execution years, except for 2020. Overall, the quality of the PIRs for 2016 and 2017 is good, and there is a detailed description of activities by Component and risks. The subsequent PIRs are not so detailed, do not describe the progress made by indicator - not even by Component -, and do not include a review of the risks. It should be noted that none of the PIRs report on the progress of impact or outcome indicators.

83 On the other hand, the semi-annual reports were correctly prepared from 2014 to 2016. Based on the information received, after that period, two reports were not completed. Until 2017, the content of the reports is appropriate, there is a detailed account of activities and progress by component, assessment of risks and mitigation measures, and financial execution. From then on, the reports only include an overview of general progress on Component 2.

84 As regards the audit, it was completed for the 2013-2016 period, although it was supposed to be conducted at the end of the Project. There is no evidence that another audit has been carried out. As for the Terminal Evaluation, it was not completed within the expected terms. It was only commissioned in October, 2021 and it is in progress.

85 In relation to the activities proposed under Component 3 for the monitoring of the installed equipment, a document called “Guidelines for the maintenance of PV projects” was prepared in July, 2017. It provides an overview of general aspects to be considered when supervising the maintenance of the installed projects.

86 In addition, using FOMIN resources, the IDB hired consulting services for controlling and supervising the PV systems, including the following outputs:

- Design of a data capture system, a control system, and a SCADA system for off-grid PV systems in the Amazonia of Ecuador.
- Design of communication systems for remote monitoring and control systems for PV microgrids in the Amazonia.
- Study for the installation of the data capture system.

87 Although the documents were delivered, the specifications for the purchase of equipment were completed and the equipment was installed, the consultant engaged by the IDB did not carry out the review and calibration missions. Although the contracting was carried out by the IDB, the MERNNR did not even follow up on this. According to testimonials collected from the interviews, the missions were not carried out due to mobility limitations derived from the COVID 19 pandemic. Resources were requested later on to carry out the missions, but the Project had already ended.

88 It is worth mentioning that the turnover of technical experts in the Project Team and the institutional reform of the electricity sector resulted in a significant loss of information

and institutional memory. At the time of conducting this terminal evaluation, it was confirmed that there was no information repository, so a significant effort had to be made to access information that is incomplete and dispersed between the IDB, the MERNNR, and the electric utilities.

4.5 Risk Management, including Environmental and Social Safeguards

89 During the preparation of the CEO Request, four risks were identified in relation to the possibility of low acceptance by beneficiaries, poor and inadequate design and/or installation, political and institutional risks, and climate change risks. While most of the proposed mitigation measures were appropriate, this was not the case with the institutional risk - during the Project design, the institutional disempowerment suffered by the MERNNR could not be anticipated.

90 Later on, the Technical Cooperation document provides a new identification of risks, reporting four risks, of which three are similar to those previously identified. It also includes a sustainability-related risk, which is assumed as a normal challenge for this type of projects and no mitigation strategy is detailed. No rating is provided for these risks.

91 It is worth mentioning that although the political and institutional context was again identified as a risk, and the Project would come into operation and face a change of government, this risk was not addressed in detail and appropriate mitigation measures were not proposed.

92 It is surprising that administrative, procurement and financial risks had not been assessed, considering the difficulties associated with carrying out projects in Ecuador due to the resources having to be deposited into an ST account.

93 During Project implementation, the risks were outlined in the PIRs, but the quality of the reports was better between 2015 and 2017. It should be noted that two new risks were properly identified along with their respective mitigation measures - little interest of vendors in participating in procurement processes, and low local capacity for the installation of PV systems. Both risks remained present in 2016 and an appropriate procurement plan was proposed. However, despite the change of government, there is no evidence that the CU had the necessary foresight to anticipate a change of authorities or potential institutional reforms.

94 In 2018 and 2019, the CU did not report any risk associated with the changes that the MERNNR was going through. In fact, the risk report is brief and shows no variations in relation to the risks identified in the original design. For 2020 and 2021, no risks were reported in connection with COVID-19, possibly because most of the Project

implementation took place in previous years and there were only a few activities still pending on the field. For 2021, there was a correct identification of the risk associated with maintaining the installed solutions, which will be a challenge due to the high access costs. The proposed mitigation measure suggests how to address this issue, but does not provide enough detail to ensure the sustainability of the operation of the equipment installed.

4.6 Environmental and Social Safeguards

95 In relation to environmental and social risks, the CEO Request considered that the Project did not pose climate change risks. The Technical Operation document does not identify those types of risks either. The applicable screening of safeguards was carried out outside those documents and the Project was designated as Category C, with the following recommendations:

a. There is no need to conduct an environmental analysis, not even for the operations;
b. Requesting the CU an Environmental and Social Strategy as well as the Safeguard Policy Filter and Safeguard Screening Form Reports.

96 There is evidence confirming completion of the Policy Filter, which resulted in the need to develop an Environmental and Social Strategy, as a recommendation. However, there is no evidence that such Strategy was actually developed. While based on the Ecuadorian regulations this type of projects do not need to obtain an Environmental Certificate, the Executing Agency did obtain it following the procedures set forth in those regulations. The Ministry of Environment recommended applying the Good Environmental Practices Guide.

97 Within Component 3, the Project proposed to develop an impact evaluation methodology. Consequently, a baseline was established based on the prevailing social conditions, that is, 1,633 families and 6,104 people who would potentially benefit from the Project. The baseline was developed by FLACSO and it enabled identifying types of education, jobs, energy uses, energy needs, and payment capacity of rural families. Afterwards, the social specialists suggested waiting one year to complete the impact evaluation including information related to the conditions before and after the intervention. For this reason, this activity was left pending and it has not been possible to evaluate the impact on beneficiaries.

4.7 Gender

98 The project design did not specifically contemplate activities related to gender equality and women empowerment. On the contrary, based on the experience with other rural electrification projects, the project design actually identified that women and girls often benefit from time savings and health improvements.

99 In this regard, although it was expected that said effect would replicate for this Project, no indicators or follow-up activities were included to verify if there was indeed such an impact.

100 It is worth pointing out that, during execution and as part of the baseline established for 23 communities under Component 3, the Project identified the number of women trained in technical skills to operate the solar systems installed by the electric utilities. Based on this information, it became apparent that there were significant barriers preventing women from the communities from participating in that type of activities - only 4 out of 200 trained technical specialists were women, i.e. only 2%.

101 On the other hand, the Project reports that beneficiary women did participate in training processes related to PV energy. Also, the 2018 and 2021 PIRs point out that beneficiary women in remote areas of the Amazonia saw their quality of life improve due to the fact that they replaced candles and kerosene with electricity.

5 PROJECT OUTCOMES AND IMPACT

5.1 Outcomes by Component

Overall quality of project outcomes	4 (Moderately Satisfactory)

102 **Based on reports, Component 1** succeeded in meeting all the intended indicators, exceeding in some cases the expected targets. In the opinion of the evaluator, the Project also assumed some key aspects for sustainability that were not originally established during the design, as is the case of the standardization document and the proposed public policies for rural electrification.

103 Indeed, among the first activities reported, the Project developed and implemented a methodology to qualify and prioritize projects based on a multi-criteria analysis that was used for the selection of project sites and beneficiaries.

104 One aspect that has been highly praised by participants was the opportunities for generating technical capacities and team building, both at the central level at the

MERNNR, and in the electric utilities. However, interviewees mentioned that these capacities have grown weaker over time because the successive institutional reforms in the sector have resulted in the loss of a significant portion of the trained staff. In contrast, electric utilities have succeeded in retaining technical teams for the monitoring and maintenance of the project investments, with the Regional Centro-Sur utility showing the greatest installed technical capacity.

105 As regards Component 1, the MERNNR took the initiative to prepare the document for standardization of PV systems property units. The purpose was to standardize the equipment and procedures for the installation of PV systems in isolated places. This decision was based on the fact that each electric utility had their own methodologies and technical specifications. During the preparation of the document, workshops were held with technical staff of the three companies. It was expected that the document would be made official so that compliance with it would be mandatory at the national level, but this did not happen. In spite of this, testimonials point at the fact that the three electric utilities have implemented the standardization document regularly as part of their operations.

106 Also, as part of this Component a consultancy for a management model proposal was carried out, but it was not fully completed and was consequently never implemented. However, a wise decision in the development of the management model was to nest the installation and subsequent operation of the PV solutions in the electric utilities, although without the necessary resources to operate.

107 Another additional input that was not originally programmed was a public policy proposal for rural electrification. The consultancy included a number of policies that the MERNNR, through the Agency for the Regulation and Control of Energy and Non-Renewable Natural Resources (ARCONEL), should adopt as mandatory for the electric utilities. Although the document was presented and had adequate participation during its preparation, its officialization was not achieved as originally expected.

108 In addition, the process of designing a financial regulation was not completed either. The consultancy that proposed financing and sustainability schemes for the off-grid system was hired and completed, but the schemes could not materialize.

Table 4. Progress of Component 1 Indicators

Indicator	Proposed Target	Achieved Target
Methodologies for qualification and prioritization of PV off-grid projects defined **BASELINE** No methodologies for RE off-grid projects	1	1 (100%)
Projects validated with new methodology	100%	100%

BASELINE 0% of projects		
# of community members trained for O&M **BASELINE** 0 community members highly trained for O&M	54	200 (370.37%)
# of public technicians trained for O&M **BASELINE** 0 technicians	10	32 (320%)

Source: PIR, 2015 - 2021

109 As regards Component 2, which contemplated the installation of off-grid RE projects in rural and isolated areas, according to the Project monitoring reports, the following solutions have been installed:

Table 5. Solutions installed by the electric utility companies

Electric Utility Company	Number and Type of Solution	Beneficiary Communities	Number of Beneficiaries	Installed Capacity
Empresa Electrica Regional del Sur	25 individual PV systems	Palanda	4 households	7.93 kWp
		Pindal	6 households	
		Calvas 2	5 households	
		Zapotillo 2	10 households	
Empresa Electrica Ambato	37 individual PV systems + Mircrogrids	Lorocahi	41 households	17.25 kWp
		Boveras	51 households	14.835 kWp
Empresa Electrica Sur	7 pieces of equipment for remote monitoring of PV systems	Wasakentza	11 households	N/A
		Jikaimat	7 households	
		Siritiak	9 households	
		Muruntsa	10 households	
		Nasees	9 households	
		Waruints	8 households	
		Wasurak	16 households	

Source: Monitoring Report, 2019

110 The GEF Project was originally expected to benefit 350 households (1,300 people would have electricity access at home), and 400 communities by providing electricity to their schools; the intended total installed capacity was 330 kW. In practice, beneficiaries amount to 187 households and 13 communities, and the installed capacity is 40.015 kWp. In addition, although it is not formally reported by the Project, the MERNN reports that, as part of the co-financing, 160 households were benefited through EERSSA, 605 households through EEASA, and 164 communities through CNEL Sucumbios.

111 Regarding the beneficiaries, they are mostly families in vulnerable conditions, and priority was given to homes in which there are elder people, children and people with disabilities.

112 During the field visit it was found that some of the installed solutions are not currently in operation, most notably the two microgrids installed in Lorocachi which, according to testimonials gathered from community members, stopped working approximately 6 and 9 months ago.

113 During the field trip, it was found that making payments for the electricity consumed is a source of generalized concern and poses a challenge to beneficiaries. Testimonials point at billing issues, long wait times, and confusing information at customer service windows. Reference is made to the payment process being time-consuming and burdensome - in some cases, despite approaching the payment offices personally with the money, it is not possible to pay. The electric utilities mention that, due to the PV systems being stand-alone solutions, bills do not go through the ordinary billing systems, and although in some cases the agencies are indeed aware of the projects, testimonials confirm difficulties in paying.

114 In addition to the planned intervention, an attempt was made to develop a remote monitoring and control system in order to reduce the high operating costs related to accessing isolated rural areas for the maintenance of installed PV solutions. This activity was not originally contemplated and evidences adaptive management capacity - the donation of this equipment was used as an opportunity to finance its integration and installation on site.

115 The installation of this pilot system took nearly 2 years, as the review of the ToRs was done in 2017 and the hiring process was completed in late 2018. A consultant was hired to design, integrate and install the equipment, which had been brought from Spain. When the equipment arrived, the MERNNR was in charge of customs clearance - a process that took considerable time. The contract signed with the consultant provided that the consultant would install and test the operation of the equipment, including the design and implementation of a graphical interface to visualize data remotely, but the latter output was finally not delivered.

116 The monitoring system got installed and, based on testimonials, it transmitted information for about 3 months, after which no information was ever again received. Reference is made to an attempt to return to the field to adjust or repair the equipment, which was ultimately not possible due to the onset of the COVID-19 pandemic.

Table 6. Progress of Component 2 Indicators

Indicator	Target	Achieved Target
CO2 emissions reduced **BASELINE** 0 tCO2e	253.20	Not reported
Energy generated by RE in isolated areas **BASELINE** 0 kWh/year generated with RE	506,400	Not reported

Source: PIR, 2015 - 2021

117 **As regards Component 3**, once the equipment was installed, it was not adjusted to accommodate monitoring, as the installation was made considering demand levels that were estimated based on surveys. Afterwards, no monitoring was carried out to determine load levels at which the equipment was operating, or if there was greater demand.

118 Monitoring and control for solutions installed in the communities of the Amazonia faced some challenges derived from their isolated location. For example, in communities like Lorocachi and Boberas, access is difficult because land transport does not reach those areas, so they must be accessed by air or river.

119 As regards the impact evaluation, it was not carried out because some PV installations had not been completed and, upon recommendation of the social specialists, it was decided to wait one year before conducting an evaluation to monitor the information related to the conditions before and after the intervention.

Table 7. Progress of Component 3 Indicators

Indicator	Target	Achieved Target
Monitoring and control protocols improved **BASELINE** 0 Monitoring and control protocols	1	1 (100%)
Qualitative and quantitative impacts determined **BASELINE** 0 Impact evaluation reports	1	0 (0%)
Results disseminated in the region **BASELINE** 0 events 0 publications	2	Not reported

Source: PIR, 2015 - 2021

5.2 Impact

120 The Project has had significant impact since energy access simultaneously triggers multiple dimensions of development and improves the quality of life of the beneficiary families. Testimonials point to a deep transformation in the lives of beneficiaries, who

clearly recognize that the Project marked a milestone in their lives. However, for this and future projects it is critical that impacts be measured and assessed, just as originally provided in the Project design.

121 Due to the absence of a M&E system and appropriate monitoring by the Project Team, the Project impact indicators were not monitored and/or disclosed. It is, therefore, not possible to qualitatively verify if the Project met its proposed targets for the indicators shown in the Table below:

Table 8. Progress of Impact Indicators

Impact Indicators	Indicator	Baseline	Target	Progress
Reduction in energy costs for the beneficiary families	% of families declaring a reduction in their energy costs	0	80%	Not reported
Sustainability of projects improved	% of the installations operating	0	90%	Not reported
Improved financial sustainability	% of delinquency	0	10%	Not reported
Increase in electricity coverage in the rural areas of the beneficiary families	% of the population with coverage	90.15%	90.20%	Not reported

Source: PIR, 2015 - 2021

122 However, testimonials make reference to avoided costs on candles and lamp fuel. There are references to the fact that electricity has extended beneficiaries' useful time due to the possibility to carry out activities at night or very early in the morning, as well as savings related to avoided trips to buy fuel, candles, or charging a cell phone.

123 Among the improvements perceived by beneficiaries, there is the significant improvement in health derived from the avoided use of diesel lamps, which usually generate smoke and a toxic environment inside homes.

124 Also, according to the beneficiaries' testimonials, the Project helped improve the connectivity of beneficiary families. They mention that before they had to walk for up to two hours to charge their cell phones. Radio and TV access is also significantly appreciated by beneficiaries.

125 In terms of reducing delinquency rates, beneficiaries' testimonials and the evidence gathered from the field mission suggest that the impact of the Project was low. The reason for this is that only one management model - the prepayment key - worked properly. Paying bills is easier because the key recharging points are close.

126 Another reported benefit is the possibility for children and young people to study and do their homework at night. Also, some of the visited families mentioned that thanks to electricity access children could attend school virtually during the pandemic.

127 In this respect, thanks to the intervention of EEASA, PV solutions were installed in two isolated communities in the province of Pastaza. These PV systems serve 98 families through individual solutions (household consumption) and through a microgrid (use in a communal home). In both cases, meters were used to record energy use.

128 As regards the documents drawn up, such as bill laws, management models, protocols to operate and maintain the installed systems, and the standardization methodology, the Project failed to get them officialized by the Ministry. However, it is recognized that the Project did make a contribution in this regard by incorporating these issues in the government agenda and promoting involvement and dialogue among the different actors in this sector.

129 The Project built capacity within the electric utilities. In fact, in one of the utilities, a relatively small task force has been created to work on renewable energies and, as confirmed during the field visit, it is capable of sizing PV systems, carrying out supervision tasks and procurement processes, drawing up specifications, controlling, and also providing maintenance or technical assistance once the equipment is installed.

5.3 Relevance

Relevance	5 (Satisfactory)

130 This Project was designed at a time when the energy sector was considered a strategic element for the development of the country. So the Project was relevant to the country and was aligned with the following policies:

- The 2009-2013 National Development Plan - Policy 11.5.e “Strengthening and expanding the basic and public utility infrastructure coverage to increase capacities and financial opportunities. Improving and expanding the electricity system coverage, promoting a sustainable use of renewable resources”.
- Electrification Master Plan
- 2005/2014 Multiannual Statistics of the Ecuadorian Electricity Sector
- 2007-2016 Electricity Coverage
- Constitution of the Republic of Ecuador 2008, section 234
- 2013-2017 National Action Plan for Good Living Policy 10.9 “Triggering the systemic productivity and competitiveness conditions necessary to enable a

transformation of the productive matrix and the consolidation of more equitable structures for wealth generation and distribution".

131 Stakeholders agree that the Project is highly relevant in that it contributes to meeting the national policy objectives in a context characterized by a financial crisis and fiscal austerity. In addition, the Project is highly relevant to the participating electric utilities because it helps them improve their coverage rates.

132 The Project has particular relevance because in recent years there have been no similar projects focused on providing electricity to isolated communities in remote areas.

133 The Project is relevant to the communities located in rural areas with little access to the electricity service because PV systems are an alternative fast solution to meet their needs.

5.4 Effectiveness

Effectiveness	4 (Moderately Satisfactory)

134 Stakeholders recognize that the Project achieved its objective of supporting national authorities in expanding the electricity service coverage to isolated areas. It is mentioned that, although significant coverage has been accomplished at the national level, with about 97% users, it is precisely the remaining 3% that entails the greatest challenge in technical and logistical terms.

135 The Project succeeded in meeting a large proportion of its intended outcomes and outputs, and even exceeded in some cases the scope and outputs originally proposed. The Table below shows the progress made in the different indicators by Component:

Indicator	Proposed Target	Achieved Target	% Achieved
Component 1			
Methodologies for qualification and prioritization of off-grid PV projects defined	1 methodology	1 methodology	100%
Projects are validated using the new methodology	100% of projects	100% of projects	100%
# of community members trained in O&M	54	200	More than 100%
# of public technicians trained for O&M	10	32	More than 100%
Component 2			

CO2 emissions reduced	766 tCO2e	Not reported	
Energy generated by RE in isolated areas	1,094,726 kWh/year generated	Not reported	
Component 3			
Monitoring and control protocols improved	1 Monitoring and control protocol	1 Monitoring and control protocol	100%
Qualitative and quantitative impacts determined	1 Impact evaluation report	0	0%
Results disseminated in the region	2 events	Not reported	

136 As regards the installed solutions, it has been reported that they operated without incidents during the first months; however, at the time of the field visit, it was confirmed that some of the EEASA and EERCS equipment is not fully operational.

137 The absence of a management model, coupled with the high operating costs associated with staff trips to perform equipment maintenance, contributed to what is seen as carelessness by the electric utilities and also the MERNNR itself. For the time being, there is no clear solution to secure the sustainability of the investments, so, in the absence of resources, the monitoring of investments is largely up to the discretion and interest of each electric utility.

138 In terms of effectiveness, the Project shows a weaker performance in relation to the outputs and outcomes of Component 1, in spite of having provided training as planned and having drawn up proposals for public policies on rural electrification, a management model, and a standardization methodology. The effectiveness in said Component was affected, in the first place, by a reform in the electricity sector which resulted in many of the trained officials leaving the Ministry and the task force dealing with these issues experiencing a significant reduction in their staff numbers. Also, the documents resulting from consultancies were not coupled with a roadmap or a concrete strategy to ensure that the Ministry would officialize them.

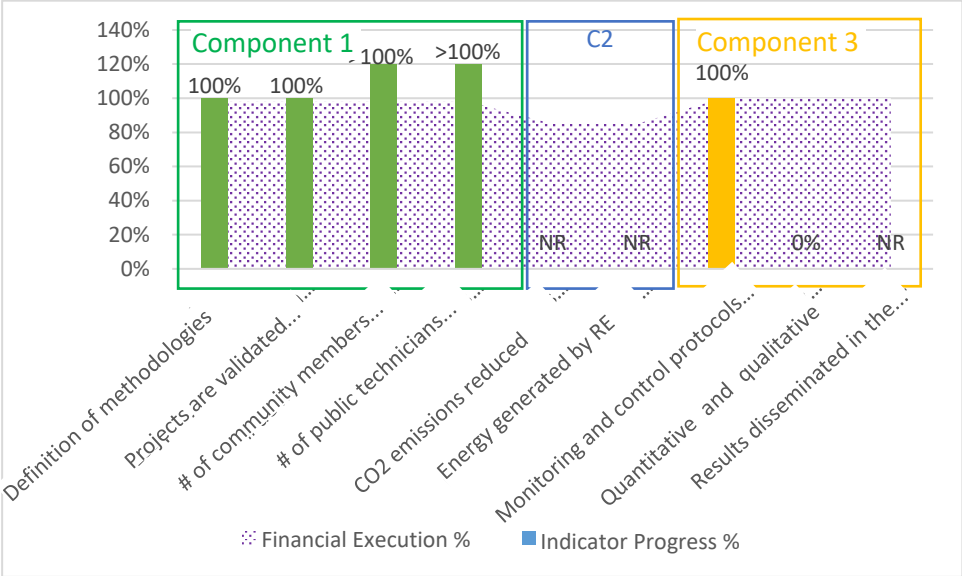
5.5 Efficiency

Efficiency	4 (Moderately Satisfactory)

139 Although it is a relatively modest amount, the Project could not fully execute the available resources within the expected time frame, in spite of having received two term extensions. According to the MERNRR, this is due to the electric utilities failing to execute a balance of the available resources.

140 In terms of Efficiency, the Project performance can be assessed only partially, because results have not been reported for all of the indicators. As seen in Figure 3, Component 1 managed to execute all of its resources and met all of its intended indicators. For the other two Components, progress in the accomplishment of indicators has not been reported.

Figure 3. % disbursed vs. % of progress in Component indicators



Prepared by: Jose Galindo, 2022

141 As regards the amounts left unused, from the IDB side it is mentioned that there was no information about the resources executed until 2020 because the Ministry had not submitted the applicable justifications. As a result of this, the resources for Component 2 that were not used could not be reassigned to Component 3. However, the MERNRR pointed out that meetings were held regularly, and said situation was reported.

142 While there are different opinions in this regard, interviewees mention that an efficient practice implemented by the Project was to separate equipment procurement processes from installation processes. The decision to separate these processes was based on a prior experience of Empresa Electrica Quito. By purchasing the equipment through separate processes, more competitive prices were obtained and there was greater compliance with the established technical standards. However, it was also mentioned that, although the ToRs for the purchase required a guarantee for each piece of equipment, the separation of processes could affect the enforcement of the guarantees in the future.

143 Although there was no management model in place, interviewees agree that entrusting the utility companies with the installation, monitoring and maintenance of the equipment was an efficient approach, since there are no other actors in the area that may assume this task in the absence of additional resources.

144 The decision to proceed with the installation of remote monitoring systems is considered an important step towards the efficiency and sustainability of the investments, even if their operation could not materialize as planned. However, some interviewees mention that almost half of the equipment donated for remote monitoring and control did not get installed and remained stored at the Ministry's warehouses. In this respect, it should be mentioned that the pilot project did not get to be completed by the consultant hired, so the rest of the available equipment did not get installed, as originally planned.

5.6 Country Ownership

145 This Project was conceived as a contribution to the national policies and priorities related to electrification and coverage in isolated areas. Consequently, there was appropriate ownership and leadership by authorities at the national level and within each participating electric utility.

146 According to the interviewees, no similar initiatives were undertaken in the country simultaneously with the Project or afterwards, so, according to testimonials, it was a good opportunity for mainstreaming and increasing the priority of this topic in the country.

147 It was found that during Project execution, there was a sense of ownership by each electric utility in relation to the PV systems, and the same applies to beneficiaries.

5.7 Sustainability

Overall likelihood of risks to sustainability:	3 Moderately Likely

148 In general, PV systems are vulnerable in terms of sustainability because they deteriorate fast if not properly maintained. While most of the installed solutions are operating, based on previous experience with similar projects, it is necessary to ensure permanent technical checks are performed on the equipment throughout their useful life.

149 From the Project side it is mentioned that, in order to ensure sustainability, workshops were held to find reasonable alternatives to ensure the technical checks can be sustained over time, but nothing concrete was achieved. However, it has been

mentioned that the sustainability of the solutions could rest with the electric utilities, provided that they undertake to keep conducting technical checks and allocate budget to the maintenance of the solutions.

150 From the Ministry side, it is not expected that the project activities can be sustained over time because this topic has lost ground and there is less capacity within the Ministry to seek financing for related topics.

151 It is considered that sustainability will largely rely on a new technical cooperation that may undertake the continuation of the implemented activities. However, no similar projects are expected to be implemented in the country any time soon, according to different interviewees - nothing points at the existence of another initiative that may ensure the continuation or replication of the Project.

152 The electric utilities do not expect to have available resources to implement similar projects in the short, medium, or long term. However, alternatives are being sought to monitor the solutions. For instance, EERCS is considering getting support from the academia through interns and/or researchers to develop a software application to visualize the data generated by the remote monitoring systems.

153 An important aspect to be considered in terms of sustainability is that the installed solutions are not expected to generate a monetary return from the service provided to the communities, although this does not apply to all of the solutions. It was found that in certain cases the proposed management model works better. This is the case with the solutions installed in Loja, where prepaid key was implemented to pay for the service. As this community is closer to the key recharging locations, paying for the service was easier. The communities of the Amazonia, however, find it difficult to get to the locations where they can pay for the service.

5.8 Project Replication

154 The Project has great replication potential, as there are previous initiatives that are being sought to be resumed. The Project results are therefore very useful. For instance, Empresa Electrica Regional del Sur (EERSSA) is seeking to repower some old PV systems from a project of 2006 for them to supply the same amount of energy as the new services.

155 At EEASA, they have identified the need to advance similar projects, as they are seen as the only possibility for the communities to access the electricity service. EEASA is expanding its concession area in Napo to the North, and consultancies are being hired to seek financing.

156 As regards the remote monitoring systems, the pilot project would be among the first of its kind worldwide. While the results are not outstanding, the possibility remains open to pick up where left off, improve, strengthen, or otherwise replicate the pilot project in the future, since if it were operating at full capacity, it would generate significant benefits.

5.9 GEF Additionality

157 This Project was conceived as part of a long tradition of cooperation between the Ministry of Energy and the Inter-American Development Bank, which is already going through its fifth phase. The IDB has financed a large number of projects that work and are operating in Ecuador. In some of those projects, for instance, USD 150 million were allocated to electrification and grid extension. Of this amount, a small fund of USD 3 to 4 million was allocated to addressing the social issue of isolated rural electrification.

158 The GEF investment built upon the institutional capacities of the Ministry of Energy, the competences, capacity and resources of the electric utilities, and also, as a third pillar, the subsequent investments made by the GEF in this country - thanks to which the country has certain installed capacities.

159 In general, this type of projects have generated institutional capacities that have enabled the GEF resources to complement existing capacities and investments to extend electricity coverage. For example, in Loja there are 400 PV systems installed by the oldest project in Ecuador, which dates from 2006. Those panels are still operating very well and, interestingly enough, of those 400 panels, there are 25 that belong to Empresa Electrica del Sur that were financed by the GEF.

160 The Project intervention influenced a change of paradigm in the electric utilities in relation to isolated users. Due to costs, logistical and sustainability issues, the utilities could not serve those users. Now interviewees consider that utility companies understand that their role goes far beyond supplying electricity, as in doing so they contribute to other cross-cutting themes like health, education, or housing with better services.

161 The Project also enabled developing a methodology to prioritize and select the pilot project beneficiaries. It is appreciated that the prioritization included a social approach. The methodology used enabled combining beneficiaries from close communities with others in distant communities, with a distance of 500 m between one another.

6 CONCLUSIONS AND LESSONS LEARNED

6.1 Conclusions

162 This Project is highly relevant to Ecuador, it responds to the national policy priorities and addresses an issue of high social sensitivity, since it provides access to electricity to families and communities which in the 21st century were still not served.

163 The design is relatively common for this type of projects. It responds to an intervention that is deemed well-balanced, integrating institutional capacities, installation of PV solutions, and monitoring of impacts.

164 While the design is not considered to be particularly ambitious in terms of the formulation of goals, during the execution the Project demonstrated adaptive capacity to take advantage of opportunities and expand its scope of action, incorporating outcomes and outputs that were not originally included.

165 Such adaptive management capacity was also reflected in the ability to advance the execution of components in spite of the complex political, institutional and economic context which prevailed during their development.

166 In the first place, the institutional structure of this sector suffered subsequent transformations, which even resulted in the removal of the functional area that should have originally hosted the Project. On top of this, the drastic cut in the government budget for this sector, coupled with government difficulties to execute resources, made it more difficult to meet the Project objectives.

167 In this context, the flexibility shown by the IDB to cover expenses that originally belonged to the MERNNR, such as studies and consultancies, is worth noting.

168 Overall, the Project succeeded in meeting the expected objectives and targets, although due to the lack of a monitoring system, results cannot be checked in terms of the Project's impact indicators.

169 The GEF investments allowed developing many valuable elements in terms of institutional capacity, such as the standardization of technologies to ensure consistency in solar panel technologies and other required equipment across the territory.

170 Another interesting element is the proposed public policy for remote or decentralized rural electrification. Although the proposal did not get officialized, the Project is credited with having opened the discussion about this issue in the country. Without public policy there is no way of having the electric utilities share responsibility for this issue and channel resources to meet the electricity needs of isolated communities.

Without public policy, actions are left to the discretion of the companies, as an optional rather than a mandatory issue.

171 Evidence points to the fact that, in spite of the relevance of this issue, save for the IDB, there is no other cooperation agency or donor investing or with prior experience investing in this type of projects with the Ministry or the electric utilities.

172 A critical aspect of sustainability for GEF investments is the lack of a management model that may ensure the operation and maintenance of the equipment installed over time.

6.2 Recommendations

173 The electricity service has relatively high coverage in Ecuador (97%), but the remaining 3% is very sensitive and additional efforts will be required to close the gap, especially in isolated areas like the Amazonia, where coverage stands at 92.89%. It is necessary to seek management models that engage other institutions in order to share the burden of logistics and maintenance, for example, the army, Petroecuador, or, also in some cases, oil operations, religious missions and schools present in isolated areas. This will enable lowering maintenance and logistics costs.

174 In addition, it is recommended contemplating the possibility of influencing other cooperation projects so that, regardless of their main objective (conservation, climate change, bioeconomy, food security, etc.), they can include activities aimed at closing the coverage gap through, for example, the installation of solar panels and Internet access as part of their comprehensive assistance package for the communities in which they work.

175 It is recommended financing technical assistance to formulate new projects of national scope intended to close the coverage gap with financing from international cooperation and/or development banks. For future projects to be financed by donors, the government, with support of the IDB, could encourage the incorporation of a social approach in the selection criteria to install technological solutions that improve the quality of life of the communities.

176 In relation to the two last recommendations, and in general to strengthen the positioning and attractiveness of the subject of rural electrification in isolated areas of Ecuador, it is recommended to complete the pending impact assessment of this Project. In addition to increasing the attractiveness of this topic to the country's decision makers, this information is extremely useful to justify new projects and investments aimed at closing the service coverage gap.

177 The utility companies do not know if there is greater use of appliances by the communities than estimated before the implementation of the Project. It is advisable conducting a field survey to establish whether the system is under or oversized. In this regard, new projects should consider increasing the installed capacity based on the beneficiaries' actual and potential demand. The reason for this is that nowadays beneficiaries can only use certain appliances - for instance, they cannot connect a refrigerator.

178 As a legacy, the Project leaves a standardization document for PV system property units, the results of which have already been tested by three electric utilities. It is important that this information is not wasted, although it will require updating to keep up with technological advances.

179 The monitoring of the installed systems should lie with the electric utilities because they were the entities in charge of the solutions during project execution, and also because they know the area better and can access the territories. In this regard, it is considered necessary to implement a management model linked to a financial sustainability strategy which proposes permanent sources and alternative mechanisms to finance the maintenance of the equipment.

180 The MERNNR should work in coordination with the electric utilities and provide greater support to maintain the projects, directly through technical and environmental advice. It is recommended that the technical experts on the field start to receive ongoing training in the use and monitoring of the electrical parameters of the systems. This will result in cost savings from avoided trips to the community areas by the electric utilities. In addition, better equipment such as multimeters, clamps, electrical material, etc., should be provided to the technical experts.

181 In terms of the electric utilities, in future projects it will be important to consolidate the progress made with this Project in relation to the management model. In the opinion of the interviewees, it is critical to cover all aspects in relation to the collection process and return to the most efficient system.

6.3 Lessons Learned

182 Rural electrification projects are not profitable from a financial perspective, but they certainly are from a social and economic perspective. In the current context of fiscal austerity it is relatively difficult to obtain financing for new initiatives from the government. It is critical for the MERNNR to have a technical team capable of sizing, formulating and executing similar projects with resources from international cooperation and development banks. Since the restructuring of the MERNNR and the

removal of a large proportion of the team that formulated and nested this Project, no similar projects have been executed in the country.

183 Future projects related to the installation of rural electrification solutions should consider the specific conditions of those areas. For one thing, the long travel distances require allocating enough resources and time to run complete tests before installing any solution. Also, the communities' conditions in terms of distance and income make it difficult for users to travel to pay for the service.

7 ANNEXES

7.1 Annex 1. List of Documents

N	Name	Status
1	CEO Request	Delivered
2	Financing Agreement	Delivered
3	Onset Report	Delivered
4	ESS and Gender	Screening delivered
5	Progress Reports (quarterly, semi-annual, or yearly) with the relevant project work plans and financial reports	2017: the report for the first half is missing 2018: the report for the second half is missing 2019: the report for the second half is missing 2020: there are no reports
6	All Project Execution Reports (PIRs)	Delivered
7	Actual costs by Project outcome, including management costs, as well as documents evidencing any significant budget review.	Financial execution information by component delivered until 2019.
9	Co-financing Table broken down by expected and actual totals in cash and in kind, as well as origin, if available.	Delivered
10	Audit reports	There is a report available for an audit conducted for the period going from November 2013 to December 2016.
11	Electronic copies of the relevant GEF Tracking Tools completed	The Tracking Tools are not completed with the final project results
12	Mission supervision reports	13 mission reports and one agenda delivered
13	Minutes of the meetings of the Steering Committee and any related body (e.g. Meetings of the Project's Preliminary Evaluation Committee)	6 Meeting minutes delivered
15	Project deliverables providing documentary evidence of the achievement of Project results	Delivered
17	Maps of the place where the Project operates	Map of Empresa Electrica Regional Sur and Empresa Electrica Ambato
18	Other related management documents: adaptive management reports, memos of the Steering Committee, etc.	Contracting of Consultants, Procurement Plan, any Addenda
20	Electronic copies of Project deliverables: newsletters, leaflets, handbooks, technical reports, articles, etc.	A User Manual and semi-annual reports
21	Any information available on relevant monitoring data related to environmental matters (species	Delivered

	indicators, etc.), beyond the information on indicators available from the logical framework of the PIRs.	
22	Any relevant monitoring data related to socio-economic matters, such as the average income/employment levels of the stakeholders in this field of activity, changes in income levels related to Project activities.	Preliminary report on social aspects. Social Diagnosis and Methodology

7.2 Annex 2. List of people interviewed online

Meeting number	Date and time	Name	Position / Organization
1	11/15/2021 2:00 PM – 4:00 PM	Renato Oña	Project Manager
2		Edison Chicaiza	Project Operational Expert
3	11/15/2021 4:15 PM – 5:00 PM	Luis Manzano	Director of Management and Promotion of Energy Efficiency Projects Ministry of Energy and Non-Renewable Natural Resources
4	11/16/2021 2:00 PM – 4:00 PM	Fernanda Jara	Member of the PMU Ministry of Energy and Non-Renewable Natural Resources
		Fabian Toscano	Operational Technical Expert Ministry of Energy and Non-Renewable Natural Resources
		Patricio Orellana	Operational Technical Expert Ministry of Energy and Non-Renewable Natural Resources
5	11/16/2021 4:15 PM – 5:00 PM	Jaime Astudillo	Member of the PMU Empresa Electrica Ambato
6	11/17/2021 2:00 PM – 4:00 PM	Wilson Nuñez	Member of the PMU Empresa Electrica Centro Sur
		Luis Urdiales	Operational Expert Empresa Electrica Centro Sur
		Angel Sanchez	Operational Technical Expert Empresa Electrica Centro Sur
7	11/18/2021 2:00 PM – 4:00 PM	Jorge Muñoz	Member of the PMU Empresa Electrica Regional del Sur
		Luis Moncayo	Operational Technical Expert Empresa Electrica Regional del Sur
8	11/19/2021 11:00 AM – 1:00 PM	Kenol Thys	Member of the PMU IDB
		Maria Molina	

7.3 Annex 3. Evaluation questions.

The questions will serve as a basis for the evaluation team to understand the context of the project and keep the focus on the most important issues that need to be evaluated and checked. The questions will be administered to the different interviewees, depending on the actor. Yes/no questions will be avoided.

- To what extent has the general objective of the GEF Project of supporting the Government of Ecuador (GoE) in increasing electrification in isolated rural areas in Ecuador using Renewable Energies (RE) been achieved?
- To what extent do the Project components, and the other Project characteristics (choice of partners, structure of the coordinating unit, implementation mechanisms, scope, budget, administrative processes, use of resources) allow the achievement of objectives?
- How relevant is the Project to the national priorities and the needs of the beneficiary men and women?
- Based on the design of the Project, was the intervention logic appropriate?
- Are the Project outcomes clear and logic, and do they address clearly identified needs?
- Does the intervention respond to the development priorities of the country or influence area?
- To what extent has the expected effect (outcome) been accomplished, or how much progress has been made towards its achievement? What factors have contributed towards or hindered the achievement of the expected effects?
- Were the approach and strategies used appropriate for the achievement or advancement of the expected outcomes?
- Are there strategies and experiences developed by the Project that have replication potential?
- What other projects with national and/or international financing are being executed in the same territories as this GEF project?
- With a view to enriching the Project and harnessing existing opportunities, were other projects at the national, regional and global levels and their lessons learned taken into account?
- Is there a structure to ensure a proper engagement of all the partners?
- Are the responsibilities well designed and distributed among the partners, and have they been fulfilled? Are such arrangements relevant?
- Has there been any kind of policy change or effect?

- Have the external factors been properly considered? How flexible were the different management levels to adapt to change?
- Is there a monitoring plan with indicators and baselines to measure progress and the eventual impact of the Project?
- How did the in-kind and cash co-financing materialize in practice?
- Describe how the selection, hiring, allocation of experts, consultants and counterpart staff is performed.
- Have other results not contemplated in the project design been achieved?
- Are beneficiaries committed to continue working on the Project objectives once the Project has ended?
- What has been the degree of engagement and ownership of objectives and outcomes on the part of the beneficiary population at the different Project stages?
- What has the support and engagement of the involved institutions been like? Has there been institutional strengthening?
- List what you consider to be lessons learned and what must/can be corrected in the future.
- What recommendations would you make to improve the execution, outcomes or impacts of the Project?

7.4 Annex 4. Mission Agenda

Mission date: November 21 to 25

Day	Time	Activity	Type of transportation and person in charge
11/21/2021	4:00 PM – 5:00 PM	Transfer from Quito to Loja (by Air)	Air transfer of Consultant
11/21/2021		Rest in Loja	
11/22/2021	7:00 AM – 12:00 PM	Transfer from Loja to Pindal to visit the community	Land transfer E.E Regional del Sur
11/22/2021	12:00 PM – 4:00 PM	Visit to the installations, interviews with beneficiaries	
11/22/2021	4:00 PM to 5:00 PM	Transfer from Pindal to Zapotillo 2	Land transfer E.E Regional del Sur
11/23/2021	7:00 AM – 12:30 PM	Visit to the installations, interviews with beneficiaries	Land transfer E.E Regional del Sur
11/23/2021	1:30 PM – 6:30 PM	Transfer from Zapotillo to Loja	Land transfer E.E Regional del Sur
11/23/2021		Rest in Loja	
11/24/2021	7:30 AM – 8:30 AM	Return to Quito	Air transfer of Consultant
11/24/2021	8:30 AM – 1:30 PM	Transfer from Quito to Shell (by Land)	Land transfer EE. Ambato
11/24/2021		Rest in Shell	
11/25/2021	7:00 AM – 8:30 AM	Transfer from Shell to Lorocachi (Charter flight)	Charter air transfer. Person in charge: Consultant 1.- Jose Galindo. 2.- Staff member of Empresa Centro Sur 3.- Staff member of Empresa Ambato
11/25/2021	8:45 AM – 11:45 AM	Visit to the installations, interviews with beneficiaries Lorocachi	1.- Jose Galindo. 2.- Staff member of Empresa Centro Sur 3.- Staff member of Empresa Ambato
11/25/2021	12:00 PM – 12:30 PM	Transfer from Lorocachi to Wiririma (Charter flight)	1.- Jose Galindo. 2.- Staff member of Empresa Centro Sur 3.- Staff member of Empresa Ambato
11/25/2021	1:30 PM – 3:30 PM	Visit to the installations, interviews with beneficiaries	1.- Jose Galindo. 2.- Staff member of Empresa Centro Sur 3.- Staff member of Empresa Ambato
11/25/2021	4:00 PM – 5:30 PM	Transfer from Wiririma to Shell	1.- Jose Galindo. 2.- Staff member of Empresa Centro Sur 3.- Staff member of Empresa Ambato

7.5 Annex 5. Mission Report

7.5.1 Main findings

1 Component 1 resulted in several valuable accomplishments, such as the standardization of technologies to ensure consistency in solar panel technologies, transformers, and other required equipment across the territory. In relation to this, a consultancy was hired to achieve the standardization of the characteristics of the technologies that would be used across the country. This finally remained as a proposal that the MERNNR took notice of but didn't turn into a public policy. The proposal was not published either, but it served as a basis for the work done on this Project by the three electric utilities.

2 Another interesting accomplishment is the proposed public policy on remote or decentralized rural electrification. The task of drawing up the proposal was entrusted to a consultant, who completed it through a relatively participatory process, but the proposal did not turn into public policy. There are some key considerations in this regard related to the fact that without public policy the Ministry cannot cause the electric utilities to share responsibility for the implementation of activities to meet the energy needs of isolated communities. Without public policy, actions are left to the discretion of the companies, as an optional rather than a mandatory issue.

3 Consequently, as difficulties in commissioning the studies arose, the IDB decided to carry out the contracting processes directly. This was good because it avoided further delays, but there are complaints from the Ministry that as they did not purchase the equipment, they had very little control over their approval and their relationship with consultants. In this regard, the IDB argues that the Ministry almost disengaged itself from this matter, and did not show the same level of ownership or commitment.

4 An essential aspect of Component 1 is that many significant training and education initiatives started when the Directorate of Renewable Energies was in place, but later on it was dissolved as a result of the change of Government and reforms in the institutional structure. Afterwards, three institutions were combined into one: the Ministry of Electricity and Renewable Energy, the Ministry of Mining, and the Secretariat of Hydrocarbons merged into the Ministry of Energy and Non-Renewable Natural Resources.

5 With the removal of the Directorate of Renewable Energies, the Project remained within the sphere of two different Directorates: one in charge of distribution, and the other one of generation. As a result of this, the empowerment that existed at the beginning was

lost. The Project was originally conceived in a historical moment for the electricity system in Ecuador. There was a strong institutional structure and significant investments. It was the decade of the shift in the energy mix.

6 Fernanda Jara, from the Ministry of Energy, pointed out that she had a team of 20 to 25 people - all of them technical specialists -, so there was adequate capacity to size renewable energy projects to submit them to the GEF and international cooperation agencies for consideration. They also had time to monitor those projects.

7 Now this human capacity for management no longer exists because with the successive institutional changes the Directorate was reduced to 2-3 people, who were also entrusted with new tasks, so they can hardly handle more projects like this one.

8 The IDB made a considerable investment in training professionals that could unfortunately not stay in the institution, and due to the high turnover and the exit of staff the commitment with the Project was ultimately lost or diluted.

9 On the other hand, the capacity built within the electric utilities stays. In fact, in one of the utilities, a relatively small task force has been created to work on renewable energies and, as confirmed during the field visit, it is capable of sizing PV systems, carrying out supervision tasks and procurement processes, drawing up specifications, controlling, and also providing maintenance or technical assistance once the equipment is installed.

10 As a result of this, the institutional capacity at the national level was significantly affected by the changes, but the capacity within the electric utilities, where staff turnover is lower and the technical teams have stayed unaltered, is significantly greater.

11 In terms of GEF Additionality, it is worth noting that the Project was conceived within the framework of a number of cooperation projects. There is a long tradition of cooperation between the Ministry of Energy and the Inter-American Development Bank, which is already going through phase 5. The IDB has financed a large number of projects that are working and operating in Ecuador, and in some of those projects, for instance, USD 150 million were allocated to electrification and grid extension. Of this amount, a small fund of USD 3 to 4 million was allocated to addressing the social issue of isolated rural electrification.

12 It can be affirmed with a certain level of certainty that the GEF investment is built upon the institutional capacities of the Ministry of Energy, the competences, capacity and resources of the electric utilities, and also, as a third pillar, the subsequent investments made by the GEF in this country - thanks to which the country has certain installed capacities.

13 These projects have generated institutional capacities that have enabled the GEF resources to complement existing capacities and investments to extend electricity

coverage. For example, in Loja there are 400 PV systems installed by the oldest project in Ecuador, which dates from 2006. Those panels are still operating very well and, interestingly enough, of those 400 panels, there are 25 that belong to Empresa Electrica del Sur that were financed by the GEF.

14 It has been found that there is an incremental reasoning in terms of not substituting government investment, but rather complementing it to expand its coverage.

15 It is also worth noting that, save for the IDB, neither the Ministry, nor the electric utilities have records of other cooperation agencies or donors investing, or with prior experience investing in this type of projects with the Ministry or the electric utilities.

16 They may have participated in solar energy projects, but this is a very important sub-theme focused on solar energy in isolated rural areas the grid cannot reach, where it is not cost-effective to extend the grid.

17 In some of the places visited, the nearest power poles were 750-800 meters away, so connecting an extension to feed one single household involves an average cost of 10 thousand dollars, considering poles, transformers, and labor. The cost benefit is very low, so it is only justified when there are 4 to 5 households to serve.

18 It is very possible that many of the Project beneficiaries' neighbors do have access to the grid, but due to the Project beneficiaries being more isolated or distant from the power line and insufficient financial resources they could not be connected.

19 As a relevant finding, it is worth noting that all of the interviewees want to have access to a conventional grid. What they now have thanks to the Project is obviously useful to them and it has been a huge step forward, but the great problem is that access is limited.

20 The connection they now have supports 4 light bulbs and one TV, but it does not support anything extra like a refrigerator, for instance.

21 However, during the field visit it was found that families simultaneously use a television connected to DIRECTV and one computer without problems. The DIRECTV service provided them with both TV and Internet access.

22 An extraordinary aspect that is worth emphasizing is that, thanks to the Project, many families could keep their children taking their school and university courses online during the pandemic.

7.5.2 Photographic records

<table>
<tr><th colspan="2">Pictures from Loja
Pindal and Zapotillo 2</th></tr>
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Pictures from the Amazonia
Lorocachi and Wasakentsa


POR FAVOR SE PROHIBE MANCHA
DIBUJAR, RAYAR, LA PARED Y LA
PUERTA DE ESTA CASA.
LA DIRECTIVA


Empresa Eléctrica Ambato
Regional Centro Norte S.A.
EEASA


CIRCUTOR
DISPENSER
CTA:332432