9/9/2020

Terminal Evaluation of the NAMA Pilot Project for the Transfer of Technology in the Industrial Sector of the Cundinamarca-Bogota Region

Project N°: COL00089717

Contracting Party:

United Nations Development Programme

Financed by:

Global Environment Facility

Consultant:

Carlos César Yammal

1. EXECUTIVE SUMMARY

1.1. PROJECT INFORMATION TABLE

This Terminal Evaluation covers the project implementation period from August 29th, 2016 to March 31st, 2020. Table 1 shows the key project data.

Table 1 - Project Information Table

Project Title: "NAMA Pilot Project for the Transfer of Technology in the Industrial Sector of the Cundinamarca-Bogota Region – COL 95815-89717"				
GEF Project ID:	5841		at approval date (US$M)	at completion date (US$M)
UNDP Project ID (PIMS #):	COL 00095815	GEF financing:	1,726,484 USD	1,549,158 USD
Country:	Colombia	IA and EA have:	Yes	Yes
Region:	Latin America	Government:	1,743,260 USD	3,087,990 USD
Focal Area:	Climate Change	Others:	10,384,200 USD	9,614,200 USD
GEF Operational Programme or Strategic Priorities/Objectives:	CCM1 and CCM6[1]	Total co-financing:	12,127,460 USD	12,702,190 USD
Implementing Partner:	CAEM	Total Project Funding:	13,853,944 USD	14,251,348 USD
Other partners involved:		Project document signature:		Aug 29, 2016
		Project closing date:	May 31, 2020	Real: Nov 30, 2020

Note: the GEF funds balance is fully committed

1.2. PROJECT DESCRIPTION

1. The aim of The NAMA Pilot Project for the Transfer of Technology in the Industrial Sector of the Cundinamarca-Bogota Region (hereinafter the project), was to provide solutions to the problem of declining productivity and loss of competitiveness in the industrial sector, both nationally and internationally. In addition, the Government of Colombia had prioritized energy savings and efficiency because of their impact on both, greenhouse gas (GHG) emissions, and the productive structure and competitiveness of the industrial sector. Enabling activities
2. The project sought to address both problems through actions aimed at increasing energy efficiency. These actions could be viewed as affordable investments that have short to medium-term financial recovery period. Furthermore, they promoted the creation and development of technical and organizational capacities; and the transfer of technology in the industries of the Bogota-Cundinamarca region, with possibilities of extension to other regions of the country.

[1] CCM1: Promote the demonstration, deployment, and transfer of innovative low-carbon technologies; and CCM6: Support enabling activities and capacity building.

1.3. PURPOSE OF THE EVALUATION

3. The ITE is one of the tools used by UNDP and GEF to assess the degree of success and effectiveness of the intervention. It is a mandatory requirement for all large and medium-sized GEF projects.
4. The purpose of the evaluation is to assess the achievement of project results and to draw lessons that may improve the sustainability of benefits from this project; thus, helping to improve UNDP's overall programming.

1.5. EVALUATION RATINGS TABLE

5. Table 2 shows the evaluation ratings of project performance against the expectations set out in the project logical framework and the results framework, which provides performance and impact indicators for project implementation, together with the corresponding means of verification.

Table 2 - Evaluation Ratings Table

Evaluation Ratings Table		
Criteria	***Comments***	***Rating***
Monitoring & Evaluation (M&E): Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)		
Overall quality of M&E	Very good combination of design and execution, which allowed a detailed and close monitoring of each beneficiary company	HS
M&E design at entry	The methodology, indicators, description of roles and responsibilities, and budget were all very well defined	HS
M&E plan implementation	It was very well implemented, including adaptation to changes and learning that fed back into project implementation	HS
Implementing Agency (IA) and Implementation & Executing Agency (EA) Execution: Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)		
Overall quality of implementation/execution	UNDP and CAEM worked very well together, being highly effective as a well-coordinated team	HS
Quality of UNDP implementation/oversight	UNDP played a very good leadership role, which involved getting involved as necessary to ensure the success of the project, particularly in its structuring, monitoring and relationships with government authorities	HS
Quality of Implementing Partner execution	CAEM executed this project with high effectiveness, due to its relevant institutional experience, a technical team of high professional level and performance, appropriate pre-existing and new institutional alliances and previous relationships with committed companies	HS
Assessment of Outcomes: Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)		
Overall quality of project results	Indicator targets have been met or exceeded in most cases and almost met in some cases, with progress expected in the latter by the end of the project	HS

Evaluation Ratings Table		
Criteria	***Comments***	***Rating***
Relevance: relevant (R) o not relevant (NR)	High level of project alignment with international, national and local priorities, which converge in the efficient use of energy, the reduction of GHG and the increase of companies' productivity and competitiveness. Very relevant to the needs of Colombian industrial companies	R
Effectiveness	The project had a very successful demonstration effect, achieving the main expected results and outputs as well as important unintended, positive results	HS
Efficiency	The project made very efficient and economical use of the financial and human resources available. For every dollar contributed by the GEF, companies and government agencies contributed 5.5 dollars in cash	HS
Sustainability: Likely (L), Moderately Likely (ML), Moderately Unlikely (MU), Unlikely (U)		
Overall likelihood of sustainability	The inherent project risks are somewhat likely given the lack of relevant public/private institutionality. The risk likelihood increases due to the economic crisis that emerged from the COVID-19 pandemic. CAEM's self-sustainability acts as "counter-weight", balancing the risks	ML
Financial sustainability	CAEM has the capacity and the ability to develop and win proposals for external funding, so it is likely that CAEM continues to deepen its technical assistance to beneficiary companies. However, Colombia's financial system is still immature, which seriously limits investment by companies	ML
Socio-political sustainability	On one hand, CAEM's strong inter-institutional partnerships are likely to continue. On the other hand, there are limitations to the level of ownership by companies, as a few of them have been little involved in their diagnosis and monitoring processes, thus having certain dependence on CAEM	ML
Institutional framework and governance sustainability	A clear institutional framework has yet to be defined, including the assurance of basic financing that will allow for the continuation of the promotion of energy management actions	ML
Environmental sustainability	The ProDoc recognizes that the industrial sector is a source of air, soil, water and noise pollution, and that surrounding communities are often directly affected by these negative side effects of the industry. The project, however, did not address these issues	MU
Impact: Considerable (C), Minimal (M), Insignificant (I)		
Improvement of the environmental conditions	The project contributed to reducing GHG emissions and provides a basis from which further reductions will be added over time	C
Environmental stress reduction	There have been reductions in black carbon emissions as a result of fuel substitution. These results were not measured, however	M
Progress towards environmental status change	While the project was a successful pilot, much remains to be done at the national level	M
General project results	Project results and products are of high quality and relevance to the development of the NAMA for the industrial sector	HS

1.6 CONCISE SUMMARY OF FINDINGS, CONCLUSIONS, RECOMMENDATIONS, AND LESSONS LEARNED

6. Below are presented the main findings and conclusions for each of the project evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact.

7. In terms of ***relevance***, the project was very well aligned with the priorities established in the National Development Plan 2014-2018, also in accordance with international frameworks. The project was very timely and remains highly relevant for Colombia, since it focuses on the intersection between three themes of great importance for businesses and the ministries of the environment and industry: energy efficiency, business competitiveness and GHG emission reduction. The project was highly relevant for beneficiary companies, which showed a low level of compliance with organizational capabilities related to energy management at the beginning of the project. meta

8. The project has contributed to Colombia´s Nationally Determined Contribution (NDC) in regards to the Commerce, Industry and Tourism sectoral goal: 10% of small, medium and large companies in priority sectors implement climate change adaptation strategies, actions or projects. More specifically, the project contributed to the minimum GHG emission goal: not to exceed 267 CO2 Mt CO2 eq by 2030, equivalent to a 25% expected reduction on 2030 projected emissions (2020 NDC Colombia's update).

9. In terms of ***effectiveness***, most of the project's expected results and outputs were achieved. Even unexpected, positive results were achieved. The project had a very successful demonstration effect, combining a very low cost “entry strategy” for companies with a capacity development strategy based on training.

10. Energy efficiency plans were developed for 162 companies, 124 of which implemented industry best practices and low-carbon technologies. Together, these actions and investments achieved savings in annual energy consumption of 78,728 MWh/year at the end of the project (98% of the 80,000 MWh/year target). In turn, the savings in consumption resulted in an accumulated emission reduction of 59,725 tCO2 over the course of the project (equivalent to 109% of the 55,000 tCO2 target).

11. The most effective projects in terms of energy savings and CO2 emission reductions correspond to companies that: (i) belong to the non-metallic mineral, food and beverage industry sectors; (ii) use coal as fuel; and (iii) have implemented both, Best Operating Practices (BOP) and High Investment Projects (HIP).

12. In addition to the inherent project risks, the current COVID-19 pandemic poses additional risks to the ***sustainability*** of project results, due to the shift in attention to economic recovery by the relevant project stakeholders, both partners and companies.

13. The project strengthened the capacities of the industrial sector, obtaining the greatest advances in the dimension of knowledge related to energy use, followed (to a similar extent) by advances in the following dimensions: senior management commitment, personnel devoted to energy management, and information combining production and energy consumption. The least progress was observed in energy efficiency practices and specially in the implementation of energy management systems. The above-mentioned capacity developments still need to be consolidated.

14. CAEM has the capacity and the ability to develop and win proposals for external funding. Beyond the implications of the pandemic, there is still a risk that companies will not be able to obtain financing on preferential terms (“green loans”), due to general lack of information (in banks and companies) and the fact that "green" interest rates are very similar to those of traditional loans.

15. The strong inter-institutional partnerships that were created or strengthened during project implementation are likely to continue, ensuring a strong institutional awareness to continue

supporting the long-term objectives of the project. It remains to be defined a clear, national institutional framework, including the assurance of basic financing that will allow for the continuation of the promotion of energy management actions, thus avoiding the current dependence on specific project funding.

16. A main project impact has been the creation of a collective awareness of the importance of energy management and its environmental impact. A cultural transformation in business and citizenship can be observed, with positive changes in stakeholder behavior and motivation.

17. Many of these changes were replicated beyond the project's scope, through the expansion of activities to 10 additional departments in Colombia, covering 70 extra companies while expanding the reach to additional industrial sectors. However, it was evident that there is still a need to further disseminate project results among participating companies and among industrial companies in general.

18. In terms of ***efficiency***, the project made a very efficient and economical use of the financial and human resources available to achieve its results. Only technical assistance was subsidized, and the investments were completely made by the beneficiary companies, totaling USD 8,23 million. The partnership strategy was key to the project's achievements, since partners helped select a relevant group of industrial companies with high potential for energy savings and with the capacity to implement improvements and invest in relevant technologies.

19. Regarding UNDP's ***added value and comparative advantage***, it should be mentioned that UNDP provided overall leadership to the project since its inception. UNDP has been a success factor throughout the project, particularly during design and planning, and later showing a constant and cordial follow-up, ensuring the timeliness and adequacy of milestone reporting. The project has contributed directly to the priority of "inclusive and sustainable growth" stated in the Country Programme Document for Colombia.

20. Based on the above findings and conclusions, a ***set of recommendations*** is formulated, around three distinct categories.

21. The first category relates to corrective actions for the design, implementation, monitoring and evaluation of the project. In this sense, it is proposed to complete the final reports for each of the beneficiary companies, make final arrangements for the Monitoring, Reporting and Verification (MRV) system, deepen communications and knowledge management, and institutionalize the two main training modalities piloted during the project.

22. With regard to the second category of recommendations, which refer to actions to continue or reinforce the initial benefits of the project, it is proposed to clearly define how CAEM's role should evolve, moving from being a "competitor" to being a "driving force" or an "ecosystem catalyst"; within the framework of the Sustainability Plan being elaborated. It is necessary to define a business model for CAEM that includes the definition of specific value propositions for each type of energy management stakeholder; the evaluation of national scaling-up possibilities based on CAEM's own experience and other initiatives; and the establishment of a clear and sustainable pricing policy for technical assistance. All these actions should explicitly consider the current pandemic situation.

23. Finally, recommendations are made around the category of future directions that emphasize the project's main objectives. Here, it is proposed to develop and agree upon on a long-term vision among the key stakeholders, which will make it possible to define an institutional sustainability model that goes beyond CAEM: to define avenues of innovation, to integrate

actions into existing environmental excellence programs, to define a financial sustainability model, to facilitate access to fiscal incentives, to manage inter-institutional alliances, and to develop studies and tools that support the achievement of the vision.

24. As ***lessons learned***, there is a trade-off between defining mandatory requirements for the participation of beneficiaries and facilitating their participation in the project. In addition, a pilot project can be flexible and begin experimenting scaling up or replication actions during its execution; and the choice of a strong implementing agency -strongly aligned with project's objectives and with high human and operational capacities- is a key success factor.

25. A summarized version of the project results is presented in Table 3.

Table 3 - Project Results Framework Evaluation Summary

PROJECT RESULTS FRAMEWORK EVALUATION						
Indicator	Baseline Level	Midterm target level	End of project target level	Level at March 31st, 2020	Final evaluation comments	Rating
Objective: Promoting the adoption of best industry practices and the implementation of low-carbon technologies in companies that form part of the industry sector in Bogota-Cundinamarca						
Amount of GHG emissions reduced in industry subsectors in the Bogota - Cundinamarca region	Current emissions of the benefitting companies in the industry subsectors in the region (to be determined in year 1 of project)	50% of BOP projects executed and project portfolio of technological reconversion, innovation and adaptation to be implemented, already identified.	Direct reduction of at least 55,000 tCO2e in priority industry subsectors for the region, by implementing pilot projects, as compared to baseline. Expected annual reductions at end of project are 23,000 tCO2e/year	The pilot project has achieved a reduction of 59,725 tCO2 accumulated throughout the project, equivalent to 109% of the target. The annual reduction at the end of the project is 24,509 tCO2/year, which exceeds the project target (106% of the target).	The cumulative value has been calculated as the addition of each project´s reductions (compared to the respective baseline), assessing the period between the beginning of each project and the completion date of the NAMA Project. The contributions to total GHG emission reductions by project type were 15% for BOP and 85% for LIP and HIP.	HS
Amount of energy saved through implementation of Energy Efficiency measures	Current energy consumption of the benefitting companies in the industry subsectors in the region (to be determined in year 1 of project)	At least 15000 MWh reduction in annual energy consumption as a result of the implementation of 50% of projected BOP projects (80 projects).	At least 80000 MWh reduction in annual energy consumption as a result of the implementation of the full portfolio of projects.	The implementation of the project has achieved a reduction in annual energy consumption of 78,728 MWh (98. 3% of the target).	The annual value has been calculated as the addition of the monthly savings in the last month of implementation, multiplied by twelve months. The contributions to the reduction of energy consumption by type of project were 16% for BOP and 84% for LIP and HIP.	HS
% of increase in energy productivity in SMEs which make up the industry subsectors in the Bogotá-Cundinamarca region	Current level of production and energy consumption in the benefitting companies in the industrial sub-sectors in the region (to be established in year 1).	Energy productivity indicators established and the goal of improved productivity defined for each project.	Increase between 1% and 3% in energy productivity of enterprises in priority industrial subsectors for the region that have implemented the proposed technology transfer projects.	According to the 2019 Technical and Financial Report, the energy productivity indicator associated to companies that implemented BOP was in the range of 1% to 7%. On average, it reached a value of 2.56% per company (taking into account energy consumption not directly associated with production levels). In the case of companies that implemented LIP and HIP, it is estimated that energy productivity increased by an average of 6.82%	MRV reports only one case of energy productivity measurement.	S
Level of investment triggered for energy efficiency in industrial sector in Bogotá/Cundinamarca region	Scattered investment taking place, unquantified and unconsolidated	Business plans in place for investment of at least USD 6,000,000 in EE in industry	At least USD 6,000,000 invested by industry in energy efficiency measures.	The goal was surpassed. According to project investment tracking records, 123 companies have made an aggregate investment of COP 27,007,030,804 which is equivalent to USD 8.23 million (137% of the target value).	Given the fluctuations in the exchange rates for the Colombian peso, the 2019 average rate of $3,281COP per dollar was used.	HS

TABLE OF CONTENTS

1.	**Executive summary**	2
1.1.	**Project information table**	2
1.2.	**Project description**	2
1.3.	**Purpose of the evaluation**	3
1.5.	**Evaluation ratings table**	3
1.6	**Concise summary of findings, conclusions, recommendations, and lessons learned**	4
Table of Contents		9
3.	**Acronyms and abbreviations**	10
4.	**Introduction**	11
a.	**Purpose of the evaluation**	11
b.	**Scope and methodology**	12
c.	**Structure of the evaluation**	12
5.	**Project description and development context**	12
a.	**Project start and duration**	12
b.	**Problems that the project seeks to address**	13
c.	**Development and immediate objectives of the project**	13
d.	**Reference indicators**	14
e.	**Beneficiaries and Main Stakeholders**	15
f.	**Expected results**	15
6.	**Findings**	16
5.1	**Project design**	16
5.2	**Project implementation**	21
5.3	**Project results**	24
7.	**Main findings, conclusions, recommendations and lessons learned**	46
a.	**Recommendations**	49
b.	**Best and worst practices to address issues of relevance, performance and success**	51
8.	**Annexes**	51

3. ACRONYMS AND ABBREVIATIONS

ANDI	Colombian National Association of Businessmen
ANLA	National Environmental Licensing Agency
APR	Annual Project Report
BAU	Business as Usual
B-C	Bogota-Cundinamarca
BOP	Best Operating Practices
CAEM	Environmental Business Corporation
CAR	Autonomous Regional Corporation
CCB	Chamber of Commerce of Bogota
CEO	East Antioquia Business Corporation
CO	UNDP Country Office
CPAP	Country Program Action Plan
CPD	Country Programme Document
EA	Executing Agency
GAAP	Gender Analysis and Action Plan
GEF	Global Environment Facility
GHG	Greenhouse gas/es
HIP	High Investment Projects
IA	Implementing agency
ITE	Independent Terminal Evaluation
MADS	Ministry of Environment and Sustainable Development
M&E	Monitoring and Evaluation
MTR	Mid-Term Review
MRV	Monitoring, Reporting and Verification
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
OCC	GEF Operations Coordination Center
PA	Project Audit
PIR	Project Implementation Report
ProDoc	Project Document
PSC	Project Steering Committee
PTS	Project Technical Support
RTA	Regional Technical Advisor
TER	Terminal Evaluation Report
IW	Initial Workshop
ToR	Terms of Reference
UNAL	National University of Colombia
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework for the Climate Change
UPME	Mining and Energy Planning Unit

4. INTRODUCTION

26. This report describes the findings of the Independent Terminal Evaluation (ITE) of the "NAMA Pilot Project for the Transfer of Technology in the Industrial Sector of the Cundinamarca-Bogota Region". The consultancy started on May 27th, 2020 according to contract number 0000045128. This ITE was carried out by individual consultant César Yammal between June and September, 2020.

27. The project aimed to promote the adoption of industry best practices and the implementation of low carbon technologies in companies that are part of the industry sector in Bogota-Cundinamarca. Specific objectives were to reduce greenhouse gas emissions, improve productivity and competitiveness in alignment with the Colombian Low Carbon Development Strategy, and provide inputs for the development of a NAMA for the industrial sector.

28. The project consisted of three components: 1) Strengthening the capacity of the industrial sector to establish its energy and GHG emissions baselines in the Business as Usual (BAU) reference scenario; 2) Implementation of technology transfer pilot projects in accordance with the mitigation actions identified and prioritized in the industrial sector; and 3) Knowledge management to replicate the impact of technology transfer pilot projects in the industrial sector.

29. The expected project's results, linked to each of the components, were: (1) a strengthened industrial sector, with the capacity to identify and develop technology transfer projects; (2) Best Operating Practices (BOP) and technology conversion, innovation and adaptation projects implemented and operating in the industrial sector in the Bogota-Cundinamarca region; and (3) inputs to replicate the development of technology transfer projects in other industrial subsectors and regions of the country, and their use in the formulation of a NAMA for the industrial sector.

30. UNDP was the project's implementing agency, and CAEM was the executing agency, working in coordination with other strategic partners.

31. This evaluation was carried out in the context of the COVID-19 pandemic, which prevented travel for meetings and field visits. Adhering to the guide by the UNDP Independent Evaluation Office of March 31st, 2020, the ITE was implemented remotely/virtually via video conferencing to complement desktop work and analysis. Beneficiary companies were also asked to send videos to facilitate the observation of the projects in the field.

a. PURPOSE OF THE EVALUATION

32. The ITE is one of the tools used by UNDP and GEF to assess the degree of success and effectiveness of the intervention. It is a mandatory requirement for all large and medium-sized GEF projects.

33. The purpose of the evaluation is to assess the achievement of project results and to draw lessons that may improve the sustainability of benefits from this project; thus, helping to improve UNDP's overall programming.

b. SCOPE AND METHODOLOGY

34. The evaluation has been conducted following the *Guía para realizar evaluaciones finales de los proyectos respaldados por el PNUD y financiados por el FMAM* (in Spanish, 2012) and the Guidance for conducting terminal evaluations of UNDP-supported, GEF-financed projects (in English, 2020). These guidelines state that the assessment should provide evidence-based information that is credible, reliable and useful, through a participatory and consultative approach that ensures close involvement with government counterparts, in particular the GEF Operations Coordination Centre, UNDP's Country Office (CO), the project team, the GEF/UNDP regional technical advisor and all key stakeholders.

35. The methodology has been designed from the project results framework, using the criteria of relevance, effectiveness, efficiency, sustainability and impact.

36. Also included in the evaluation were criteria related to the value-added and comparative advantages of UNDP's involvement as project's development partner, and cross-cutting criteria such as gender equity. The contributions of this project to the development of a NAMA for the industrial sector were also surveyed.

37. The following techniques were used to assess the indicators associated with each of the evaluation criteria: documentary and bibliographic analysis, interviews with stakeholders, virtual field visits, questionnaires and virtual focus groups, which made it possible to include the perspective of all types of stakeholders involved in the project. For the implementation of each of the techniques, guides and questionnaires were developed. The methodological design guarantees the reliability and validity of the results obtained. The details of the field work can be found in Annex A.5: Summary of field visits. The enterprise survey is also attached as Annex A.9: Enterprise survey questionnaire. The results of this questionnaire can be found throughout the report and in Annex B: Systematization of the enterprise survey results. The survey was sent to all 162 companies involved in the project, in the Bogota-Cundinamarca region. A total of 95 companies responded, that is, 59% of the total population or 68% of the companies that implemented at least one BOP, one Low Investment Project (LIP) or HIP.

38. Once data collection, processing and analysis were concluded, the evaluator presented a first draft of the evaluation in Spanish; then the final version of the document was elaborated (in Spanish and English), considering the comments of the CO, the Regional Technical Advisor (RTA) and the Project Technical Support (PTS) team.

c. STRUCTURE OF THE EVALUATION

39. The evaluation report follows the general structure suggested in the terms of reference. Section 4 provides a description of the project and the strategy implemented for the development context. Section 5 presents findings regarding project design, implementation and results achieved. Finally, Section 6 summarizes conclusions, lessons learned and recommendations.

5. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

a. PROJECT START AND DURATION

40. The project started in August, 2016, with a planned end date of December 2019, and an actual end date of November, 2020. Its actual duration will have been four years and four months.

b. PROBLEMS THAT THE PROJECT SEEKS TO ADDRESS

41. As outlined in the Project Document (ProDoc), the project was intended to provide solutions to the problems of declining productivity and loss of competitiveness of the industrial sector, both nationally and internationally. The causes of these problems are both, internal and external to industrial companies.

42. The main internal cause is technological obsolescence, which produces high production costs, high energy consumption and high levels of pollutant emissions.

43. The main external causes are the fall in product prices due to competition with other countries' industries, competition with imported products, the loss of strategic international markets due to political and/or economic problems, high transport and logistics costs, infrastructure deficiencies and the revaluation of the peso in recent years.

44. Both internal and external causes mainly affect the industries of the Bogota-Cundinamarca region that have an export vocation or those companies whose products compete with substitute or imported products.

45. In addition, the Colombian government has identified energy saving and the efficient use of energy as priorities because of their impact on both, national GHG emissions and the productive structure and competitiveness of the industrial sector.

46. The project sought to address both problems through energy efficiency actions, such as affordable investments that have a short to medium-term financial recovery period. These actions also promote the creation and development of technical and organizational capacities; and the technology transfer in the industries of the Bogota-Cundinamarca region, with possibilities of replication in other regions of the country.

47. Very importantly, the project sought to address the barriers that slow down the implementation of technology transfer projects. Three types of barriers were identified: (i) regulatory/ compliance, including unawareness by industrial companies of the existent regulations and compliance measures and lack of incentives for the improvement of environmental performance and compliance; (ii) technological/ technical expertise, including scarce technical capacity to identify the potential for technology conversion processes and lack of implementation of methodologies for the formulation and monitoring of energy related indicators; and (iii) market/ financial barriers, including low financial capacity for the implementation of technology conversion projects and limited access to existing credit lines.

c. DEVELOPMENT AND IMMEDIATE OBJECTIVES OF THE PROJECT

48. The Project aimed to promote the adoption of industry best practices and the implementation of low carbon technologies in companies that are part of the industry sector in Bogota-Cundinamarca in order to reduce GHG, improve productivity and competitiveness in alignment with the Colombian Low Carbon Development Strategy, and provide inputs for the development of a NAMA for the industrial sector.

49. To achieve this general objective, the following specific objectives were set:

1. Strengthen the technical, financial and administrative capacity of the stakeholders that make up the value chain in the prioritized industrial sub-sectors;
2. Develop instruments to encourage and catalyze private sector investment in the implementation of low carbon technology transfer projects;
3. Implement low-carbon technology transfer pilot projects in the prioritized industrial sub-sectors of the city-region;
4. Implement an intensive strategy to disseminate and replicate the experience gained from the project, in other industrial sub-sectors and regions of the country; and
5. Analyze the results achieved through the implementation of the technology transfer pilot projects, providing inputs for the development of a NAMA for the industrial sector.

50. These specific objectives are consistent with the purpose of the project and the problems it sought to address, thus facilitating the project's monitoring and evaluation.

51. Each project component had an associated outcome. Expected outcomes were:
    a. Outcome 1: Strengthened capacity in the industry sector to identify and develop GHG emission reduction technology transfer projects;
    b. Outcome 2: Pilot projects implemented and operating in the industry sector in the Bogotá-Cundinamarca region, including best operative energy practices (BOP), process and technology re-conversion, innovation and adaptation projects; and
    c. Outcome 3: Inputs provided for the formulation of a NAMA for the industry sector to replicate the development of technology transfer projects in other industry subsectors and regions of the country.

d. REFERENCE INDICATORS

52. The project supported technology transfer in priority industrial sectors in the region through the implementation of three components. To assess the results of the execution of these components, a set of indicators and targets to be measured was defined:[2]

    a. Reduced GHG emissions in the industrial sub-sectors in the Bogota-Cundinamarca region (target: direct reduction of at least 55,000 tCO2e in GHG emissions and expected annual reductions of 23,000 tCO2e/ year by the end of the project);
    b. Amount of energy saved through the implementation of energy efficiency measures (target: at least 80,000 MWh reduction in annual energy consumption);
    c. Strengthened stakeholders' and decision makers' technical capacities in the prioritized industrial subsectors of Bogota-Cundinamarca (target: 300 people trained);
    d. Percentual increase in SME's energy productivity in the industrial subsectors in the Bogota-Cundinamarca region (target: energy productivity increase between 1% and 3%); and
    e. Level of active investment in energy efficiency in the industrial sector in Bogota-Cundinamarca (target: at least USD 6,000,000 invested by industry in energy efficiency measures).

[2] Baseline data was not available at the time of the ProDoc, as data was dependent on the selection of beneficiary companies.

e. BENEFICIARIES AND MAIN STAKEHOLDERS

53. The three main stakeholders of the project are UNDP, CAEM and the Ministry of Environment and Sustainable Development (MADS) as strategic partners. 162 industrial companies, as direct project beneficiaries, were key implementation stakeholders. 727 employees from those companies benefited from training activities. In addition, multiple and diverse stakeholders from all relevant sectors participated in project design and contributed to project implementation as well.

54. One group of stakeholders was composed by institutional partners, such as the Ministry of Environment and Sustainable Development; the Ministry of Trade, Industry and Tourism (MICIT); Colombia Productiva; the Regional Government of Cundinamarca; the Regional Autonomous Corporation of Cundinamarca (CAR); the Bogota Chamber of Commerce (CCB); the Bogota Electric Energy Cluster (Intelligent Specialization); and the Colombian National Association of Businessmen (ANDI). In addition, regional institutional allies were incorporated, such as the Clay-Brickmakers Association of the Coffee Axis, the Barranquilla Chamber of Commerce, the Valle del Cauca Regional Autonomous Corporation and the Eastern Antioquia Business Corporation.

55. International organizations also participated in the project: Climate & Clean Air Coalition, UNIDO, World Resources Institute and the Chilean Energy Sustainability Agency.

56. Financial sector stakeholders also participated in the project: Bancoldex, Davivienda, Bancolombia, Garper Energy (ESCO) and Conix (leasing and technology renting).

57. Individually, and through their relationship with CAEM, technology providers also participated in the project.

58. Relevant actors from academia and research centers such as Uniempresarial, EAN University and National University of Colombia (UNAL) were also included as project stakeholders.[3]

f. EXPECTED RESULTS

59. The expected results were: (i) a direct reduction of at least 55,000 tCO2 in priority industry subsectors for the region, through the implementation of pilot projects, compared to the baseline value; (ii) expected annual reductions of 23,000 tCO2/year by the end of the project; (iii) a reduction of at least 80 MWh in annual energy consumption as a result of the full project portfolio's implementation (160 balance-of-payment projects and 86 technological conversion, innovation and adaptation (processes and technologies) projects; (iv) an increase of between 1% and 3% in energy productivity of enterprises in priority industry subsectors that have implemented the proposed technology transfer projects; and (v) at least US$ 6,000,000 invested by industry in energy efficiency measures. Table 6, Project Results Framework Evaluation, includes the complete set of expected and actual results and indicators.

60. In addition, specific results for project components 1, 2 and 3 are detailed in Table 6.

[3] No gender specific or wider civil society stakeholders participated in the project

6. FINDINGS

5.1 PROJECT DESIGN

A. ANALYSIS OF THE RESULTS FRAMEWORK

61. In general, the project's general and specific objectives, as well as the project's components were designed in a clear, feasible and viable fashion. The capacities of the implementing institutions and partners were adequately assessed at the design stage.

62. The quality of indicators included in the Project Results Framework is satisfactory. This scheme generally meets the "SMART" best practice criteria for the design of indicators.

63. The simplicity of these indicators allows for adequate monitoring and evaluation of the goals to be achieved. The choice of indicators and alignment are compatible with the development priorities of the Bogota-Cundinamarca region -and of Colombia in general- and achievable within the project's timeframe.

64. Clear means of verification have been established for the achievement of the project's goals and critical activities are well interconnected towards the achievement of the project's expected results. An exception is the indicator belonging to Component 3: "Level of systematization of local socio-economic benefits resulting from project implementation"; which is not clearly defined. While the absence of a quantitative baseline is explicitly clarified, the indication of defining a baseline that measures industry competitiveness, employment and gender is offered in a generic way. This design limitation was not addressed in the project implementation report (PIR).

65. CAEM´s implementation capabilities were correctly evaluated at the time of project design. Project management was well structured, in an articulated manner and in line with the capacities and responsibilities of each party, having the UNDP as the responsible entity, CAEM as the executing entity with its Project Coordination Unit, and the participation of strategic partners in the Technical Committee.

66. The analysis of the regulatory context at the time of entry or start of the project was accurate and relevant.

67. The assessment of the project's development context conditions and available resources was generally adequate. The knowledge and technical barriers identified in the project are reasonable and from an ex-post analysis they responded exactly to what was verified in practice. In addition, the limitations of industries to establish their energy consumption patterns, and their scarce technical capacity to conduct internal energy audits and identify potential technology conversion processes were well anticipated in project design.

68. The normative and regulatory barriers identified, such as the difficulties of articulation between the public sector and companies, given the existing regulatory framework at the time, were correctly established.

69. There were no gender specific actions included in the ProDoc. There only were indicators disaggregated by gender in relation to training activities: "Number of men and women trained in technical, financial and commercial projects related to the development of specific technology transfer projects" and "Number of training processes for men and women aimed at

strengthening the technical capacities of actors and decision-makers in the priority industry subsectors for Bogotá-Cundinamarca".

B. ASSUMPTIONS AND RISKS

70. The assumptions or external factors (events, conditions or decisions) that are beyond the control of the project and are likely to occur in the short and medium term, influencing its implementation and long-term sustainability were generally well established.

71. The main assumptions set out in the design for the achievement of the project's objectives were: a) the stability of macroeconomic conditions; b) interest of potential beneficiaries in actively engaging in the project; c) companies with a good financial situation have a preference for developing positive return projects in the short and medium term; d) a context of public policies aimed at promoting investment in energy efficiency, in continuous, positive evolution.

72. The risks and assumptions affecting the implementation of the project and their mitigation measures have been established in a comprehensive manner. In addition, they are adequately articulated with the objectives set out for each component in the project document. Risk probabilities were medium and low.

73. With respect to the financial context and the financing of projects, which cut across components 2 and 3, the complexity of the relationship between businesses and the financial sector was underestimated. While barriers to business access to credit were correctly identified, and lack of collaboration from banks in the provision and development of financial instruments was also included as a risk, it was assumed that the project would have the capacity to overcome such barriers. Although the financial sector offers green credit lines, the market is not yet mature, and the characteristics and conditions of access are like those of regular loans.

74. External effects such as climate change were present throughout project implementation, but did not substantially affect project development. The emergence of the COVID-19 pandemic only had a partial impact on the final stages of the project, on project management and closure activities.

C. LESSONS FROM OTHER REVELANT PROJECTS INCORPORATED INTO PROJECT DESIGN

75. At the time of design, the were no similar, finalized projects to take as a reference to incorporate lessons learned. World-wide, there were GEF financed NAMA projects that were in the process of design or starting implementation in 2016, but focusing on energy efficiency in different economic sectors (transport, residential, public sector), or in very specific industrial subsectors (textile industry, cement, tea and coffee production). The complementary, UNIDO/GEF "Promotion of Industrial Energy Efficiency in Colombian Industries" project was implemented in parallel to the NAMA project.

76. It should be noted that CAEM worked based on its previous projects' experience, leveraging its learning. Key participating companies were selected based on their performance in previous projects, thus avoiding "starting from scratch". CAEM's previous projects most relevant to the NAMA Industry were the Market Opportunities for Clean Energy and Energy Efficiency (OPEN) Project and the Energy Efficiency Program for the Brick Industry (EELA).

77. In the OPEN project, financed by IDB-MIF between 2008 and 2012, different types of activities with companies were experimented, which were resumed and expanded six years later with the NAMA project. Some of these activities were: business awareness raising, business rounds,

technical assistance to companies to implement BOP, energy assessments and audits. Twelve pilot projects on energy efficiency were formulated, and the economic evaluation and implementation of 10 demonstration projects on the use of clean energy were carried out. NAMA project was an opportunity to give continuity to those previous efforts and go beyond them, through the full implementation of numerous investment projects.

78. With the EELA Program, supported by Swisscontact between 2013 and 2016, CAEM was able to experiment implementation approaches that it would then use in the NAMA project: its role as a disinterested third-party integrator of different market functions, connecting key stakeholders. It was precisely in this project that the criterion of non-subsidization of business investment was established as a working principle.

D. PLANNED STAKEHOLDER PARTICIPATION

79. Partnerships with multiple stakeholders have been incorporated into project's implementation. As a preparatory project activity, a stakeholders' map was drawn up and an awareness campaign was carried out, including academia and territorial environmental authorities. Independent meetings were held with prospective partners, and feedback and commitment letters were obtained. Throughout the project, new allies were incorporated, exceeding initial expectations. Roles and functions, as well as mechanisms for stakeholder interaction, were made explicit in the ProDoc and later expanded to include new partners.

80. Agreements were signed with most partners, and they covered either continued involvement during the project, or specific activities. An excellent example is the partnership with CAR, whose partnership agreement states as objectives to join efforts with CAEM to promote the reduction of GHG emissions in the industrial sector located within CAR's jurisdiction and promote environmental self-management strategies for comprehensive water resource management and monitoring of municipal carbon footprint implementation. CAR contributed the equivalent of one million dollars in cash towards the implementation of the agreement.

81. CAEM raised awareness among potential beneficiaries though numerous events and through partners. From September to December, 2016, 68 dissemination events were carried out. Interested companies would fill an on-line form and a project team member would later contact the company. The selection criteria included the company's energy savings potential, belonging to one of the priority industrial sectors (as defined in the ProDoc) and past performance (for those companies that had participated in previous projects, coordinated either by CAEM or a strategic partner).

82. The role of CAEM as a network articulator for the formation of alliances was very important, mainly as a technical facilitator, and to a lesser extent as a financial facilitator. CAEM made it possible to bring projects to the attention of the beneficiary companies' top management, making the economic and environmental benefits of project participation visible to them. CAEM facilitated links with technology service providers, organized national and international business missions and brought together stakeholders involved in energy efficiency.

83. A large proportion of the participating companies were already aware of the general issue of energy sustainability, due to their participation in previous programs by CAEM or its partners, as noted in the previous section.

E. REPLICATION EFFECT

84. The project demonstrated various characteristic elements of the catalytic or replication effect: (i) production of a semi-public good; (ii) manifestation; (iii) replication; and (iv) enhancement. For replication, CAEM's alliance with Colombia Productiva was key.

85. The project was replicated through the application of the project's methodology to 70 additional firms (beyond the ones envisioned in project design) in 10 departments of Colombia. Energy efficiency plans were developed, and BOP were implemented in those companies. The role of Colombia Productiva consisted in the funding of the replication exercise, with the equivalent to USD 305,000 and in the identification of beneficiary companies, through local chambers of commerce and industry

86. The NAMA project was enhanced as a new project, now funded by the UK from September 2019, began to be implemented by CAEM. This new project, "Energy Efficiency for Productivity," extends the CAEM-Colombia Productiva partnership to UK Pact Colombia, Bancoldex, Carbon Trust and the Colombian Council for Energy Efficiency. This project will benefit 60 companies from the NAMA project (assisting them with new investment projects) and 50 additional companies located in the metropolitan areas of the main Colombian cities: Bogota, Medellin, Cali, Bucaramanga, Cartagena and Barranquilla. This project provides companies with technical assistance similar to that provided by NAMA, in addition to improved financial facilitation as a result of a more active participation by Bancoldex. The new project includes: (i) energy characterizations, energy efficiency plans, and investment project profiling; (ii) detailed financial evaluations by Bancoldex, structuring the projects so that they can benefit from tax incentives; (iii) activation of the financial system, with Bancoldex seeking co-financing from commercial banks (through the elaboration of business cases); and (iv) virtual training.

F. UNDP COMPARATIVE ADVANTAGE

87. UNDP's comparative advantages consist in its national and international recognition, which has been an even greater advantage in the current period of economic crisis. UNDP was as a partner that facilitate linkages, being a key participant in the project, but without assuming a leading role, and was a facilitator of a collaborative space that produce synergies with other projects, such as the UNIDO/GEF "Promotion of Industrial Energy Efficiency in Colombian Industries".

88. UNDP also ensured that project commitments were fulfilled, maintaining a very close and articulated relationship with the government. This project has stood out within the climate change portfolio of the Ministry of Environment and Sustainable Development, which has a total of 35 projects.

89. This project had a high visibility at UNDP's management level, enabling the use of UNDP's media for wider dissemination.

90. A comparative advantage of UNDP's Colombia Office has been the provision of technical support according to the needs of the project, as was evident for example in the development of the gender agenda and in relation to the project's sustainability, through a new cooperation in progress with CAEM to seek fresh funds from the NAMA Facility to scale up interventions.

G. LINKAGES BETWEEN THE PROJECT AND OTHER INTERVENTIONS WITHIN THE SECTOR

91. There was effective coordination with the UNIDO/GEF project to jointly provide capacity building activities to industrial companies, particularly in the organization of a diploma course for the management of energy efficiency systems.

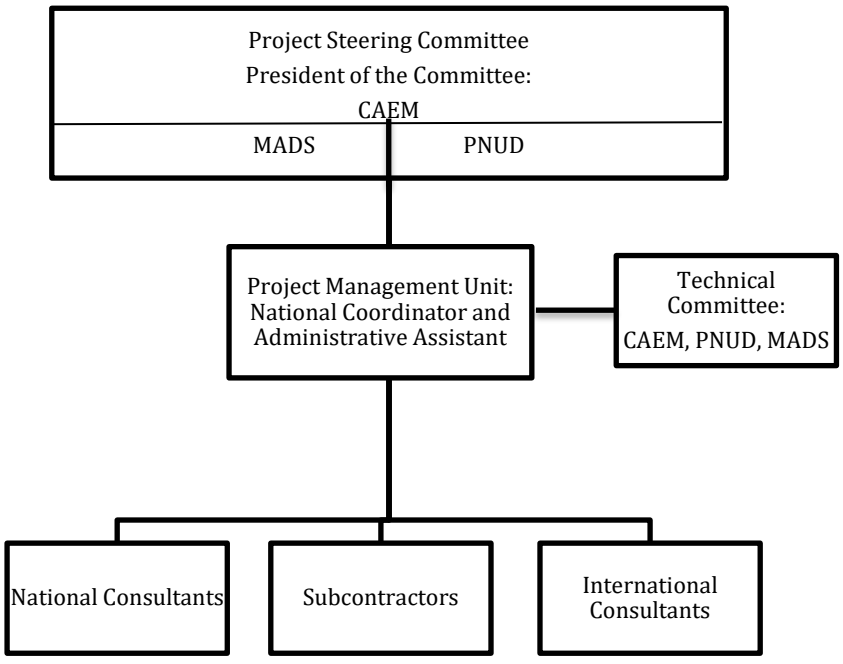
92. There are interesting learning opportunities emerging from this project, particularly in that emphasis is placed on training managers within the beneficiary companies, who can make their own energy efficiency diagnosis and monitoring, with very limited support from external consultants.

H. MANAGEMENT ARRANGEMENTS

93. This project was executed under the civil society organization implementation modality and is an integral part of the UNDP Country Programme Action Plan (CPAP) (2015-2019) signed by the Government of Colombia and the UNDP in 2015. Thus, the project contributed to the product: "Compensation and mitigation strategies to achieve the transition to a 'green' economy, implemented by the productive sectors with the greatest environmental impact and by sub-national institutions."

94. The management structure responded well to the needs of the project in terms of direction, management, control and communication. The project was cross-cutting in nature and involved various stakeholders, so its structure was flexible in order to adapt to potential changes during project implementation. The organization chart of the project is shown in Illustration 1.

Illustration 1- Organization chart of the Project



Source: Translated from the ProDoc

5.2 PROJECT IMPLEMENTATION

A. ADAPTIVE MANAGEMENT (CHANGES IN PROJECT DESIGN AND PROJECT OUTPUTS DURING IMPLEMENTATION)

95. The monitoring indicators defined in the ProDoc are adequate to measure progress and performance. The small adjustments made to the estimation methodology (specifically to the baseline design for the estimation of energy savings and GHG emission reductions) were positive and improved data quality.

96. Although the articulation with national and local strategies that promote gender equality is not made explicit in the ProDoc, a linkage is later made in the Gender Action Plan (GAP), a document elaborated in July, 2019. This document identifies opportunities for the project to contribute to gender equality and women's empowerment through the incorporation of appropriate actions. The GAP also describes Colombia's gender profile, as well as the national framework for promoting gender equality and women's empowerment. It also refers to the current regulations regarding gender equality within the mining, energy and environment sectors.

B. ACTUAL STAKEHOLDER PARTICIPATION AND PARTNERSHIP ARRANGEMENTS

97. Project governance worked very well due to the active participation of partners, both, within the Project Steering Committee (constituted - as defined by the program's rules - by UNDP, the Ministry of Environment and CAEM), and within the Technical Committee (in which the most important strategic partners participated, such as the Ministry of Commerce and Industry, the Bogota Chamber of Commerce and CAR, among others), which allowed for balancing perspectives and approaches in decision making.

98. It is important to highlight the participation of various partners -governmental and non-governmental- linked to the two main themes of the project, business productivity and the environment. Partners found in this project a good point of convergence of their own interests. This project has been considered very relevant by all partners, some of them considering it a high impact project. Key partners signed cooperation or association agreements with CAEM and examples of partners and partnership objectives are: (i) CAR, to support the introduction of energy efficiency practices in industrial companies in Cundinamarca and provide funding; (ii) CCB, to promote the project in companies located in Bogota, particularly those belonging to CCB's supported clusters, to participate in the Technical Committee and provide in-kind support; and (iii) the Secretariat for Competitiveness and Economic Development, Regional Government of Cundinamarca, to support investment projects in micro, small and medium sized companies in Cundinamarca, and provide funding.

99. The different allies recognized that CAEM played a very important role as a reliable partner, highlighting its stakeholder articulating function and the generation of participatory spaces, for example, within the Technical Committee.

100. CAEM's alliances facilitated the positive results obtained by project activities: call for and selection of beneficiary companies (especially through regional and local allies such as governmental entities of Cundinamarca, Colombia Productiva and Departmental Chambers of Commerce), elaboration of two methodological documents, articulation with technology suppliers, and the development of training activities for capacity building (with UNIDO, World

Resource Institute and the Chilean Energy Sustainability Agency). Likewise, the alliance with Colombia Productiva allowed the project to expand beyond the Bogota-Cundinamarca region.

101. An area of improvement is related to the low level of external communication of the project and its results by some partners (e.g. on their websites) and the limited dissemination of the methodological documents produced. In relation to the articulation with technology suppliers, there is a certain lack of knowledge among companies of the complete roster of suppliers, as well as some difficulties to link companies with the right suppliers. There is also potential and opportunity to expand the network of key partners.

C. FEEDBACK FROM M&E ACTIVITIES USED FOR ADAPTION MANAGEMENT

102. Early M&E activities, particularly site-visits, were instrumental to understand how the project was evolving in the field. The corresponding feedback was used to improve project implementation.

D. PROJECT FINANCE AND CO-FINANCE

Table 4 shows the assessment on project financing.

Table 4 - Project finance and co-finance

Co-financing (type/source)	Own financing from GEF/ UNDP (US$m)		Government (US$m)		Beneficiary enterprises and partners (US$m)		Total (US$m)	
Type of co-financing	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Cash	1,726,484	1,549,158	-	1,344,730	-	8,230,000	1,726,484	11,123,888
Loans	-	-	-	-	9,000,000	-	9,000,000	-
In-kind support	200,000	200,000	1,743,260	1,743,260	1,184,200	1,184,200	3,127,460	3,127,460
Totals	**1,926,484**	**1,749,158**	**1,743,260**	**3,087,990**	**10,184,200**	**9,414,200**	**13,853,944**	**14,251,348**

Source: Own elaboration based on ProDoc, collaboration agreements with key partners and latest financial, annual and quarterly reports

103. As of this report's closing, the level of implementation of the total planned budget is 103%. While the implementation of GEF funds is 90%, the remaining balance is already committed. It is important to note that, at the time of design, Bancoldex committed to reserve credit lines for companies of up to USD 9 million, which were not used. This was offset by the combination of cash investments made by companies (mostly with their own funds) and cash contributions made by partners: CAR, Colombia Productiva and the Government of Cundinamarca.

E. MONITORING & EVALUATION: DESIGN AT ENTRY, IMPLEMENTATION, OVERALL ASSESSMENT OF M&E

104. UNDP and GEF have a set of procedures and instruments for monitoring and evaluating project's progress and results, impact and the corresponding means of verification. In the present project, the Monitoring and Evaluation (M&E) Plan included the following instruments: a) Inception Workshop and Inception Report; b) Annual Project Report (APR); c) Project Implementation Reports (PIR); d) Quarterly Progress Reports; e) Technical Reports; f) Final Project Report; g)

Final Evaluation and Final Project Report (FPR); h) Project Audits (PA); i) Periodic Thematic Reports; h) Project Publications; and i) Reports from UNDP Field Visits (Regional Supervisor and Country Office Representative) and other ad-hoc visits.

105. In general, the M&E Plan is well defined, with a methodology and description of roles and responsibilities well-articulated. Its design allows for adequate control of the results and helps keep records of the project's actions. The M&E budget was sufficient. It should only be noted that, although the periodicity of each of the instruments to be used is well detailed, it does not include a tentative timetable for the implementation of the Plan's activities.

106. The effort put into the design of the project was reasonable and helped with the correct management of the project, both in its implementation and follow-up.

107. The quarantine decreed by the national government resulting from the COVID-19 pandemic implied a readjustment of the M&E scheme that involved, for example, changes in the format of company monitoring, monitoring and socialization of project reports and analysis of information on pilot project results, which had to become completely virtual.

108. The M&E reports were of great value and effectiveness. Their contribution to the good functioning of the project's governance, especially of the PSC and the Technical Committee, is evident. The latter involved the most important strategic allies, particularly the Ministry of Trade, Industry and Tourism, which was fundamental to the development of the project. The planned periodicity for the committee meetings was generally met. The basic requirements for progress and financial reports were met, although they present some limitations in terms of systematizing the information on the implementation of in-kind contributions throughout the project.

F. UNDP IMPLEMENTATION/OVERSIGHT, IMPLEMENTING PARTNER EXECUTION AND OVERALL ASSESSMENT OF IMPLEMENTATION/OVERSIGHT AND EXECUTION

109. UNDP played a prominent role in project's design and monitoring, proposing initiatives and promoting linkages among stakeholders. UNDP's support to the project was extensive, with permanent involvement, guaranteeing follow-up and quality of reports, as well as the fulfilment of commitments by partners. UNDP also played a technical advisory role, although to a lesser extent, given the limitation of not being a specialist on industry issues.

110. UNDP provided overall leadership to the project since its inception. UNDP has been a success factor throughout the project, particularly during design and planning, and later showing a constant and cordial follow-up, ensuring the timeliness and adequacy of milestone reporting. The project has contributed directly to the priority of "inclusive and sustainable growth" stated in the Country Programme Document for Colombia. UNDP also facilitated the financing of the project.

111. CAEM has been a relevant and qualified partner for project implementation. On the one hand, the fact that CAEM operates as a subsidiary of the CCB -where all companies in Bogota and 59 municipalities in Cundinamarca are registered- facilitated contact with potential beneficiaries and stakeholders' articulation. On the other hand, CAEM's long trajectory and background have made possible the adequate development of the project's activities, clearly oriented to results. It is worth mentioning that CAEM is 37 years old, has a national scope, and a history of activities very similar to those proposed in the project. As a result, CAEM had staff and procedures already tested by the start of the project.

112. The staff, with several years of previous experience with CAEM or with environment related organizations -such as CAR and the District Secretary of Environment of Bogota- provided a high-level technical response. As part of CAEM, the staff had previously participated in projects such as Carbon Footprint, Energy Efficiency in Brick Companies and Black Carbon. Other relevant staff experiences include the greenhouse gas inventory and the GEF voluntary mitigation mechanisms.

113. CAEM's implementation team was valued by stakeholders as being of high professional level, high performance, organized, generous, punctual and committed. It is also worth noting that through their procedures they managed to introduce discipline related to energy efficiency actions in beneficiary companies, keeping an eye on progress, monitoring and providing feedback. The reports produced were assessed as being of high quality. In cases where there were changes in team-members assigned to companies, changes were only rarely an obstacle to the adequate continuation of relationships.

114. As an area for improvement, it can be mentioned that in some cases measurement and verification of results, to know the effective energy savings achieved, were not carried out. In these cases, a final closing visit to companies was omitted, leaving a feeling in a few beneficiaries that "something was missing".

115. Beneficiary companies valued very positively the technical capacity of the implementation professionals and their responsiveness (see Table 5).

Table 5 – *Perceptions of the technical capacity of the project implementation professionals and their timely response*

Rating	Technical capacity of professionals involved (%)	Timely response (%)
Excellent	43	35
Very Good	53	56
Fair	2	7
Poor	2	2

Source: Own elaboration based on the enterprise survey. N= 95

116. In addition, beneficiary companies mentioned the following as the greatest benefits that CAEM brought to them: awareness on the issue of energy efficiency (79%); the possibility of making a diagnosis of the company's energy efficiency (79%); technical advice and support (60%); assistance in decision-making related to energy efficiency issues (37%); being part of a network with common objectives (13%); access to technology service and equipment providers (13%); articulation with other public and private stakeholders (13%); and access to finance (7%)[4].

5.3 PROJECT RESULTS

A. OVERALL PROJECT RESULTS - Rating: (HS)

117. General and specific project results, as well as their evaluation ratings and comments, can be found in Table 6. Overall, milestones have been met very satisfactorily and, in some cases, satisfactorily.

[4] Percentages add up to more than 100% as companies were asked to mention the three most important benefits received.

Table 6 - Project Results Framework Evaluation

PROJECT RESULTS FRAMEWORK EVALUATION[5]						
Indicator	Baseline Level	Midterm target level	End of project target level	Level at March 31st, 2020	Final evaluation comments	Rating[6]
Objective: Promoting the adoption of best industry practices and the implementation of low-carbon technologies in companies that form part of the industry sector in Bogota-Cundinamarca						
Amount of GHG emissions reduced in industry subsectors in the Bogota - Cundinamarca region	Current emissions of the benefitting companies in the industry subsectors in the region (to be determined in year 1 of project)	50% of BOP projects executed and project portfolio of technological reconversion, innovation and adaptation to be implemented, already identified.	Direct reduction of at least 55,000 tCO2e in priority industry subsectors for the region, by implementing pilot projects, as compared to baseline. Expected annual reductions at end of project are 23,000 tCO2e/year	The pilot project has achieved a reduction of 59,725 tCO2 accumulated throughout the project, equivalent to 109% of the target. The annual reduction at the end of the project is 24,509 tCO2/year, which exceeds the project target (106% of the target).	The cumulative value has been calculated as the addition of each project´s reductions (compared to the respective baseline), assessing the period between the beginning of each project and the completion date of the NAMA Project. The contributions to total GHG emission reductions by project type were 15% for BOP and 85% for LIP and HIP.	HS
Amount of energy saved through implementation of Energy Efficiency measures	Current energy consumption of the benefitting companies in the industry subsectors in the region (to be determined in year 1 of project)	At least 15000 MWh reduction in annual energy consumption as a result of the implementation of 50% of projected BOP projects (80 projects).	At least 80000 MWh reduction in annual energy consumption as a result of the implementation of the full portfolio of projects.	The implementation of the project has achieved a reduction in annual energy consumption of 78,728 MWh (98. 3% of the target).	The annual value has been calculated as the addition of the monthly savings in the last month of implementation, multiplied by twelve months. The contributions to the reduction of energy consumption by type of project were 16% for BOP and 84% for LIP and HIP.	HS
% of increase in energy productivity in SMEs which make up the industry subsectors in the Bogotá-Cundinamarca region	Current level of production and energy consumption in the benefitting companies in the industrial sub-sectors in the region (to be established in year 1).	Energy productivity indicators established and the goal of improved productivity defined for each project.	Increase between 1% and 3% in energy productivity of enterprises in priority industrial subsectors for the region that have implemented the proposed technology transfer projects.	According to the 2019 Technical and Financial Report, the energy productivity indicator associated to companies that implemented BOP was in the range of 1% to 7%. On average, it reached a value of 2.56% per company (taking into account energy consumption not directly associated with production levels). In the case of companies that implemented LIP and HIP, it is estimated that energy productivity increased by an average of 6.82%	MRV reports only one case of energy productivity measurement.	S

[5]Note that the first four columns of this matrix have been literally extracted from the 2019 Project Implementation Review, which in turn is based on the ProDoc, except for the second indicator (amount of energy saved) where the original targets were too low (15 MWh and 80 MWh for mid-term and end-of-project respectively).

[6] HS: Highly Satisfactory, S: Satisfactory, MS: Moderately Satisfactory, MU: Moderately Unsatisfactory, U: Unsatisfactory, HU: Highly Unsatisfactory.

PROJECT RESULTS FRAMEWORK EVALUATION[5]						
Indicator	Baseline Level	Midterm target level	End of project target level	Level at March 31st, 2020	Final evaluation comments	Rating[6]
Level of investment triggered for energy efficiency in industrial sector in Bogotá/Cundinamarca region	Scattered investment taking place, unquantified and unconsolidated	Business plans in place for investment of at least USD 6,000,000 in EE in industry	At least USD 6,000,000 invested by industry in energy efficiency measures.	The goal was surpassed. According to project investment tracking records, 123 companies have made an aggregate investment of COP 27,007,030,804 which is equivalent to USD 8.23 million (137% of the target value). Of these investments, 2% correspond to BOPs, 2% to LIP (<15,000 USD) and 96% to HIP (>15,000 USD).	Given the fluctuations in the exchange rates for the Colombian peso, the 2019 average rate of $3,281COP per dollar was used.	HS
Outcome 1: Strengthening of the capacity of the industry sector						
Number of guidelines for Energy and GHG emissions self-assessments produced for companies benefitted by the GEF project	General technical information, mainly from international sources and partially from domestic sources about establishing GHG baselines and defining relevant emission factors. Specific information and methodologies required for industrial sub sectors are unavailable.	General methodological guide for determining baseline energy and GHG emissions applicable to this type of projects in the industrial subsectors in the region properly developed and disseminated.	Methodological guidelines applied by all companies that have implemented balance of payments projects (in building their energy and GHG emissions baseline).	The goal was completely achieved. A methodological guide to determine energy and GHG emission baselines for the industrial sector was developed and distributed. A total of 163 companies had access to a print or digital version of the guide. A hard copy of the guide was provided to companies against delivery of final project reports in 2020.		HS
Number of persons trained in technical, financial and commercial projects associated with the development of specific technology transfer projects for industrial subsectors in the region	Industry specific capacity development programs not developed.	Capacity-building programs developed for technical, financial and commercial aspects associated with the development of specific technology transfer projects for industrial subsectors in the region.	At least 300 people trained in technical, financial and commercial projects associated with the development of specific technology transfer projects for industrial subsectors in the region.	According to attendance records, the total number of people trained is 727 (442 men and 285 women), achieving 242% of the target. Training courses were carried out in partnership with technically appropriate and relevant institutions such as UPME and UNIDO (short courses on emissions inventories), the National University of Colombia (Energy Management Systems), GIZ Chile and the Chilean Energy Sustainability Agency (cogeneration courses).	The following attendance records were considered: e-learning, short courses, workshops, specialized courses, missions and seminars	HS

PROJECT RESULTS FRAMEWORK EVALUATION[5]						
Indicator	Baseline Level	Midterm target level	End of project target level	Level at March 31st, 2020	Final evaluation comments	Rating[6]
Number of companies that implement BOP with energy and GHG emissions assessment completed	There is no baseline GHG in the companies.	Energy and GHG emissions assessment in the 80 companies that have implemented BOP projects so far.	Energy and GHG emissions assessment of the 160 companies that have implemented BOP projects.	The goal was completely achieved. Baselines for energy and GHG emissions were assessed for the 162 BOP projects implemented, and were carried out in accordance with the project guidelines.		HS
Outcome 2: Implementation of technology transfer pilot projects according to the mitigation actions identified and prioritized in the industry sector						
Number of projects accessing funding from financing mechanisms defined by the GEF project.	Overall, there are financial models for the promotion and financing of energy efficiency activities in general (ESCO type models with performance payments) but not specific to the types of projects proposed by the project, added to the lack of resources to promote major industry changes (the resources used by these modeling is limited to the financial capabilities of companies or ESCOs).	Defined and structured financing mechanisms.	80% of the identified projects seeking funding have access to financing mechanisms defined by the GEF project	Although the project team promoted connections between companies and banks offering green credit lines, the companies self-financed themselves or resorted to traditional credit lines. The number of projects that sought funding as defined by the GEF project was not measured. As reported in the MRV System, 61.8% of the total investments in energy efficiency measures were made with own resources ($16,641,581,271 COP), 31.8% used conventional credit from banks ($8,573,658,118 COP) and 6.5% used unidentified sources ($ 1,653,330,000).	Very limited use of green credit is reported in the 2019 annual report. Bank Davivienda disbursed COP $311,500,000, to two brick companies through its energy efficiency leasing line. In addition, as a result of the business rounds, negotiations were closed on three projects with a total value of $64,000,000 COP.	MS
Number of Best Operating Practices projects identified and implemented within SMEs	There is a prior definition of the most appropriate mitigation measures to reduce the consumption of electricity and heat in industries that make up the industrial subsectors in Bogotá-Cundinamarca	160 identified BOP projects, and a first project portfolio of technological reconversion, innovation, and adaptation identified in at least 40 SMEs. (investment below $15,000)	100% (160 projects) of BOP projects and of the portfolio of technological reconversion, innovation, and adaptation is implemented. (investment below $15,000)	According to the energy assessment reports, 257 BOP projects were identified and implemented by 107 companies (160% of the target) and 32 LIPs by 42 companies (105% of the target).		HS
Number of projects implemented in technological and/or process conversion, innovation and/or adaptation	There is a characterization of project types per sub sector. Individual projects not defined	At least 86 of technological reconversion, innovation and adaptation (processes and technologies) projects identified and financially structured.	At least 86 of technological reconversion, innovation and adaptation (processes and technologies) projects implemented (Investment minimum $15,000).	According to the energy assessment reports, 88 HIP projects were identified and implemented by 57 companies in compliance with GEF standards.		HS

PROJECT RESULTS FRAMEWORK EVALUATION[5]						
Indicator	Baseline Level	Midterm target level	End of project target level	Level at March 31st, 2020	Final evaluation comments	Rating[6]
		(Investment minimum $15,000).				
Number of Monitoring, reporting and verification systems (MRV) for monitoring indicators and outcomes of technology transfer projects.	The MADS is developing an MRV system for Colombia, with the purpose of having a standardized approach that allows to estimate and report the change in GHG emissions and absorptions caused by policies and/or mitigation actions in the sector. Within this process, the definition of indicators is planned through the application of the Policy and Action Standard Guide published by WRI.	Basic design parameters defined for the operation of the project MRV system in accordance with the needs of the stakeholders and the national government.	An MRV system (tool) in place covering the scope of this project and collecting and reporting GHG and associated data for investments triggered by project.	An MRV system has been developed and implemented, hosting basic information for 160 companies and BOP data for 92 companies, corresponding to 206 measures. The MRV provides individual company reports and consolidated information across companies. The information covers the scope of the project.	The design meets the information needs for the creation of a NAMA. The functioning of the system is adequate. It is necessary to point out that there are deficiencies in the reporting of investments and in the production levels reported before and after project implementation. This is a constraint on the evaluation of energy efficiency improvements resulting from project implementation.	S
Number of training processes aimed at strengthening technical capacities of stakeholders and decision-makers in priority industry subsectors for Bogota-Cundinamarca.	Energy efficiency technical capacity is spread throughout the sector, without having been set specifically to date.	Training and strengthening processes carried out with stakeholders and decision-makers within companies that have implemented BOP projects (50% of companies planned).	100% of the companies benefitted by the GEF project have participated in the training activities carried out and are fully trained to identify EE opportunities and conduct MRV on implemented measures.	The records of participation in training activities show that participants corresponded to 120 beneficiary companies, achieving 75% of the goal. All companies with trained personnel have carried out the identification of EE opportunities. However, some companies have not completed the reporting of some variables in the MRV system (e. g. production).	The following attendance records were considered: e-learning, short courses, workshops, specialized courses, missions and seminars	MS
Outcome 3: Knowledge management for the replication of the technology transfer pilot projects' impact in the industry sector						
Level of systematization consolidation and analysis of best practices of technology transfer pilots.	Currently, no knowledge management system aimed at monitoring energy indicators and mitigation for such projects has been implemented	Having defined a project outcome management system of technology transfer projects implemented	100% of the outcomes and energy and GHG mitigation indicators of implemented projects properly consolidated and analyzed.	According to final and emissions reports, all implemented projects have the outcomes, energy and GHG mitigation indicators properly consolidated and analyzed.		HS
Level of systematization of local socioeconomic benefits resulting from project implementation	Level of socioeconomic benefits attained through energy efficiency investments is unclear and assessed qualitatively	Baseline parameters for socioeconomic assessment are defined, in terms of industry competitiveness,	Full assessment of socioeconomic benefits of energy efficiency investments in industry is	The information is limited to the evaluation of benefits in terms of specific project indicators (energy consumption, GHG emissions, savings, mitigation). In these cases, there is a baseline and estimation of reductions.	The annual and quarterly reports include activities aimed at gender parity in training and dissemination, which are insufficient to meet the target.	MS

PROJECT RESULTS FRAMEWORK EVALUATION[5]						
Indicator	Baseline Level	Midterm target level	End of project target level	Level at March 31st, 2020	Final evaluation comments	Rating[6]
		employment, and gender.	finalized and disseminated	The technical results of the project have been adequately disseminated, including the economic benefits for the participating companies. However, there is no assessment of the socio-economic benefits, nor related to increased competitiveness or to gender focus.		
Level of dissemination of project results and processes carried out in different regions of Colombia (lessons learned and project achievements)	N/A	2 dissemination processes (in different regions to that of the project) of experiences from lessons learned and successful outcomes achieved by the projects implemented.	4 dissemination processes (in different regions to that of the project) of experiences from lessons learned and successful outcomes achieved by the projects implemented.	In total, the project has carried out 5 dissemination processes of the lessons learned, experiences and successful results achieved in different regions of the country, reaching 120% of the goal.		HS
Level of availability of financial mechanisms and products in place to guarantee sustainability and replicability of future pilot interventions in the industrial sector and other subsectors in Colombia.	Financing available, but not specifically tailored to the needs of energy efficiency investments in industrial SME sectors	Financial mechanisms and products defined and on-going.	At least 2 financial mechanisms available, capable of delivering at least USD 10m annually to EE projects in SMEs in Colombia.	Four agreements were signed with financing entities to facilitate access to the financing of technology transfer (energy efficiency) projects. The agreements facilitate access to pre-existing credit lines, which exceed USD 10M per year. However, availability of funding lines is not a consequence of the project. No agreements were signed for specific amounts as requested by the indicator.		MS
Quality of information provided to MADS for development and implementation of a NAMA in the industry sector.	Through the ECDBC and the MinCIT, the country has been working on the definition of the structure for constructing the NAMA for the industry sector, clearly defining the basis of the scheme, support activities required and the types of projects to be implemented that seek the desired results.	Inputs established to align the project with the methodology defined for structuring the NAMA for the industry sector.	NAMA implementation case study report formulated and aligned with the government's defining parameters and complying with all MRV procedures	The case study report was not available at the time of elaborating the current report. The actions carried out in the project have generated inputs for the elaboration of the Second Biennial Colombia's Update Report to the UNFCCC, and contributed to the industrial sector's energy efficiency actions defined in the NDC and the Ministry of Trade, Industry and Tourism's Integrated Climate Change Management Plan.	The case study is under development	MS

118. The project has built up an experience and knowledge base that needs to be expanded nationally. In fact, the project has already expanded its actions by developing energy efficiency plans for 70 additional companies (in 10 departments different from the Bogota-Cundinamarca region) that later implemented the BOP identified in their plans.

119. Key project, expected products were delivered, including: (i) methodological documents and tools, (ii) training materials (including videos on YouTube), (iii) energy assessments incorporated into energy efficiency plans and related reports (follow-up and final reports), (iv) BOP and investment projects implemented, (v) MRV system implemented, and (vi) information dissemination processes carried out.

120. By the closing of this report, several final reports for beneficiary companies, the case study report on inputs for the NAMA Industry and the sustainability plan had yet to be finalized. Delays were due to the COVID-19 pandemic, which disrupted the work processes of both the implementation team and the beneficiary companies.

121. Furthermore, the project did not define or structure new funding mechanisms according to the expected financial needs for project implementation as suggested by the ProDoc. In parallel and independent of the project's evolution, commercial banks were offering Bancoldex's green credit lines. CAEM, however, acted as a link between banks and companies, organizing business rounds, and achieving the financing of few projects through green loans.

B. RELEVANCE - Rating: (R)

122. Sustainable human development is a key solution to the latent crises in Latin America in general and in Colombia in particular. International bodies, such as UNDP and GEF, have developed strategic plans to provide guidance to governments. In particular, the government of Colombia has identified energy saving and efficient use as priorities because of their impact on both, national GHG emissions and the productive structure and competitiveness of the industrial sector.

123. The project aims to reduce the GHG emissions of the industrial sector and improve its productivity and competitiveness through technology transfer. From the outset, it was very well aligned with the priorities set out in the National Development Plan 2014-2018. Specifically, it is aligned with one of its six flagship solutions: "Closing the energy gap" and with the expected results from the sustainable development strategies included in the United Nations Framework for Cooperation for Sustainable Development.

124. The project was very timely. It was and continues to be highly relevant for Colombia, as it focuses on the intersection of three themes of high importance to businesses and the ministries of environment and industry: energy efficiency, business competitiveness and GHG emission reduction.

125. Preparations for the UNDP-CAEM project began in the years 2010-2011, when there was not yet a robust institutional framework in terms of both, the environment and energy efficiency. It is only in 2012 that the Low Carbon Strategy is developed, with the formulation of the Climate Change policy dating back to 2017. The results of the NAMA project are being included in the Paris Agreement reporting for 2030.

126. The project has contributed to Colombia´s Nationally Determined Contribution (NDC) in regards to the Commerce, Industry and Tourism sectoral goal: 10% of small, medium and large companies in priority sectors implement climate change adaptation strategies, actions or

projects. More specifically, the project contributed to the minimum GHG emission goal: not to exceed 267 CO2 Mt CO2 eq by 2030, equivalent to a 25% expected reduction on 2030 projected emissions. Moreover, the project is strongly aligned with the two actions corresponding to the sectoral strategy of energy efficiency: (i) management and promotion of energy efficiency projects and programs; and (ii) integral development of brick manufacturing companies (2020 NDC Colombia's update).

127. Thus, project implementation was carried out in parallel to country developments in policies and the legal and regulatory framework: the project both, contributed to and adapted itself to these processes.

128. The strong linkages between the project and environmental priorities at national, regional and local levels is widely demonstrated by the variety of partnerships with organizations at all these levels. In addition, the project was very relevant for strategic partners. For example, the Regional Competitiveness Commission (the CCB being its technical secretariat) endorsed the participation of the Secretariat of Competitiveness and Economic Development of Cundinamarca as a project partner, as it was considered to be a high impact project.

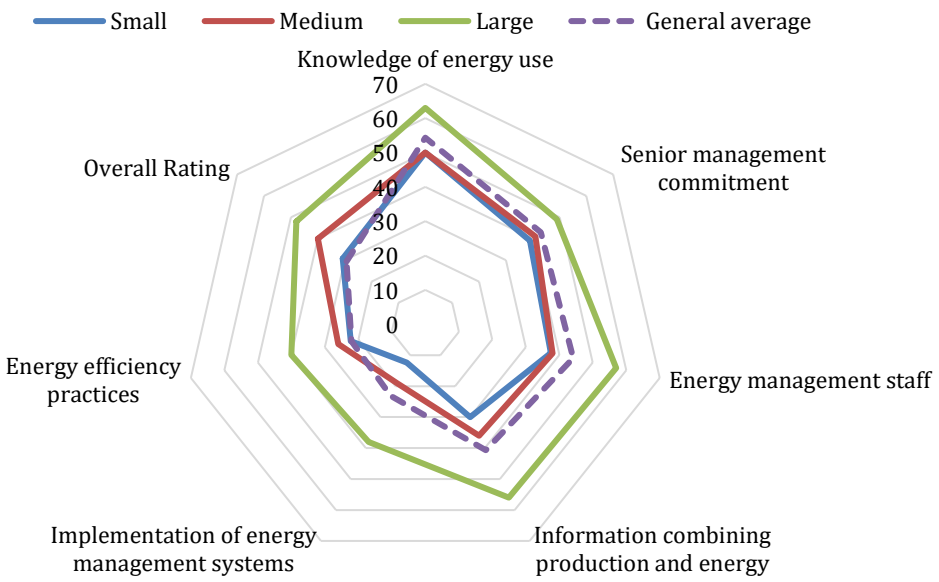
129. In addition, the project responds to one of the five areas of the Intelligent Specialization Strategy for the B-C Region: Bogota Sustainable Region, which hopes to achieve solutions to the region's challenges. Furthermore, in Cundinamarca, the manufacturing sector is the most important economic sector. Also, the project was relevant to other economic and environmental priorities beyond the B-C region, such as the preservation of the coffee cultural heritage site, which was declared a world heritage site by UNESCO.

130. In turn, the alliances at regional and local levels facilitated the call for and selection of beneficiary companies: the appropriate selection of participating companies was a project success factor.

131. The project was also very timely and relevant for Colombian industrial companies. As part of the development of the energy efficiency plans, CAEM surveyed organizational capabilities related to energy management based on ISO 50001. The average overall compliance for all categories and all companies was 40%, which showed a general need for improvement. The areas of greatest weakness were: (i) implementation of energy management systems (20% compliance), (ii) energy efficiency practices (22%), (iii) information combining production and energy consumption (31%), and (iv) senior management commitment (36% compliance). In turn, the project was particularly relevant for small and medium enterprises, which showed capacity levels in between 8 and 20 points lower than large companies per category (see Graphic 1).

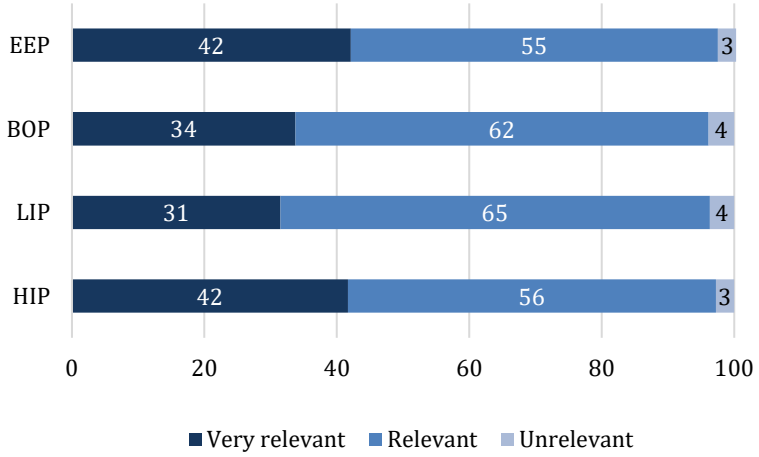
132. Although companies were generally aware of energy efficiency, it was not well known what it was about. On the other hand, prior to project's participation, business efforts were focused on production and costs were taken for granted: there were "hidden costs" and "little understanding" of energy related costs. There was also a general lack of knowledge of the relevant technologies available, and an abundance of technology providers, making it difficult for companies to make appropriate purchasing decisions. The issue of energy management remains relevant in Colombia: according to ANDI, only 39% of large companies carry out energy audits. 93% of the beneficiary companies consider the contents of the energy efficiency plans (EEP) elaborated by CAEM to be relevant or very relevant; 95% in the case of the BOP; 94% for Low Investment Projects (LIP); and 98% of the companies considered High Investment Projects (HIP) to be relevant or very relevant (see Graphic 2).

Graphic 1 – Kiviat diagram of organizational capacities´ compliance, according to company size



Source: Own elaboration based on the enterprises´ Energy Efficiency Plans. N= small-sized enterprises= 51; medium-sized= 57 and large enterprises=52.

Graphic 2 - Degree of relevance according to type of intervention



Source: Own elaboration based on the enterprise survey. N= EEP=95; BOP=77; LIP=54 and HIP=36.

133. Regarding gender, the ProDoc indicates that 14.6% of people employed in the industrial sector are women, and points to a study that shows that industrial activity can increase by up to 20% medical consultations due to acute respiratory infections among vulnerable populations (children, pregnant women and the elderly). Considering this background, there was a need for the project to include issues regarding women working in the industrial sector. Likewise, one of

the gaps to be addressed is the equal strengthening of women and men's knowledge on climate change and energy use, as well as women's participation in the project implementation team, thus reducing the gaps in incentives, investment, financing, and capacities.

C. EFFECTIVENESS – Rating: (HS)

134. For the most part, the project's expected results and outputs were achieved. Even unexpected, positive results were achieved, exceeding initial project expectations. The project had a very successful demonstration effect, combining a very low cost "entry strategy" for companies (which produced the expected energy savings and emission reductions), with a capacity development strategy based on training.

135. The results can be analyzed from multiple points of view, according to the variable taken as a reference. The two main approaches are: a) taking as a reference the type of intervention or project carried out (HIP, LIP, BOP); or b) taking as reference the type of companies that participated in the project.

136. In the first case, descriptive statements can be made regarding the general characteristics of the projects, the actions carried out and the relative importance of the combination of different characteristics (size, line of business, level of investment, energy source used, energy efficiency savings, CO2 emission reductions). These measures describe in broad terms how the project has developed.

137. In the second case, from the point of view of the types of companies involved, a focus can be placed on the size of companies and their performance in terms of the main variables (energy efficiency savings, CO2 emission reductions).

138. In general, it can be stated that results obtained are heterogeneous for most of the variables analyzed, where performance depend on specific characteristics of companies and not necessarily on a common characteristic shared by several companies. It is difficult to point out "success patterns". In general terms, the projects that have been most effective or successful in terms of energy savings and CO2 emission reductions correspond to companies that: (i) belong to the non-metallic mineral, food and beverage industry sectors; (ii) use coal as fuel; and (iii) have implemented both, BOP and HIP. This generic profile describes the set of companies that have obtained better results, although not all companies with these characteristics have obtained similar achievements.

139. Table 7, Table 8, Table 9, Table 10, Table 11 and Table 12 show project results considering different variables. Table 5 details the number of participating companies, the projects they developed and the average number of projects according to the size of the company.

Table 7 - Number of enterprises, projects and project average according to enterprise size

Type of enterprise	Number of enterprises	Number of projects implemented	Project average per enterprise
Large	36	138	4
Medium	54	150	3
Small	34	95	3

Source: Own elaboration based on project data base. N= 124 enterprises

140. The annual energy consumption savings at the end of the project are 78,728 MWh/year, reaching 98% of the 80,000 MWh/year target, i.e. with almost total compliance. Table 8 indicates that most of the energy savings (78%) were made as a result of HIP implementation, followed by BOP (16%) and LIP implementation (6%).

Table 8 - Contributions to total energy savings by project type

Type of project	Contribution to total savings
HIP	78%
LIP	6%
BOP	16%

Source: Own elaboration based on project data base. N= 124 enterprises

141. Doing the same analysis according to company size, it can be seen that small and large companies share an important portion of energy savings (just over 70%), representing 38% and 35% of savings respectively, leaving a contribution of 27% to medium-sized companies (see Table 9).

Table 9 - Energy savings according to enterprise size

Type of enterprise	Contribution to energy savings	Annual savings average (kWh)
Large	35%	788,560
Medium	26%	380,428
Small	38%	887,340

Source: Own elaboration based on project data base. N= 124 enterprises

142. The productive sectors with the greatest volume of energy savings were manufacturing of other non-metallic mineral products (59%), manufacturing of food products (21%) and manufacturing of rubber and plastic products (6% of total savings). The remaining sectors account for 14% of total energy savings (see Table 10).

Table 10 - Energy savings by productive sector

Sector	Volume of total savings
Non-metallic mineral products	59%
Food products	21%
Rubber and plastic products	6%
Other sectors	14%

Source: Own elaboration based on project data base. N= 124 enterprises

143. Out of the 10 companies that obtained the greatest energy savings with respect to their baseline (in percentage terms), 7 companies manufacture other non-metallic mineral products, typically bricks, ceramics and construction products (savings in between 18% and 63%); 2 companies manufacture food and beverages (20% to 38%); and one company manufactures asphalt (23% of energy savings). On average, energy savings per participating company is around 3%.

144. This means that only some projects belonging to specific, energy-intensive sectors have been able to achieve significant percentage savings. This is not only due to the specific characteristics of the sector to which they belong, but also to the specific characteristics of the companies, as there are also companies in the same sector with relatively small savings.

145. The consequence of this observation is that a key factor to maximize energy savings is the elaboration of energy efficiency plans that identify and assess likely savings in companies with high potential.

146. Regarding the non-metallic mineral sector, the 35 companies in this sector participated with 65 projects, making investments of $ 13,960,856,705 COP or 52% of the project's total investments. This group of companies obtained energy savings of 45,811,269 kWh/year or 59% of total savings achieved; and reduced GHG emissions by 13,306 tCO2/year or 56% of total reductions achieved in the project (see Table 11). On average, energy savings achieved, compared to the baseline, are 2.4%, less than the 3% general project average.

Table 11 – Project participation of the sector "Other non-metallic mineral products"

Indicator	Value	Participation in the project's total
Investment	13,960,856,705 COP	52%
Energy savings	45,811,267 kWh/year	58%
GHG reduction	13,306 tCO2/year	54%

Source: Own elaboration based on project data base. N= 35 enterprises

147. With regard to energy savings in relation to the type of technology used (see Table 12), indirect heat, with 30,123,421 kWh/year (38% of total savings) and direct heat 24,038,230 kWh/year (31% of total energy savings) were predominant. The other technologies used had a significantly lower share in energy savings: other technologies, 12,793,486 kWh/year (17% of the total); engines, 4,066,884 kWh/year (5%); compressed air, 3,775,022 kWh/year (5%); automation, 1,396,376 kWh/year (2%); refrigeration, 1,152,937 kWh/year (2%) and lighting, 1,094,857 kWh/year (1% of total energy savings).

Table 12 - Energy savings by type of technology used

Type of technology	Annual savings	Participation in total savings
Indirect heat	30,123,421 kWh	38%
Direct heat	24,038,230 kWh	31%
Other technologies	12,793,486 kWh	17%
Engines	4,066,884 kWh	5%
Compressed air	3,775,022 kWh	5%
Automation	1,396,376 kWh	2%
Refrigeration	1,152,937 kWh	2%
Lighting	1,094,857 kWh	1%

Source: Own elaboration based on project data base. N= 124 enterprises

148. With respect to emission reduction, at the end of the project the average annual reduction of emissions was 24,509 tCO2 /year, equivalent to 106% of the goal of 23,000 tCO2 /year, having successfully met the goal (see Table 13).

Table 13 - Emission reductions by type of project

Type of project	Average annual emission reductions at the end of the project (tCO2/año)	Average of annual emission reductions (per project) at the end of the project (tCO2/año)
HIP	3,612	213.54
LIP	2,106	48.97
BPO	18,792	14.05
Total	24,509	63.33

Source: Own elaboration based on project data base. N= HIP (88); LIP (43); BOP (257)

149. In terms of total emission reductions by company size, large companies reduced 9,426 tCO2/year (68 tCO2/year average per company), medium companies reduced 7,247 tCO2/year (48 tCO2/year average per company), and small and micro enterprises reduced 7,830 tCO2/year (79 tCO2/year average per project, see Table 14).

Table 14 - Emission reductions by enterprise size

Enterprise size	Number of projects	Total of emissions reduction by enterprise size (tCO2/year)	Average emission reductions per project by enterprise size (tCO2/year)
Large	139	9,426	68
Medium	150	7,247	48
Micro and small	99	7,830	79

Source: Own elaboration based on project data base. N= Large (36); Medium (54); Micro and Small (34)

150. Regarding the reductions achieved by the 99 small and micro enterprise projects, they can be broken down into two components: the first component (6,468 tCO2/year) can be explained by 10 projects, 8 of which belong to the other non-metallic mineral manufacturing sector. The second component corresponds to the remaining 89 projects, explaining reductions of 1,343 tCO2/year (15 tCO2/year average per project).

151. Regarding investments made by companies, they totaled $ 27,007,030,804 COP, of which $ 25,870,342,677 COP corresponded to HIP (representing 96% of the total); $ 567,757,955 COP corresponded to LIP (2% of the total); and $ 568,930,172 COP to BOP, that is 2% of the total. In terms of average investments, HIP implied average investments of $ 293,981,166 COP; LIP implied investments of $ 17,742,436 COP and finally, BOP implied average investments of $ 2,213,736 COP (see Table 15).

Table 15 - Average and total investments per project

Type of project	Total investment (COP)	Percentage of the total	Average investment per project (COP)
HIP	$25,870,342,677	96%	$ 293,981,166
LIP	$567,757,955	2%	$ 17,742,436

BOP	$568,930,172	2%	$ 2,213,736
Total	$27,007,030,804	100%	$71,636,686

Source: Own elaboration based on project data base. N= HIP (88); LIP (43); BOP (257)

152. With respect to investments according to company size (see Table 16), it can be seen that large companies invested $12,415,990,326 COP in 139 projects, resulting in an average of $89,323,671 COP per project and $354,742,580 COP per company; medium sized companies invested $9,771,767,763 COP in 150 projects, resulting in an average of $65,145,118 COP per project and $ 180,958,662 COP per company, and finally small and micro companies invested $4,819,272,715 COP in 99 projects, resulting in an average of $48,679,522 COP per project and $141,743,315 COP per company.

Table 16 - Investments by company size, averages per company and averages per project

Enterprise size	Total investment (COP)	Number of enterprises	Average investment per company (COP)	Number of projects	Average investment per project (COP)
Large	$12,415,990,326	36	$354,742,580	139	$89,323,671
Medium	$ 9,771,767,763	54	$180,958,662	150	$65,145,118
Micro and Small	$ 4,819,272,715	34	$141,743,315	95	$48,679,522

Source: Own elaboration based on project data base.

153. Geographically, 27% of the investments was made by companies located in Bogota, while 73% of the investments was made by companies located in Cundinamarca.

154. The 10 projects that generated most investment amounted to $ 12,897,492,463 COP or 47% of the total amount invested. Of these 10 projects, 6 correspond to the non-metallic minerals sector. The energy savings from these 10 projects were 12,516,765 kWh/year (16% of total savings) and the range of energy savings from these projects varies between 0.08% and 63% (9% in average).

155. Because of the investments made, there were improvements in the existing productive capacity, mainly through the modernization of equipment or replacement of old or obsolete equipment. Productivity (and management of production processes) improved, followed by cost reductions, in turn driven by energy savings. Companies were also able to make better choices regarding energy sources.

156. In addition, a series of co-benefits were identified in beneficiary companies: (i) improvements in the quality of employment, (ii) water savings, (iii) improved effluent management, (iv) technological waste management, and (v) quality of life in the company's surroundings.

157. The importance and relevance of two working tools used by CAEM's implementation team are highlighted: the energy efficiency plan and the energy management systems following ISO 50001, since both contributed greatly to the identification, prioritization and implementation of energy measures.

158. Both, the processes of preparing the energy efficiency plan and its implementation were very useful for the companies, introducing powerful technologies previously unknown to the companies, such as thermographic cameras. Starting with the first visit of the technical team, companies began implementing improvement actions. The energy efficiency plan helped them to learn how to measure energy use, reprioritize, define the optimal point of energy use and measure waste. Progress was made in the capacity to analyze information and learn about the

relationship between energy consumption and production. In addition, the quality of the energy supply -which in some cases had shortcomings- could be assessed, leading to improvements after discussions with energy suppliers. Finally, standardized reports were produced for the companies, which constituted an improvement on current market methodologies.

159. The most valued project training activity was the diploma on ISO 50001 implementation, delivered by the National University of Colombia, which allowed participating companies to implement energy management systems, and thus be able to make their own energy measurements. In addition, improvements were made to staff job profiles, manuals and procedures. This diploma course included field monitoring of the management systems implementation by the specialists who taught the course.

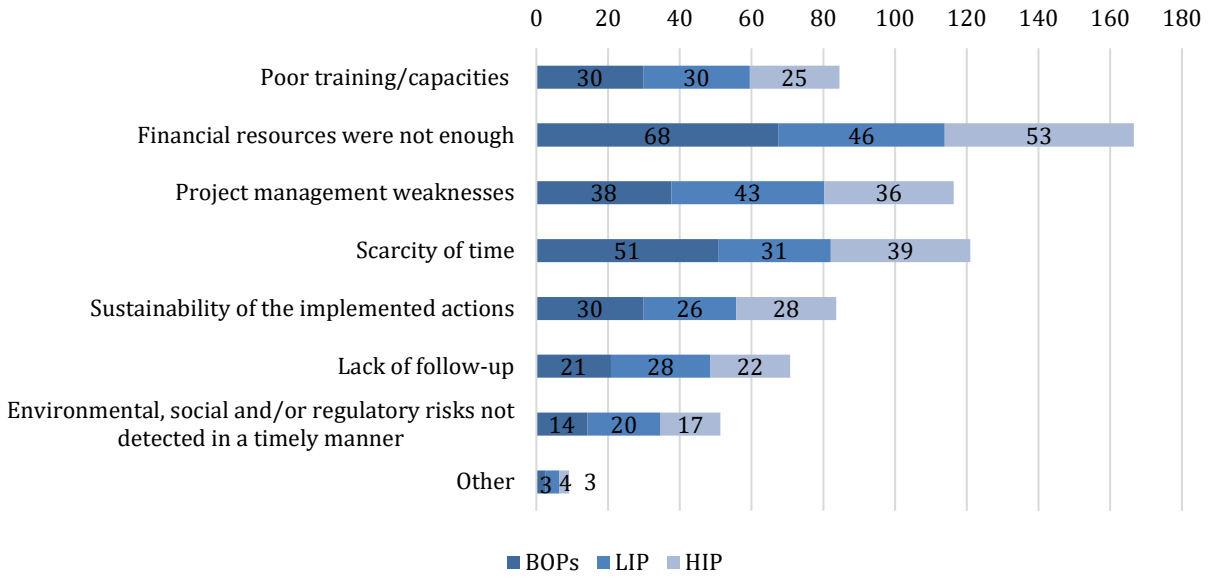
160. Out of the 162 beneficiary companies in the Bogota-Cundinamarca region, representatives of 120 companies (74%) undertook some form of training. This percentage is broken down as follows: 49% of the companies sent participants to workshops, 28% to virtual courses and 7% of the companies sent participants to specialized courses. In turn, the companies that were represented in more than one type of training were counted: 11% of companies were represented in both virtual courses and workshops, while 5% of companies were represented at all three types of training. In addition, of the total number of people trained (727), 39% were women and 61% were men.

161. The national and international technology missions were very useful. For example, the mission to Spain included the participation of representatives from academia and industry and important contacts were made to take advantage of business opportunities and make joint proposals with Spanish companies. A mission to Paris was carried out to attend a technology fair for the brick industry, which was very relevant to participants.

162. Also, it is important to point out the partnership between CAEM and EAN University that led to the development of a low-cost prototype for measuring electrical variables in SME (consumption, electric current, voltage, power factor). This is very relevant since this equipment could be manufactured in Colombia for a cost of $500,000, when the price of an imported equipment of similar characteristics is between $7 and 8 million. This experience illustrates the potential of collaborative work with universities.

163. Although the benefits of the project were numerous, beneficiary companies reported a level of achievement of their own objectives between partial and total. All project objectives were met for 41% of the LIP and 44% of the HIP. The main difficulty encountered during the implementation of BOP, HIP and LIP was that financial resources were not enough. In HIP and BOP the second biggest difficulty was the scarcity of time, while for LIPs it was project management weaknesses. Then, in decreasing order of importance, there were other difficulties such as the sustainability of the implemented actions, poor training/capacities, lack of follow-up, and environmental, social and/or regulatory risks not detected in a timely manner (see Graphic 3).

Graphic 3 - Main difficulties faced during BOP, LIP and HIP implementation (percentages)



Source: Own elaboration based on the enterprise survey. N= 95

164. Additional identified difficulties are: (i) mandatory isolation due to the pandemic; (ii) lack of a post-implementation schedule; and (iii) poor follow-up by CAEM once the project is completed. The project has been effective in inducing investment in beneficiary companies. 37% of the companies attributed all their energy efficiency actions and benefits to having participated in the project, while at the other extreme, only 20% of the companies would have carried out similar actions regardless of their participation in the project (see Table 17).

Table 17 – Company actions in the scenario of non-participation in the NAMA industry project

Actions in the scenario of non-participation in the NAMA industry project	Participation of possible actions in the total
The company would not have taken actions to improve its energy efficiency	37%
The company would only have implemented some BOP	23%
The company would have implemented some BPO and some investment projects (less than the actual number of projects implemented)	20%
The company would have implemented similar BOP and similar investment projects (similar number to the actual number of projects implemented)	20%

Source: Own elaboration based on the enterprise survey N= 95

165. In relation to the project's gender approach, an important milestone was the formulation of the Gender Action Plan in July, 2019. Within the framework of this Plan, workshops were held with CAEM officials and the project's implementation team. The workshop "Gender and Energy Efficiency Meeting" for beneficiary companies was organized. In this workshop, a survey was conducted among participants to guide future actions in gender approach. Twenty-one people

(both women and men) participated in these activities, which is still a low level of participation for the number of beneficiary companies.

166. It is important to point out the cases of three companies: Genovas Santafereñas, Almasa and Challenger, which were studied with respect to their gender approach. Participants from these companies stated that the gender workshop was positive for the women present, since it was inspirational and motivational to listen to the experience of female leaders.

D. EFFICIENCY – Rating (HS)

167. Overall, the project made a very efficient and economical use of the financial and human resources available to achieve its results. In contrast to similar projects in other countries, only technical assistance was subsidized, and the investments were completely made by the beneficiary companies, leveraging resources.

168. The project had a significant multiplier effect, leveraging significant private sector investment. Thus, for every GEF dollar, there was an investment of 4.8 dollars by the beneficiary companies, so the leverage factor is almost 5.

169. The project also leveraged additional resources from new strategic partners such as Colombia Productiva, which contributed USD 300,000 for the extension of the project to 10 new departments in the country.

170. Regarding human resource management, the project's technical team was adjusted in size according to the level of activity, reaching a maximum of 20 people and having up to 7 technicians in the field.

171. The project contributed to increase the efficiency of the market for energy efficient technology and financial service providers. CAEM acted as a link or articulator between the beneficiary companies and their most relevant technology suppliers, and companies were able to choose their most suitable supplier (in a context where it is easier to acquire technology, there is a higher presence of foreign companies in Colombia and it is easier to import technology). These company-supplier linkages were made on a case-by-case basis or through business rounds or events involving companies and technological or financial service providers. While these mechanisms worked quite well for the identification of technology suppliers, there were cases where companies were not given any potential suppliers or where the proposed suppliers were not suitable to the company’s needs.

172. About the efficiency of the training activities, these were not fully exploited, as 26% of the beneficiary companies did not participate in any of them. In the specific case of the virtual courses, there was a 35% completion rate.

173. Some important limitations related to the work efficiency of the beneficiary companies were noted. There are limitations in the decision-making capacities for investment, particularly when energy efficiency projects compete with projects of a different nature. In addition, there are human resource constraints to managing several projects at the same time and in financing them, since the traditional credit quota is often taken with working capital needs (particularly in the case of SME).

174. In relation to the Gender Action Plan developed for this project, a budget of USD 22,480 was allocated to carry out the planned actions, which is adequate.

E. NATIONAL OWNERSHIP

175. The project was developed in close collaboration with the Ministry of Environment and Sustainable Development, which is part of the PSC. A partnership with the Ministry of Trade, Industry and Tourism (MINCIT) was later incorporated as the Ministry of Environment has been decentralizing the components of the climate change agenda to other ministries according to their areas of competence. MINCIT has been participating in the project's Technical Committee, linking its Colombia Productiva program to the project. Colombia Productiva has a specific line of work on energy efficiency, so there was a very clear confluence of interests with the project.

176. The NAMA Industry Pilot project has been regarded as a successful demonstration, public interest project, and as such, the project team was invited to participate in numerous regional and national workshops to present its experience.

F. MAINSTREAMING

177. The project objectives meet the priority of "Inclusive and sustainable growth" of the Country Program Document for Colombia (2015-2019) and its Action Plan (paragraph 17): *"In strategic partnership with the private sector, UNDP will advocate and provide technical assistance to the Ministry of Environment and Sustainable Development to reduce the environmental impact of certain economic sectors, including the extractive industries, agriculture and cattle ranching. In collaboration with the United Nations Environment Programme, UNDP will help identify carbon r*eduction potentials across multiple productive sectors, and will downstream this knowledge to subnational governments in order to help in the implementation of carbon reduction strategies."

178. Although the project did not generate regulatory or legal advancements at the national or regional level, it helped mainstream energy efficiency practices in programs supported by key partners such as CAR, CCB, Regional Government of Cundinamarca and Colombia Productiva.

G. SUSTAINABILITY – Rating: (ML)

179. An important aspect that facilitates the sustainability of the project is that there were no subsidies for the implementation of investment projects. Until now, technical assistance has been free of charge, which is not sustainable over time. In addition, companies (particularly the larger ones) have the ability and willingness to pay if there is a clear economic return, which the project has already been demonstrating.

180. In addition to the project's intrinsic risks, the current pandemic of COVID-19 adds additional risks to the continuation of project outcomes. This is so because the attention of the relevant project stakeholders (companies and government agencies) is and will be focused on companies' survival -ensuring payroll and raw material payments- during the next months. The implication for project sustainability is that the redistribution of national and corporate resources to address the consequences of the pandemic will continue.

181. At the close of this report, a Sustainability Plan is being prepared. The Plan will include a business model to be developed based on national and international relevant business models. The plan will prioritize actions organized into three strategies: (i) consolidation of the market for energy management/ energy efficiency systems; (ii) increased technical assistance to the productive

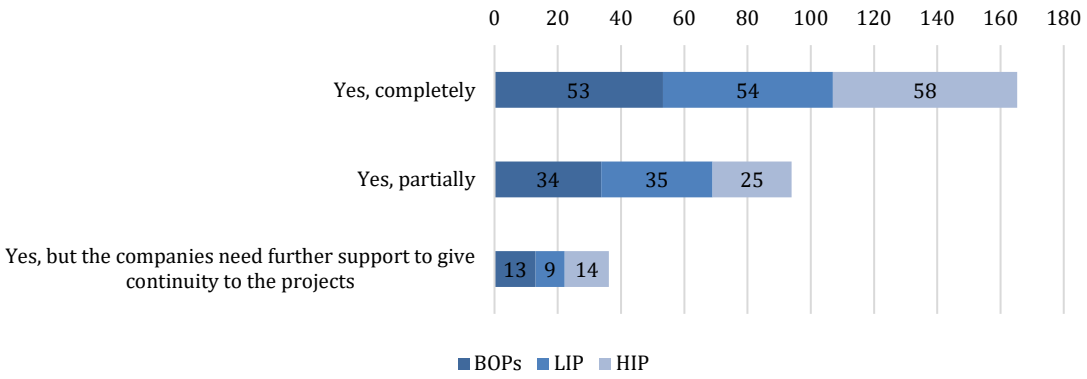
sectors; and (iii) elimination of barriers to access to energy management/ energy efficiency services. It is recognized that CAEM is competing with companies that offer basic technical assistance in energy management/ energy efficiency systems, so CAEM would no longer provide such basic services.

182. However, the draft version of the plan does not include a consideration of general risks, nor of specific risks generated by the pandemic. While identifying relevant stakeholders, the Plan projects CAEM more as a specialized consulting institution than as a catalyst for a more robust institutionality or governance.

183. With regard to the sustainability of the results derived from the implementation of BOP and investment projects (see Graphic 4), between 53% and 58% of companies indicated that the results will be fully sustainable. Between 25% and 34% mentioned that results will be partially sustainable and between 9% and 14% of the companies need further support to give continuity to their projects.

184. Among the necessary support pointed out by companies for the sustainability of project results are: increased preventive and corrective maintenance, advice and talks from experts, financial resources, data collection before and after improvements are made, and training.

Graphic 4 - Sustainability of BOP, LIP and HIP results



Source: Own elaboration based on the enterprise survey N= BOP (77); LIP (54); HIP (36). For 3 cases of HIP and 2 cases of LIP the enterprises indicated that their results were not sustainable over time

185. 29% of the companies mentioned the existence of risks that could compromise the sustainability of their investment projects' results. Among the risks identified were the following: (i) the current pandemic situation and the country's economic situation; (ii) personnel changes and lack of resources (mainly financial and resources provided by CAEM); (iii) changes in legislation (lack of continuity and slow administrative decision making); (iv) lack of staff's commitment (especially senior management) in relation to energy use; (v) product quality; (vi) environmental standards that are less viable to comply with; (vii) poor operation of equipment and failure to follow recommended maintenance practices; and (viii) legal and land use regulations.

<u>Financial risks:</u>

186. The likelihood that financial and economic resources for NAMA-type activities will not be available is low, as CAEM has the capacity and ability to develop and win proposals for external

funding. In fact, CAEM is currently implementing a project with United Kingdom funding to deepen and improve the results obtained by selected companies in the NAMA project, allowing a "second phase" to those beneficiaries with the potential to implement or continue implementing high investment projects.

187. In this "Energy Efficiency for Productivity Project," progress is being made on the sustainability front by communicating to beneficiaries that the value of the technical assistance service is $40 million COP (or USD 10,400) and that the company must pay 5% of that value in cash in order to participate in the program. While service valorization is a start in the right direction, the counterpart requested is insufficient from the point of view of cost recovery and to achieve significant commitment from the company. In addition, a proposal to the NAMA Facility is being developed with UNDP to scale up the NAMA project.

188. Beyond the implications of the pandemic, there remains the risk that companies will not be able to obtain financing on preferential terms of the green credit type. Businesses perceive that traditional credit lines (with 13 to 15% annual interest) are not attractive, with green credit lines reaching similar or higher rates once commercial banks add their surcharge.

189. Within commercial banks that channel Bancoldex loans, there is a lack of knowledge about both, the availability and the management of green credits. As a novelty, Bancoldex is now making direct loans to companies for investments of more than USD 1 million, which far exceeds the needs of the NAMA target companies, which are between USD 30,000 and USD 100,000. On the other hand, there is still lack of knowledge about financing alternatives such as ESCOS or leasing/renting, and whether these options are working.

190. There are other difficulties that also constitute barriers to financing. Although the design of the companies' investment projects had a very good technical foundation, they were not structured with a banking logic, adequate for the financial system. And on the incentives side, industrial SME generally do not have enough profits to take advantage of income tax benefits. In addition, SME often have their traditional financing quota filled by working capital financing.

191. Finally, the procedures required to take advantage of income tax benefits are complex and long-lasting. They must be processed at the Mining and Energy Planning Unit (UPME) and the National Environmental Licensing Agency (ANLA), and a consultant is needed to prepare the corresponding documentation.

192. All the above elements have contributed (and are expected to continue to contribute) to the lack of financial sustainability for the continued development of investment projects in a way that produces a significant impact at the national level.

Socio-economic risks:

193. The strong inter-institutional partnerships that CAEM created or strengthened during project implementation are likely to continue, ensuring a strong institutional awareness to continue supporting the long-term objectives of the project.

194. The level of stakeholder ownership is generally high, although there are some limitations. There are companies that have been little involved in their diagnosis and monitoring processes, thus having certain “dependence” on CAEM. National regulations are not demanding enough on industrial companies and their personnel have a high turnover, eroding the development of capacities.

195. While companies highly value the services provided by CAEM, many of them resist the concept that they should pay at least a significant part of the value of the services received. Many companies are used to receiving free or very low-cost technical assistance, and some companies assume that the value of these services is covered by the fees they pay to their chambers of commerce.

196. The dependence on CAEM is accentuated by the fact that there is no list of recommended or validated technology suppliers available to the public. Although CAEM has an internal list of validated suppliers, this modality limits their accessibility by companies

H. INSTITUTIONAL FRAMEWORK AND GOVERNANCE RISKS

197. The project wove a network of abundant partnerships with organizations of different types (including environmental authorities and chambers of commerce), which is a fundamental step in building governance. Although this was not a project objective, in order to minimize this type of risk, a clear institutional framework has yet to be defined, with basic financing assured to give continuity to energy efficiency actions, thus avoiding the current dependence on specific projects and donors.

198. Another important step taken by the project towards institutional sustainability is the establishment of a robust and functional MRV system. The lessons learned from this MRV's implementation were used in the development of the national RENARE registry, which began its activities in October, 2019. One limitation of the MRV is not having active participation by companies (although companies have their active users, they do not add their information or report new projects to the system). In addition, NAMA's MRV has yet to report to RENARE, as the protocols for information harmonization have yet to be established.

I. ENVIRONMENTAL RISKS

199. The ProDoc recognizes that the industrial sector is a source of air, soil, water and noise pollution, and that surrounding communities are often directly affected by these negative side effects of the industry. The project, however, did not address these issues.

J. IMPACT – Rating: (M)

200. The project has been contributing to the creation of a collective awareness of the importance of energy management and its environmental impact. A cultural transformation in business and citizenship can be observed, with changes in behavior and great motivation on the part of the stakeholders involved.

201. During interviews with company representatives, it was very common to hear phrases such as: "it opened my mind", "eye opening", "we now have a direction", "they changed my mind-set", "they brought us down to reality"; phrases that denote an important awareness. This awareness led to changes in employees' culture and behavior, whom introduced general energy use care in their production plants, from more efficient use of lights, to taking care not to leave engines running unnecessarily. These changes also moved into personnel's homes.

202. Prior to the project, little energy related data was available at the company level, and process data collection was missing. As a result of the intervention, lessons were learned and new points of view emerged. Indicators and data analysis tools are now available, as well as regular

measurements. The articulation of actions between different departments within the company was also observed. Energy efficiency was included in the development plans of the companies, moving from corrective to preventive maintenance, and to the elaboration of maintenance plans. Finally, improvements were reported in the staff working conditions, with reductions of accident rates.

203. Many of these changes were replicated beyond the project's original scope. Formally, the project expanded its impact to 10 departments in Colombia, covering 70 additional companies (to the original 160), and extended the scope to additional industrial sectors (such as food processing). In addition, some beneficiary companies replicated energy efficiency practices, with their own resources, to additional production plants they owned, and other companies have carried out additional projects on their own initiative as a result of the experience with CAEM. Finally, there were also cases of companies that did not participate in the program, but implemented energy efficiency actions on their own, imitating beneficiary companies.

204. While there have been co-benefits that have reduced the negative impact of companies on their environment (such as savings in water use and reduced emissions), no systematic measurements of environmental stress indicators (such as reduced emissions of black carbon into the air as a result of fuel substitution) have been taken.

205. Without forgetting the fact that this project has been a demonstration pilot, a limitation to its impact has been the relatively small size of the technical team and its centralized geographical location in the city of Bogota, making it evident that the technical group needs to be expanded and distributed geographically throughout the country.

206. Finally, the need to further disseminate the global results of the project, both among participating companies and towards industrial companies in general, was also highlighted.

207. Regarding organizational capacities for energy management, beneficiary companies stated that, due to the project, greater progress was made in the dimensions of: commitment of senior management, knowledge of energy uses and personnel in charge of energy management. The management systems implementation dimension made the least progress, clearly lagging the development of other capacities (see Table 18).

Table 18 - Degree of progress in organizational capabilities for energy management

Organizational capabilities	Much progress	Intermediate progress	Some progress	No progress
Knowledge about energy use	22	55	21	2
Productive energy information	17	52	25	6
Staff in charge of energy management	19	49	27	4
Commitment of high direction	29	37	25	8
Energy efficiency practices	17	43	35	5
Management systems implementation	15	39	28	18

Source: Own elaboration based on the enterprise survey N= 95

208. It is also important to highlight co-benefits or additional results achieved by the companies (see Table 19). Most of the companies had additional results process improvements, cost reductions, reduced occupational risks and improved working conditions for staff.

Table 19 - Additional results accomplished by beneficiary enterprises

Additional results accomplished	
Process improvements	75%
Cost reductions	71%
Labor risk reductions	66%
Better work conditions for the staff	61%
More staff trained in energy efficiency	53%
Water use savings	45%
Process time decrease	41%
Integration between different company areas	41%
Productivity increase	37%
Production increase	27%

Source: Own elaboration based on the enterprise survey N= 95

209. As for project maintenance, 90% of the companies that implemented BOP have been maintaining them, while the remaining 10% have not maintained them for the following reasons: (i) weaknesses in operational management and financial resource management; (ii) lack of personnel's commitment; (iii) lack of continuity and reprogramming of tasks, processes and resources; (iv) lack of time and personnel training; (v) restructuring of the maintenance process; (vi) plant shutdown because of COVID-19; and (vii) lack of a dedicated budget.

210. 87% of the companies that implemented LIP have been maintaining them. The remaining 13% have not maintained them mainly due to the COVID-19 pandemic, and to a lesser extent due to lack of continuity and follow-up, as well as the need to change to better technologies.

211. Finally, 81% of the companies that implemented HIP have been maintaining them, while the remaining 19% did not maintain their projects due to: (i) the economic situation of the country; (ii) the crisis caused by the COVID-19 pandemic; (iii) lack of investment, administrative continuity and future vision; and (iv) the unsuitability of the implemented project.

7. MAIN FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND LESSONS LEARNED

212. The following are the most important findings and conclusions of the project, arranged according to the categories in which the evaluation questions were organized.

Relevance – Rating: (R)

213. The project was very well aligned with the priorities established in the National Development Plan 2014-2018. Specifically, it is aligned with one of its six flagship solutions: "Closing the Energy Gap" and with the results expected from the implementation of the sustainable development strategies mentioned in the United Nations Framework for Cooperation for Sustainable Development.

214. The project was very timely and remains highly relevant for Colombia, since it focuses on the intersection between three themes of great importance for businesses and the ministries of the environment and industry: energy efficiency, business competitiveness and GHG emission reduction. The project was highly relevant for beneficiary companies, which showed a low level of compliance with organizational capabilities related to energy management at the beginning of the project.

215. All the actions developed by the CAEM team provided a high value and contributed directly to the achievement of the project's objectives. The objectives of the project are still appropriate, and the design needs to be adjusted considering the beneficiary companies' feedback, consisting of a combination of reactions to the way the project was implemented and to the economic crisis generated by the COVID-19 pandemic.

Effectiveness – Rating: (HS)

216. For the most part, the expected project results and outputs were achieved. Even unexpected, positive results were attained. The project had a very successful demonstration effect, combining a very low cost "entry strategy" for companies with a capacity development strategy based on training.

217. Energy efficiency plans were developed for 162 companies, 124 of which implemented industry best practices and low-carbon technologies: 257 BOP (by 107 companies), 42 LIP (32 companies) and 88 HIP (implemented by 57 companies). Together, these actions and investments achieved savings in annual energy consumption of 78,728 MWh/year at the end of the project (98% of the 80,000 MWh/year target). In turn, the savings in consumption resulted in an accumulated emission reduction of 59,725 tCO2 over the course of the project (equivalent to 109% of the 55,000 tCO2 target).

218. The most effective projects in terms of energy savings and CO2 emission reductions correspond to companies that: (i) belong to the non-metallic mineral, food and beverage industry sectors; (ii) use coal as fuel; and (iii) have implemented both, BOP and HIP.

219. Although the expected, overall results of the project were achieved, results at the level of participating companies have been heterogeneous. Approximately half of the companies succeeded in achieving their project objectives completely, while the other half achieved them partially and a few companies did not. The main difficulties faced by companies were insufficient financial resources, followed by scarce time availability and weaknesses in operational or administrative management. Regarding training participation, difficulties were related to lack of time, conflict with the regular working days agenda and lack of information or communications that did not reach the appropriate people on time.

220. Approximately, 90% of BOP and LIP, and 80% of HIP have been maintained, with the effects of the pandemic being felt and some weaknesses in the availability of economic resources, operational management, staff commitment and training.

221. Improvements in energy productivity, overall productivity and competitiveness of enterprises were observed in many cases, although such improvements could not be measured accurately and would now be relativized by the pandemic's effects.

Sustainability – Rating: (ML)

222. One factor that facilitates the sustainability of the project is that there were no subsidies for the implementation of investment projects. Until now, technical assistance has been free of charge, which is not sustainable over time. In addition, companies (particularly the larger ones) have the capacity and willingness to pay if there is a clear economic return.

223. In addition to the inherent project risks, the current COVID-19 pandemic poses additional risks to the sustainability of project results, due to the shift in attention to economic recovery by the relevant project stakeholders, both partners and companies.

224. The project strengthened the capacities of the industrial sector, obtaining the greatest advances in the dimension of knowledge related to energy use, followed (in a similar measure) by advances in the following dimensions: senior management commitment, personnel devoted to energy management, and information combining production and energy consumption. The least progress was observed in energy efficiency practices and specially in the implementation of energy management systems. The above-mentioned capacity developments still need to be consolidated.

225. CAEM has the capacity and ability to develop and win proposals for external funding. In fact, CAEM is currently implementing a project with United Kingdom funding to deepen and improve the results obtained by selected companies in the NAMA project, allowing a "second phase" to those beneficiaries with the potential to implement or continue implementing high investment projects.

226. Beyond the implications of the pandemic, there remains the risk that companies will not be able to obtain financing on preferential terms of the green credit type, due to the general lack of knowledge (in banks and companies) and the fact that "green" interest rates are very similar to those of traditional loans.

227. In relation to socio-economic risks, the strong inter-institutional partnerships that CAEM created or strengthened during project implementation are likely to continue, ensuring a strong institutional awareness to continue supporting the long-term objectives of the project.

228. Although creating or fostering an appropriate institutional or governance framework for energy management was not among the project's objectives, it is still necessary to define a clear institutional framework with basic financing assured to give continuity to energy efficiency actions, thus avoiding the current dependence on specific projects.

Impact – Rating: (M)

229. The project has been contributing to the creation of a collective awareness of the importance of energy management and its environmental impact. A cultural transformation in business and citizenship can be observed, with changes in behavior and great motivation on the part of the stakeholders involved.

230. Many of these changes were replicated beyond the project’s original scope. Formally, the project expanded its impact to 10 departments in Colombia, covering 70 additional companies (to the original 160), and extended the scope to additional industrial sectors (such as food processing). Nevertheless, it was evident that there is a need to further disseminate the global results of the project, both among participating companies and towards industrial companies in general.

Efficiency – Rating: (HS)

231. The project made a very efficient and economical use of the financial and human resources available to achieve its results. Only technical assistance was subsidized, and the investments were completely made by the beneficiary companies, leveraging resources and multiplying them by a factor of 5.

232. The partnership strategy was key to the project’s achievements, since partners helped select a relevant group of industrial companies with high potential for energy savings and with the capacity to implement improvements and invest in relevant technologies.

Added value, comparative advantages and cross-cutting issues

233. UNDP provided overall leadership to the project since its inception. UNDP has been a success factor throughout the project, particularly during design and planning, and later showing a constant and cordial follow-up, ensuring the timeliness and adequacy of milestone reporting. UNDP also facilitated the project's financing.

234. The gender approach gained momentum with the formulation of the Gender Action Plan in July, 2019.

a. RECOMMENDATIONS

REC	*Recommendations*	*Responsible Entity/ies*	*Time frame*
A	*Category 1: Corrective actions for the design, implementation, monitoring and evaluation of the project*		
A.1	*Close the final reports for each of the beneficiary companies*, specifying the benefits obtained. Hold individual closing meetings, even virtually.	Project team	Before project closure
A.2	*Make final arrangements for the MRV*, including: (i) filtering by company size; (ii) typology of project financing (add green loans, leasing/renting; bank or supplier name); (iii) include data from the 70 linked companies in regions; (iv) homologation of MRV with the National GHG Emissions Reduction Registry (RENARE) and ensuring information synchronization between platforms.	CAEM	Until March, 2021
A.3	*Deepen communications and knowledge management*, including: (i) visibility of the project's results and the Methodological Guide on the websites of strategic partners; (ii) project's success stories; (iii) success stories of financing (bearing in mind that, independently of the project, some 200 SME have received green financing in Colombia to date).	Project team	Before project closure
A.4	*Institutionalize the two main training modalities piloted during the project*, online (making available the materials already elaborated) and diploma (or postgraduate), to be in charge of a university or consortium of universities, with the participation of representatives of beneficiary companies sharing their experiences. Some characteristics to consider would be to: (i) carry out training before starting in-company activities and as a program participation requirement (consider the possibility of "cohort" formats); (ii) expand online training to more companies´ employees; (iii) integrate the training with the energy efficiency diagnosis and with the monitoring of indicators (to transfer responsibilities to the company), offering more management tools, for example, of self-diagnosis.	CAEM	Until March, 2021
B	*Category 2: Actions to continue or reinforce the initial benefits of the project*		
B.1	*Specify how CAEM´s role will evolve within the framework of the Sustainability Plan being drawn up, moving from being a "competitor" to being a "driving force" or "catalyst".* Consider roles related to the elaboration of tools and studies, to the empowerment of other stakeholders (certifying role) and not so much to perform "direct consultancy" to companies. *Define a business model for CAEM* that considers recommendations B.2 to B.4.	Project team and CAEM	Before project closure
B.2	*Define specific value propositions for each type of stakeholder:* (i) *company owners and senior management*, considering: (a) providing tools for investment decision making, (b) introducing elements of self-management, being able to give continuity to efforts or participate in training activities (following co-payment principles), (c) involving them in high-level activities of their specific interest (conferences on regulations, demonstration of experiences; with speakers of the highest level), (d) elaborating an instructive on commercial banks that provide green loans and their financing conditions, (e) going beyond energy efficiency, including: asset and risk management, operational excellence; (ii) *company staff responsible for energy or environmental management*, considering increased training to be able to handle their own data (expanding the implementation of energy	Project team and CAEM	Before project closure

REC	*Recommendations*	*Responsible Entity/ies*	*Time frame*
	management systems under the 50001 standard); (iii) *technology service providers,* considering: (a) giving them formal recognition (perhaps similar to awards for companies); (b) giving them a certification seal, publishing the complete list of providers, along with their references and success cases; (iv) *financial service providers*, considering: introducing financial modelling logic for major investment projects, guided by Bancoldex (e. g, for investment higher than USD 30,000); (v) *all stakeholders*, considering: making more business rounds, with specific themes and now in virtual mode.		
B.3	*Explicitly consider the pandemic situation, and how it will affect the business model's assumptions, understanding government's priorities to reallocate resources and seeking synergies with them (emphasis on SME and supply chains).*	Project team and CAEM	Before project closure
B.4	*Evaluate possibilities of scaling up at national level based on own experience and other initiatives´ experience*, considering: (i) replicating "the CAEM model" with strong agents in the territory, such as business chambers (e.g. Medellin), Technological Development Centers, Productivity Centers, 4th. Industrial Revolution Centers (Antioquia), university research groups; (ii) replicating the experience with the CAR (including its important economic commitment) to other environmental authorities in departmental territories of the country, training and certifying local technical teams; (iii) certifying internal and external professionals to companies and from university laboratories, with the possibility of developing a national database of professionals, similar to the "National Base of Extensionists" of the Colombia Productiva's Productivity Factory; (iv) complementing the model that UPME-UNIDO are using to scale up through PEVI Centers (Industrial Assessment Program) modeled from DOE's Industrial Assessment Centers, USA; (v) relying on large companies, as multipliers of effects and with willingness to pay, considering possibilities such as: (a) "Replicating companies", which are committed to training other companies as a form of payment, (b) projects in the value chain, where a large company coordinates interventions for its suppliers, (c) projects for corporate groups, (d) include additional elements such as introduction and/or strengthening of gender policies, social environmental responsibility, triple impact.	Project team and CAEM	Before project closure
B.5	*Establish a clear and sustainable pricing policy*, considering: (i) defining values or prices for technical assistance, with discounts that take into account factors such as: size of the company and number of free technical assistances received previously; (ii) defining an increase payment scale, which may include full payment for the services based on the results obtained, which will align the incentives of all participants, including follow-up; (iii) defining a co-payment for the trainings, as used by the Chamber of Commerce of Bogota in its own trainings.	Project team and CAEM	Before project closure
C	*Category 3: Future directions that emphasize the project's main objectives*		
C.1	*Agree on a long-term vision with key actors that considers:* (i) *defining a model of institutional sustainability that goes beyond the CAEM*, taking into account models such as: (a) agency of public-private nature, taking lessons from the Chilean Agency of Energy Sustainability, (b) the project of Electric Mobility of Colombia as a possible example to follow; (ii) *defining avenues of innovation,* going beyond technological modernization: co-generation of energy, technological changes, more aggressive introduction of renewable energies; (iii) *integrating actions to existing programs of environmental excellence,* such as those of the CAR and PREAD of Bogota; (iv) *defining a model of financial sustainability*, including: (a) a better "division of labor" between Bancoldex and the commercial banks for lending using green credit lines; (b) the possibility of lowering the cost of bank guarantee funds for SME; (v) *facilitating access to fiscal incentives* by: (a) simplifying access procedures and consolidating the legal framework, transferring all remaining procedures in the ANLA to the UPME; (b) strengthening UPME's staff; (c) considering the possibility of delegating part of the documental review to CAEM.	CAEM with key actors, such as the Ministry of Environment, MINCIT, Colombia Productiva, Bancoldex and UPME	Until March, 2021
C.2	*Manage inter-institutional alliances to achieve the agreed vision*, defining a continuous work agenda among the key actors to improve regulations and develop capacity in banks, companies and technology suppliers, including (i) the organization of an annual conference on energy efficiency and related issues as a way to continue mobilizing the business community; (ii) the integration with or extension of the know-how developed by the project to different MINCIT initiatives or programs such as productive chains, competitiveness agreements, clusters and regional agendas; (iii) the exploration of deeper alliances with universities, as partners in the territory in different roles: (a) training, (b) technical assistance agents (academic experts	CAEM, Bancoldex, Colombia Productiva	Until June 2021

REC	*Recommendations*	*Responsible Entity/ies*	*Time frame*
	accompanying technical teams), (c) solution of technical problems and development of equipment for SME, (d) deepening the collaboration with EAN for the commercialization of the prototype already developed.		
C.3	*Develop studies and tools to support the achievement of the vision*, considering as possibilities: (i) elaboration of recommendations to improve regulations and legislation; (ii) technological surveillance on energy efficiency and the use of clean energy; (iii) study on the operation of ESCOS in Colombia, considering the case of Bancoldex's financing for clinics and hospitals where it paid for results in energy savings; (iv) common online tool for monitoring and measurement at the national level that serves two purposes: (a) to track energy consumption, savings and production within the company, with the generation of graphs and indicators automatically, (b) automatically report key indicators to the MRV / RENARE system; (v) electronic platform for challenges and solutions or open innovation, with the participation of companies, suppliers, universities and financiers.	CAEM, Bancoldex, Colombia Productiva	Until December, 2021

b. BEST AND WORST PRACTICES TO ADDRESS ISSUES OF RELEVANCE, PERFORMANCE AND SUCCESS

235. There is a trade-off between defining requirements for the participation of beneficiaries and facilitating their participation in the project. If the participation and results targets are ambitious, then chances are that not much will be demanded from beneficiaries in return for their participation, as the priority will be to "add up" beneficiaries. For example, this project showed that important elements for the sustainability of its results are training and co-payment for services received. These two elements should be mandatory in future projects.

236. This project further demonstrates that a pilot can be flexible and begin experimenting scaling up or replication actions during its execution, provided early results are shown and strategic alliances are cultivated with proactive and empowered partners, whom can take prompt budgetary and operational decisions.

237. Finally, and although this is commonly accepted knowledge, it is important to emphasize the key importance of choosing an implementing agency with a solid track record, strongly aligned with project's objectives and with high human and operational capacities.

8. ANNEXES

Annex A: Annexes Document

Annex 1: ToR

Annex 2: Mission itinerary

Annex 3: Inception Report

Annex 4: List of persons interviewed

Annex 5: Summary of field visits

Annex 6: List of documents reviewed

Annex 7: Evaluation question matrix

Annex 8: Audit trail

Annex 9: Enterprise survey questionnaire

Annex 10: Signed evaluation consultant agreement form

Annex 11: Recommendations from beneficiary companies

Annex B: Systematization of the enterprise survey results

Annex C: Tracking Tool