

Funding Proposal

FP 063: Promoting private sector investments in energy efficiency in the industrial sector in Paraguay

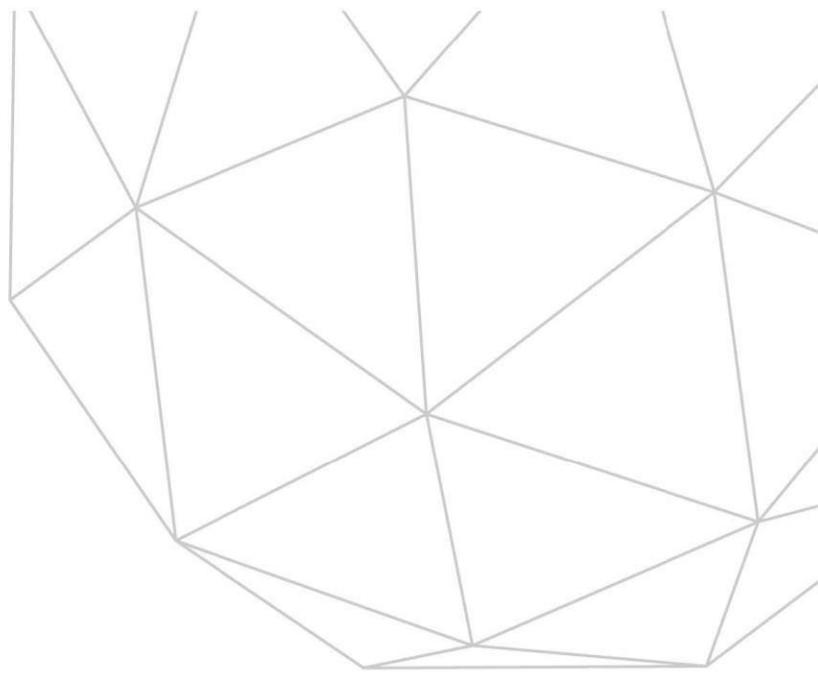
Paraguay | Inter-American Development Bank (IDB) | Decision B.19/12

16 March 2018





GREEN
CLIMATE
FUND



Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: **Promoting private sector investments in energy efficiency in the industrial sector in Paraguay**

Country/Region: Paraguay

Accredited Entity: Inter-American Development Bank (IDB)

Date of Submission: November 14, 2017

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Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“[FP]-[Agency Short Name]-[Date]-[Serial Number]”



LIST OF ABBREVIATIONS

AFD	Agencia Financiera de Desarrollo de Paraguay
ANDE	National Electricity Authority
EE	Energy Efficiency
ESI	Energy Savings Insurance
ESTP	Energy efficiency services and technology providers
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GWH	Gigawatt/hour
IDB	Inter-American Development Bank
LFI	Local Financial Institution
MRV	Monitoring, Reporting and Verification
NAMA	National Appropriate Mitigation Actions
NCCP	National Climate Change Plan
NDA	National Designated Authority
NDB	National Development Bank
NDC	Nationally Determined Contribution
NDP	National Development Plan
OR	Operational Regulations
SME	Micro, Small and Medium Sized Enterprise
STP	Secretaria Técnica de Planificación
TCO ₂ EQ	Tons of Carbon Dioxide equivalent
TNC	Third National Communication
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title	Promoting private sector investments in energy efficiency in the industrial sector in Paraguay	
A.1.2. Project or programme	Project	
A.1.3. Country (ies) / region	Paraguay	
A.1.4. National designated authority (ies)	Secretaria Técnica de Planificación (STP)	
A.1.5. Accredited entity	Inter-American Development Bank (IDB)	
A.1.5.a. Access modality	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
A.1.6. Executing entity / beneficiary	Executing Entity: <ul style="list-style-type: none"> • AFD (<i>Agencia Financiera de Desarrollo</i>) for Component 3 (Loan component) • IDB for Component 1 and 2 (Grant components) Beneficiaries: Micro, Small and Medium Enterprises (SMEs) in the industrial sector and Ministry of Energy of Paraguay	
A.1.7. Project size category (Total investment, million USD)	<input type="checkbox"/> Micro (≤ 10) <input checked="" type="checkbox"/> Small ($10 < x \leq 50$) <input type="checkbox"/> Medium ($50 < x \leq 250$) <input type="checkbox"/> Large (> 250)	
A.1.8. Mitigation / adaptation focus	<input checked="" type="checkbox"/> Mitigation <input type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting	
A.1.9. Date of submission	14-07-2017	
A.1.10. Project contact details	Contact person, position	Gloria Visconti, Climate Change Lead Specialist / Maria Netto, Lead Capital Markets and Financial Institutions Specialist
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	Telephone number	+1 202-623-3390 / +1 202-623-2009
	Mailing address	1300 New York Avenue NW, Washington DC 20577, USA

A.1.11. Results areas <i>(mark all that apply)</i>	
Reduced emissions from:	
<input type="checkbox"/>	Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
<input type="checkbox"/>	Low emission transport (E.g. high-speed rail, rapid bus system, etc.)
<input checked="" type="checkbox"/>	Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
<input type="checkbox"/>	Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)
Increased resilience of:	
<input type="checkbox"/>	Most vulnerable people and communities (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
<input type="checkbox"/>	Health and well-being, and food and water security (E.g. climate-resilient crops, efficient irrigation systems, etc.)

- Infrastructure and built environment
(E.g. sea walls, resilient road networks, etc.)
- Ecosystem and ecosystem services
(E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

1. In Paraguay, micro, small and medium-sized enterprises (henceforth SMEs for simplicity) have an inadequate access to medium and long-term finance to narrow technology gaps and boost productivity and growth. This inadequate financing access, coupled with the limited transmission network to access sources of affordable and readily available hydroelectricity, has restricted SMEs in key energy consuming sectors to develop energy efficiency investments projects, including: (i) the exchange of old equipment with new efficient equipment that reduces use of firewood, biomass and other fossil fuels ; (ii) the exchange of old equipment with new efficient equipment that replaces use of firewood, biomass and other fossil fuels by electricity from hydropower; and (iii) the retrofit of equipment with new efficient equipment that reduces use of firewood, biomass and other fossil fuels.
2. Access to these investments¹ could reduce energy consumption from non-renewable energy source, mainly biomass, and reduce greenhouse emissions by about 4 million tCO₂eq over the project's lifetime, in addition to promoting increased SME productivity gains. GCF reimbursable funding will help increase medium and long-term financing for energy efficiency (EE) projects in SMEs by supporting the structuring of financing mechanisms and instruments and improve local financial institutions (LFIs) and SMEs' local technical capacity and knowledge on EE investments. Thus, GCF funding will increase energy efficiency in the SMEs industrial sector, with reduced GHG emissions through diminished demand of non-sustainable biomass and other fossil fuel energy sources.
3. GCF funding will be channeled through a sovereign-guaranteed loan from the Inter-American Development Bank (IDB), according to its own policies and procedures, to the *Agencia Financiera de Desarrollo* (AFD), a second-tier national development bank (NDB). The GCF reimbursable resources, which will be maintained in a dedicated account, will be blended with AFD's own resources in order to provide a concessional line of financing available to first-tier local financial institutions (LFIs) so that they can, in turn, offer financing at adequate terms and conditions to SME firms interested in adopting eligible EE measures. And will support the Energy Ministry in enhancing the execution of its policies and legislation aimed at reducing the use of fuel wood and promoting the uptake of standards and technologies to ensure an efficient and sustainable use of biomass.
4. The GCF reimbursable resources will be blended with AFD's own resources to provide a concessional line of financing for first-tier LFIs so that they can, in turn, offer financing at adequate terms and conditions to SME firms interested in adopting eligible EE measures. The economic and financial analysis of the project show the project has an economic rate of return of 136% with a social cost of carbon of USD 62/tCO₂, and a financial return of 74%.² The project is aligned with Paraguay's National Development Plan 2030³, National Energy Policy, National Climate Change Plan, National Climate Change Policy and the National Determined Contribution⁴, where improvement of energy efficiency is one of the strategic areas included under those policy guidelines. The project design has taken into consideration the input of stakeholders, as they have been fully consulted and the NDA has issued a Letter of Non-Objection.

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	15/10/2017
Expected financial close (if applicable)	Not applicable

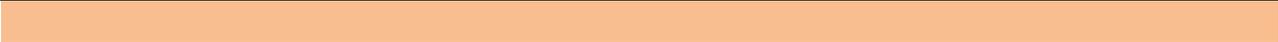
¹ The change to electricity using equipment is subject to the financial viability of each sub-project, which strongly depends on the ratio between firewood and electricity. to the financial viability of each sub-project, which strongly depends on the ratio between firewood and electricity price. Under the current short to medium-term scenarios (2-3 years) the financial viability this ratio remains unfavourable to electricity. Therefore the credit line finances the aforementioned activities to facilitate a transition to efficient electricity using equipment by bridging the change through efficient equipment investments and retrofits in fire-wood using equipment's

² The financial IRR is stable against a variety of market changes, with the lowest IRR being above 50%.

³ <http://www.stp.gov.py/pnd/wp-content/uploads/2014/12/pnd2030.pdf>

⁴ The IDB is preparing two projects for the GCF as part of its broad strategy to assist Paraguay to achieve its National Determined Contribution (NDC) targets. Support will be made through investments in: (1) in energy efficiency for the industrial sector (this project proposal) and (ii) resilience to climate change in depressed urban areas of Asuncion. These actions are prioritized in Paraguay's NDC, which commits GHG emission reductions of at least 20% compared to the business as usual scenario by 2030. Per the above approach, a separate Funding Proposal will be submitted for an adaptation program focusing on riverside and urban development resiliency in Asuncion's historical downtown district.

Estimated implementation start and end date	Start: <u>15/04/2018</u> End: <u>15/04/2023</u>
Project/programme lifespan	5 years



B.1. Description of Financial Elements of the Project / Programme

5. The Project involves the financing of energy efficiency investment projects in industrial SMEs for a total amount of USD 57.05 million, including USD 23 million of GCF funds, of which USD 3 million in grant resources, USD 20 million from AFD and an estimated USD 14.05 million of SME equity investment.⁵ To that end, GCF resources will be used to support the structuring of financial instruments and non-financial mechanisms required to build trust among SMEs and first-tier LFIs on EE investment projects, enhance knowledge on the benefits of EE measures, and develop a pipeline of technically-robust, bankable EE projects. GCF resources will be intermediated by the IDB to AFD, under a sovereign guarantee granted by the Republic of Paraguay.
6. The project applies the Energy Savings Insurance (ESI) model experience of IDB with National Development Banks (NDBs) (see the *Global Innovation Lab for Climate Finance* Annex XI) that is currently being piloted in several countries in LAC, including Colombia and Mexico for promoting EE investments⁶. The ESI approach has been approved by the GCF Board B.13 for BANDESAL, the National Development Bank of El Salvador.⁷
7. **GCF non-reimbursable resources**⁸ will support AFD to address real or perceived risks and barriers that are currently preventing EE investments by SMEs, and include:
- Developing and elaborating a financing strategy, including the financial instruments and non-financial instruments to help originate and fulfill the demand for financing EE investments by SMEs⁹;
 - Engaging LFIs in the deployment of the new financial instruments and create awareness on the multiple benefits of these type of operations;
 - Identifying and engaging technology providers and other key market stakeholders to support the demand for financing through the development of technically-robust, bankable projects whose benefits are measurable and able to be monetized ex ante;
 - Developing standards and mechanisms for adequate monitoring, reporting and verification of energy savings and GHG emissions reductions or avoidance resulting from the support to EE investment projects in industrial firms including SMEs; and
 - Supporting the Energy Ministry in developing actions to enhance the execution of its policies and laws for the reduction in the use of fuelwood, updating the information available on the subject, enhancing monitoring of the evolution of biomass consumption, identifying opportunities for improve efficiency of biomass use and facilitating the transition to more sustainable alternative sources.
8. **GCF reimbursable resources** will support AFD in:
- Deploying a credit line to ensure that long term financing is available in the market, that in conjunction with the risk sharing instruments to be deployed with support from the non-reimbursable activities, would result in an integrated strategy to promote LFIs further engagement in financing EE SME projects, developing an EE market niche, and finance eligible EE private sector investment projects in Paraguay's economy.
 - This activity will be financed through a sovereign guaranteed loan channeled by IDB to AFD, which in turn will make credit lines available through LFIs (second tier program) to SME EE projects. These resources are expected to eventually mobilize/leverage further private sector investments in EE in Paraguay.
9. Instruments to be used by the Project to address barriers include blended loans to soften the terms and conditions of the financial package (i.e. lower interest rates, longer tenors) to overcome high up-front costs and longer payback periods and insufficient information for decision making by SMEs.

⁵ The Financial Model (Annex III) estimates that 26% of total investments will be leveraged by SMEs equity. Equity participation comes from the LFI standard requirement to their clients to add at least 20-30% equity. If the SMEs are unwilling to contribute the required equity, the LFIs' risk management system would not allow to finance these projects.

⁶ The projects in Colombia, with Bancoldex, and in Mexico, with FIRA, have launched their respective ESI credit lines. As of March 2017, the Mexican programme has validated eleven technology service providers, is in the project validation for three projects and about USD 1.9 MM investment volume, and expects thirty projects to be financed in 2017. The Colombian programme is currently in the promotion phase and expects at least 6 projects for a potential of USD1.2 MM to be financed by the end of 2017.

⁷ See GCF project in [El Salvador](#) (BANDESAL).

⁸ The GCF grant activities are supported by additional donor grant co-finance for AFD by the Germany's International Climate initiative of the German Ministry of Environment and Buildings which complements the establishment of an enabling environment and project support activities.

⁹ It is important to note that potential demand for credit undertaken by IDB has considered the existing appetite of firms to take credit to invest in technology improvements that result in energy efficiency. This appetite for finance is determined by the cost of energy as well as on other benefits such as the potential productivity gains and modernization improvements that SMEs are expected to pursue with technological changes. Better equipment will allow for example energy-intensive brick producers to generate more and better quality end-products and thereby access a wider end-user market resulting in additional revenue gains.

10. Non-financial barriers such as lack of awareness of business opportunities, insufficient technical capacity, and entrenched behavioral patterns will be addressed through the combination of technical assistance, financed projects, and financial incentives such as preferential interest rates, grace periods and longer tenors.

11. Leverage is defined as the co-financing offered by AFD and the ratio of AFD finance to private investments in EE projects. The leverage ratio is expected to be at least 1:1. This ratio has been estimated based on the IDB's experience in supporting similar programs. In addition, project developers and SMEs are often required to provide a ratio of additional investments or equity often corresponding to additional 20-30% (AFD portfolio average 26%) of the total investments. The proposed Project is expected to develop the capacities to develop a new line of business in the financial sector. Also, it should support the development, diffusion and dissemination of information on new risk mitigation products, such as standard contracts, and methodologies for monitoring, reporting and verification.¹⁰ These efforts will be carried out in coordination with existing initiatives and organizations. These capacity building efforts should help economic actors at all scales to prioritize EE investments as part of their priority investments. They should also help LFI to build their knowledge and experience of the risk/return profile associated with this type of project. Together, these capacity building efforts are expected to create a business environment in which both SMEs and LFIs see EE investments as an attractive business opportunity and start to actively promote the adoption and financing of EE measures to their potential SME clients.

12. **Financing scheme.** The IDB, in its capacity as Accredited Entity of the GCF, will provide a USD20M loan (to be repaid in 20 years). These loan resources will be blended with GCF funds of a USD 20 M loan (with the same tenor as the IDB funds) and supported by a USD 3.0 Million non-reimbursable grant to AFD and the Energy Ministry. All funds will be channeled through the IDB, in its capacity as a GCF accredited entity. Without the combination of GCF loan and grant resources, it would be very difficult to promote EE investments due to the aforementioned barriers, despite suitable project IRRs. Given that financial constraints result from the scarcity of long-term financial resources -due to the current structure of the financial system in Paraguay-, the availability of long-term finance at adequate conditions, to be provided by this project, has a key role in making investments in EE projects feasible, in particular for SMEs.

13. The proceeds of the GCF 20-year loan will be blended with an equivalent amount of AFD's own resources to structure and establish a dedicated concessional financing line to be made available to first-tier LFIs in the local credit market so that they would have the incentive to, in turn, offer sub-loans at medium and long term maturities required for the payback period of EE technologies and concessional conditions to firms, in particular SMEs interested in investing in EE technologies in selected key sectors and economic activities.¹¹ In order to also ensure higher participation of industrial firms in the program, the medium and long term financing will be complemented by project and pipeline development resources in addition to capacity building and awareness raising activities. The grace and maturity periods of the sub-loans will be established taking into account the costs and returns of appropriate technologies, ensuring that those periods are sufficiently long so as to allow the monetized energy savings to cover loan servicing obligations of the SME.

14. Also, the concessional nature of GCF loan resources will reduce the risk for LFIs to participate in EE investments with SMEs.¹² Usually, SMEs lack credit access, as they are perceived as riskier clients by LFIs. At the same time, EE projects is a new area for LFIs, that is also perceived as riskier investments, for which the spread is higher, as these investments have a longer payback period. The concessional nature of GCF loan resources will reduce for LFIs these perceived risks. That would allow LFIs to finance EE investments to SMEs, sustaining the long-term goal of creating a local market for EE investment. LFIs would be able to pass GCF concessional nature onto final beneficiaries through potential lower interest rates and longer maturity terms than those currently offered in the market to stimulate EE investments and hence generate a powerful demonstration effect in the local credit market. An example of the estimated interest rates is presented in section E.6. The IDB will ensure the appropriate monitoring and application of the GCF's concessional nature. IDB will also require that corrective measures to be specified in the OR in case of non-compliance with the Project requirements will be

¹⁰ The project promotes primarily energy efficiency. Each project will apply a MRV methodology that measures the baseline consumption in the base fuel and compare with the consumption of the equipment to be installed. The methodology enables to monitor how much the actual consumption with the project is and calculate how much the consumption would have been without the sub-project. If the sub-project involves a fuel-switch, the methodology enables the calculation of how much of the particular fuel (electricity, wood, fuel oil) the industrial entity would have consumed. Based on this data, indicative reductions in fuelwood consumptions can be extrapolated. While possible to measure, to be conservative, the project will not take these indicators into account in the impact monitoring (Section H.) as a) the project objective is not explicitly to reduce deforestation and b) this measure alone cannot guarantee a reduction in deforestation and would therefore be misleading. However, the project can report where a fuel-switch from wood is involved and what is the reductions of fuel wood use of the sub-projects. In addition, to ensure that the project has no adverse impact projects that would reduce use of firewood, but still rely on it, that these projects would have to show the firewood is from legal provenance and certified sources which exclude eucalyptus monocultures as a criteria for accessing credit from AFD, which will be further monitored.

¹¹ The only information on existing credit lines for targeted sectors is for the grain industry, where there is credit for improved production (i.e. machinery, inputs, etc.), but not EE. In that segment, the range of loan tenor is between 4-9 years. The goal would be to increase the loan tenor to a range of 6-9 years.

¹² The Project provides long-term tenors with adequate rates and technical assistance to incentivize LFIs to experiment with this new business and to create a track record to justify the inclusion of energy efficiency operations in their standard practices by convincing the LFIs' risk management team that these loans are low risk.

undertaken by AFD. The reporting will differentiate between the rate provided from IDB to AFD, from AFD to LFI and from LFI to end-beneficiaries.

15. **Standardized performance contract.** There is virtually no EE market in Paraguay, and there are no clear and established processes and contractual arrangements on how to assess and implement projected energy savings - and subsequently allocate the risks to market actors best able to manage these risks related to achieving those savings. The proposed Project introduces a contractual arrangement between a potential client (e.g. SME) and an energy efficiency services and technology providers (ESTP) in which the risks associated with achieving the future energy savings are transparently and efficiently shared by both parties in the contract. The contract provides a performance guarantee mechanism through a contractual retention (around 25%) that is deducted from the total value of the project to be paid to the ESTP and retained by the client until the ESTP demonstrates that the contracted energy savings were realized. A standardized contract not only gives confidence to the SME that the ESTP will deliver the contracted energy savings but also provides the ESTP with the incentive to deliver the contracted energy savings. Furthermore, the existence of a standardized contract allows LFI to process loan applications in a standardized manner, reducing not only their transaction costs but allowing them to develop standardized approaches to assess the risks associated with EE projects.

16. **Energy savings Insurance (ESI)**¹³. As highlighted in the Global Innovation Lab for Climate Finance Analysis (Annex XI) and the EE Project Evaluation and Implementation Flow (Annex XIII), and already piloted in other countries, a financial risk mitigation instrument in the form of a surety that partially covers the energy saving commitment made by the ESTP under the contract would help to minimize the performance risk of the project for industrial firms and their potential financiers. To that effect, local insurance/surety firms will be engaged in the program, and these firms are likely to reinsure their policies with international re-insurance companies. The insurance has a similar expected positive effect on the trust and on the access to finance barrier as the standardized contract. The ESI mechanism promotes financing for energy savings projects where end-beneficiary clients (SMEs) repay the project loan through the monetized energy savings of the project. A standard performance contract will be established between a technology service provider and an end-beneficiary client, which contemplates a retention fund to be managed by an insurance company. The inclusion of the retention fund means that only part of the 100% of project costs for the exchange of inefficient with efficient equipment will be paid by the client to the technology service provider. A share of the project costs go into a retention fund managed to be managed by the insurance company. The retention fund will be paid out to the technology service provider once energy savings have been realized and thus the TSP complies with its promises. If there is a lack of energy savings, the share of the retention fund will be paid to the client to cover the lack of energy savings. If the lack of energy savings goes beyond the coverage of the retention fund (first loss), the insurance that has been signed at the beginning of the project pays the remaining share to cover the lack of energy savings.¹⁴ The grant will enable to support the surety company to structure a suitable market product based on an additional business line to their project surety products. The insurance company relies on the technical due diligence of the third-party validator, while the insurance company does conduct their own financial due diligence of the TSP companies to be covered.

17. **Validation and verification mechanisms.** Independent validation procedures will be carried out by an independent third party with strong credentials on EE normalization and certification processes. Its role will include: a) validation of the ability of each EE sub-project to deliver expected and contracted energy savings; b) validation of the capacity of the ESTP to realize the contracted EE sub-project and to realize necessary service; c) verification that the equipment has been installed according to the EE project proposal (under a)) and that the old equipment has been properly decommissioned and disposed of to avoid GHG emissions leakages and other negative environmental impacts; d) verification of realized energy savings; and e) arbitration in case of conflict between the SME and the ESTP on the actual energy savings. The validation¹⁵ mechanism provides the investing firm as well as the LFI with the assurance and trust that the energy savings proposal or the reduction of non-renewable biomass use is attainable, that the technology provider has adequate capacity, and that potential conflicts on the project's energy saving performance would be solved through arbitration by an independent, technically qualified party. This assurance is expected to increase the willingness of SMEs and LFI to invest in and finance EE projects, respectively. It is important to note that the design of the formats, protocols and methodologies which will be developed by the independent technical validator for each of the technologies

¹³ The ESI mechanism is a set of instruments consisting of a standard contract (paragraph 15) with a contractual retention, validation methodologies and activities (paragraph 17), and the insurance (paragraph 16). The retention can be structured as an escrow account, as an individual and as a pooled retention fund which sits with the insurance company. The costs and legal requirements of each of these options varies. In the economic and financial analysis, we contemplate a conservative high cost of 5%, which in reality should be lower.

¹⁴ See also Annex XIV Energy Service Insurance Project Flow diagram cycles and Engagement phases of Market actors.

¹⁵ AFD will choose the institution in coordination with IDB and according to the procurement plan in Annex IX. The main criteria that are taken into consideration in the selection include: technical capabilities to work with the relevant ISO standards; National presence and capacity to deliver services in all relevant regions in Paraguay; and independence and privately managed to avoid delays and conflicts of interest.

eligible under the program, with feedback from AFD and the IDB will be based on international best practices and standards, and, as applicable, on the technical regulations on EE for those technologies in Paraguay at the outset of the Project.

18. **Capacity building.** The proposed Project is expected to develop the capacities of ESTPs to develop a new line of business, namely, the sale of guaranteed energy savings rather than just the sale of technologies. Also, the Project is expected to support the development, diffusion and dissemination of information on new risk mitigation products, such as standard performance contracts, monitoring, reporting and verification methodologies, and insurance products, among relevant stakeholders.

19. **Marketing strategy.** A key aspect of making EE markets take off is to raise awareness and engage key actors in EE opportunities. Potential investors (industrial firms, in particular SME clients), LFIs and ESTPs are targeted, and initially connected to facilitate subsequent market transactions. As part of the proposed project, an initial pipeline of technically robust, “bankable” EE projects will be supported to demonstrate the viability of the proposed financing strategy and attract the interest of market actors (ESTPs, LFIs, and SMEs). The marketing strategy addresses primarily the lack of prioritization for EE investments by SMEs. By connecting the relevant actors, it closes the information gap about the opportunities and realistic cost savings that EE investments allow and promotes an integral approach.

20. Looking to the medium term, given the potential energy savings expected to result from financed EE sub-projects, and the risk mitigation instruments developed through the proposed Project, Paraguayan economic actors -at different scales- and LFIs shall become more confident in investing and financing EE projects, respectively, paving the way for long term sustainability of investment projects and ensuring the transformational impact of the project beyond GCF, IDB and AFD support.¹⁶

21. **Co-financing.** Co-financing from the AFD (USD 20 million)¹⁷ directed directly for supporting the credit lines to LFIs, and ultimately, the SMEs. It is expected that, in the short term, the credit line from AFD (USD 20 million) would leverage at least an additional 26% in investments from SMEs’ own resources. In the paradigm-shift scenario, once LFIs and investors become aware of the real risks and returns associated with EE investments, each dollar in financing provided by AFD could leverage 1.6 dollars in private sector investments through LFIs co-financing and SMEs own resources.

22. **Grant Instrument.** Component 1, “Improved access to financial and non-financial instruments and operational mechanisms for financing EE investments by SMEs” (including technical assistance, training, methodology development, MRV systems, etc.) and Component 2 “Development of enabling institutional, policy and regulatory environments for EE investments” are needed and required to facilitate the disbursement of medium and long-term loans granted to EE projects in SMEs under Component 3. In other words, the preliminary interventions are necessary facilitators to channel the EE investments by SMEs. As facilitators, activities under Component 1 and Component 2 are linked to, and required for, the investment intervention under Component 3. The IDB will directly execute the Grant, of the Component 1 and 2, since it should focus on a number of highly complex technical inputs which would feed into specific project preparation requirements from both the IDB and the GCF.

23. IDB is already providing USD 500,000 in co-financing as Technical Assistance. In addition, AFD, as a public entity, will provide for the GCF Technical cooperation USD 460,000 in in-kind resources, counterpart resources will consist on staff time, facilities for the development of planned promotional workshops and events, and office space for the consultants supporting the design of the different products envisioned under the TC. The Energy Ministry will provide USD 140,000. This is in line with IDB practice by asking 20% in in-kind resources by Beneficiaries to ensure commitment. These numbers are reflected in the revised project Proposal.

24. The Project is technology-open, as long as energy efficiency improvements are achieved.^{18,19} An indicative allocation of project resources to the technologies that have been analyzed is provided below to support assumptions in terms of credit demand volumes are.

¹⁶ See Financial Model, covering the period from financial closing through final maturity of the proposed GCF financing with detailed assumptions and rationale, in Annex III.

¹⁷ See Co-Financing Terms and conditions details in Annex XV. The co-financing will be provided through an IDB loan.

¹⁸ The financing line will be open to energy efficiency projects in general and hence does not comprise only reduced use or fuel switch from biomass, but also potential reduction of use or fuel switch from other sources. The program is built to evolve in including additional technologies in the ESI package and develop the relevant validation methodologies as demand and opportunities arise from the market. The program team considers it key to (i) address the existing appetite for credit from SMEs identified in the market assessment; and (ii) build the capacity of technology providers to identify and structure bankable projects.

¹⁹ It is important to note that the credit-line will be disbursed based on market demand and so that these numbers are indicative. Furthermore, It is expected that financial viability for equipment utilizing electricity will be reached during the later half of the execution period. Currently the electricity price is higher than firewood price. This balance will be influenced by increases in the industrial price for electricity in the future. This is based on data of fuel wood price increases between 2008-2013, the identified supply gap in [Rios et al 2016](#), increasing transportation costs and distances to areas in Western Paraguay relative to the industrial areas in the Eastern Paraguay, the recent large increase in industrial electricity prices and related industrial policy. These estimates are conservative. However, to mitigate any risk of the price change not developing as projected the project foresees mitigation measures – see

Investment (USD)		Oven EE	Boilers	Drying EE	Co-Generation	Total	Total
Retrofit existing equipment (Wood as fuel)		720,000	420,000	-	-	1,140,000	54,310,000
Change to efficient equipment (Wood as fuel)		13,320,000	5,040,000	-	-	18,360,000	
Change to Electricity equipment*		9,360,000	4,200,000	9,250,000	-	22,810,000	
Replacement of fuel		-	-	-	12,000,000	12,000,000	
Total		23,400,000	9,660,000	9,250,000	12,000,000	54,310,000	

Financing (USD)		Oven EE	Boilers	Drying EE	Co-Generation	Total	Total
GCF		8,617,050	3,557,295	3,406,313	4,419,000	19,999,658	54,310,000
AFD		8,617,050	3,557,295	3,406,313	4,419,000	19,999,658	
Equity		6,165,900	2,545,410	2,437,375	3,162,000	14,310,685	
Total		23,400,000	9,660,000	9,250,000	12,000,000	54,310,000	

Firms		Oven EE	Boilers	Drying EE	Co-Generation	Total	Total
Retrofit existing equipment (Wood as fuel)		24	40	-	-	64	365
Change to efficient equipment (Wood as fuel)		72	120	-	-	192	
Change to Electricity equipment*		24	40	37	-	101	
Replacement of fuel		-	-	-	8	8	
Average Investment		195,000	48,300	250,000	1,500,000	148,795	

FRR@6Years		With GCF Concessionality				Without GCF Concessionality [despite suitable IRRs, projects are not happening]			
		Oven EE	Boilers	Drying EE	Co-Generation	Oven EE	Boilers	Drying EE	Co-Generation
Year 0	Retrofit existing equipment (Wood as fuel)	187.0%	7.0%			184.6%	4.8%		
Year 0	Change to efficient equipment (Wood as fuel)	34.5%	45.5%			32.4%	43.3%		
Year 3	Change to Electricity equipment*	41.7%	18.5%	33.2%		39.5%	16.4%	31.0%	
Year 0	Replacement of fuel				175.1%				172.7%

FIRR@6Years		With GCF Concessionality				Without GCF Concessionality [despite suitable IRRs, projects are not happening]			
		Oven EE	Boilers	Drying EE	Co-Generation	Oven EE	Boilers	Drying EE	Co-Generation
Year 0	Retrofit existing equipment (Wood as fuel)	159.8%	25.7%			110.9%	10.2%		
Year 0	Change to efficient equipment (Wood as fuel)	151.6%	149.9%			149.2%	147.6%		
Year 3	Change to Electricity equipment*	114.8%	74.4%	100.4%		112.5%	72.2%	98.1%	
Year 0	Replacement of fuel				199.6%				195.8%

Payback Period in Years		With GCF Concessionality				Without GCF Concessionality [despite suitable IRRs, projects are not happening]			
		Oven EE	Boilers	Drying EE	Co-Generation	Oven EE	Boilers	Drying EE	Co-Generation
Year 0	Retrofit existing equipment (Wood as fuel)	0.6	6.3			0.6	6.5		
Year 0	Change to efficient equipment (Wood as fuel)	3.6	2.8			3.8	2.9		
Year 3	Change to Electricity equipment*	3.0	5.3	3.7		3.2	5.5	4.0	
Year 0	Replacement of fuel				0.7				0.7

Emissions Reductions in tCO2e		With GCF Concessionality				Without GCF Concessionality [despite suitable IRRs, projects are not happening]			
		Oven EE	Boilers	Drying EE	Co-Generation	Oven EE	Boilers	Drying EE	Co-Generation
Year 0	Retrofit existing equipment (Wood as fuel)	10,867	3,675						
Year 0	Change to efficient equipment (Wood as fuel)	81,499	27,564						
Year 3	Change to Electricity equipment*	129,364	43,752	35,130					
Year 0	Replacement with bagasse				58,238.3				
Total		221,730	74,992	35,130	58,238				
Total				390,090					

25. The project budget presented for each Component and Activity is presented in Table B1.1.

Table B1.1. Project Budget by Component and Activity (in million USD)

Component	Activity	Amount (for entire project) (USD Mil)	GCF funding amount (USD Mil)
1. Improved access to financial and non-financial instruments and operational mechanisms to deploy them for financing EE investments by SMEs (grant - non-reimbursable funds)	1.1. Develop financial and non-financial instruments, including standard performance contract, insurance policy covering energy savings and validation methodologies to account energy savings	1.36	1.36

	1.2. Strengthen capacity of LFIs, ESTPs and validators for EE project development	0.44	0.44
	1.3 Implemented monitoring mechanisms of fuel wood price	0.30	0.30
2. Development of enabling institutional, policy and regulatory environments for EE investments (grant - non-reimbursable funds)	2.1 Promote an environment for enhancing the execution of the energy policies to reduce of use of fuel wood	0.70	0.70
3. Increased annual dollar amount of medium and long-term loans granted to EE projects in SMEs using the ESI strategy (sovereign guaranteed loan - reimbursable funds)	3.1 Increase second tier medium and long-term credit line for EE projects provided to SMEs in key industrial sectors	40.00	20.00
Project Management Unit (PMU)	The PMU will be Establishment at AFD dedicated for EE financing and project supervision - this is an integral part of Activity 1.1	0.20	0.20
Total Project financing		43.00	23.00

26. The budget breakdown by expenditure type (project staff and consultants, travel, goods and services) for the grant funding component of the project is presented in Table B1.2:

Table B1.2. Project Budget for Grant Component by Expense type (USD)

Expenses by type (Grant)	USD
Consultant services	2,465,000
Travel	132,400
Training, workshops, and conference	119,500
Materials and Supplies (includes publications)	82,200
PMU	200,900
Total	3,000,000

.2. Project Financing Information							
	Financial Instrument	Amount	Currency	Tenor	Pricing		
(a) Total project financing	(a) = (b) + (c)	43.0	million USD (\$)				
(b) GCF financing to recipient	(i) Senior Loans	20.0	million USD (\$)	(20) years () years	(0.75) %		
	(ii) Subordinated Loans	.....	Options				
	(iii) Equity	.....	Options				
	(iv) Guarantees	.....	Options				
	(v) Reimbursable grants *	.....	Options				
	(vi) Grants *	3.0	million USD (\$)				
* Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E .							
	Total requested (i+ii+iii+iv+v+vi)	23.0	million USD (\$)				
(c) Co-financing to recipient	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
	Senior Loans	20.0	million USD (\$)	AFD (IDB funds)	(20) years	(4.75) %	pari passu
	Equity	0 ^[a]	million USD (\$)		() years	() %	Options
	Options	.....	Options	.....	( ) years	() % IRR	Options
	Options	.....	Options	.....			Options
	Lead financing institution: AFD						
[a] The Financial Model in Annex III estimates that 26% of total investments will be leveraged by SME equity participation based on data from AFD's current portfolio. Equity participation comes from the LFI standard requirement to their clients to add at least 20-30% equity. If the SMEs are unwilling to contribute the required equity, the LFIs' risk management system would not allow to finance these projects.							
* Please see Annex IV for AFD's letter of commitment issued for its co-financing commitment.							
(d) Financial terms between GCF and AE (if applicable)	In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped. If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.						
	Financial instrument	Amount	Currency	Tenor	Pricing		
	Choose an item.	.....	Options	() years	() %		

Please provide a justification for the difference in the financial instrument and/or terms between what is provided by the AE to the recipient and what is requested from the GCF to the AE.

B.3. Financial Markets Overview

27. **General Overview.** Paraguay's financial system consists of 16 banks and 13 finance companies.²⁰ Bank assets (US\$19.2 billion) as of December 2014, accounted for 95% of total system assets. Paraguay's financial system is relatively liquid but lacks depth. Of those US\$19.2 billion in bank assets, US\$13 billion (69%) are in the loan portfolio. Agriculture and livestock receive a little bit more than a third of all bank loans (34.4%), given the importance of that sector in Paraguay's economy. The remaining 65.4% is distributed between wholesale commerce and services (31.3%), consumption (15.3%), industry (10.4%) and financial system (7%). Consumer lending has risen steadily in recent years as a result of the recovery in the domestic economy.

28. Paraguay's financial system is dominated by commercial banks. The main components of the system are: (i) banking institutions, which account for about three quarters of total assets (76%); (ii) credit unions, with 19% of total assets; (iii) other financial institutions, with about 4%; and (iv) currency exchange offices, which account for the remaining 1%. There are also four nonbank state-owned financial institutions, including *Agencia Financiera de Desarrollo* (AFD), holding assets of about 2 percent of GDP. These institutions mainly fund their operations with transfers from the budget and loans from international development agencies.

29. **Lack of long term credit.** The principal indicators of Paraguay's financial system performance indicate that it has performed well in recent years. Despite its substantial progress, the financial system still has structural weaknesses that prevent it from meeting the demand for credit among domestic production sectors. The unmet demand for medium and long-term credit is particularly acute despite gradual increases in the loan portfolio of LFIs. Firms require considerably more financing than the amount effectively available in the financial sector.

30. Furthermore, an analysis of loan maturities in the financial system reveals that by the end of 2016, 39.3% of the portfolio is concentrated in loans of up to one year, 18.9% of one to three years, and longer-term loans (more than 3 years) account for 41.8% of the total. These indicators show an improvement from previous years, as long-term credit has increased from 28.2% in 2013 to 41.8% in 2016. Despite the improvements in the financial system, the deposit structure still restricts medium and long-term lending by intermediary LFIs both to individuals and businesses, as a way to control the risk of term mismatches on their balance sheets. By the end of 2016, 11.4% of deposits were for more than 3 years (up from 6.7% in 2013), 24.9% for 1-3 years and 63.7% of deposits for less than 1 year. The financial system does not meet the need for productive lending, especially long-term investment lending, defined as credit with maturities longer than one year. The financial sector offers less attractive instruments, adjusted for inflation and with variable rates, and long-term lending is scarce.

31. The lack of availability of long-term credit directly undermines firms' capacity to invest in new projects. The financing needs of Paraguay's private sector are equivalent to about 10% of GDP, of which only 4% is provided by the financial sector.²¹ This lack of investment translates into low competitiveness, especially for SMEs, which have very limited access to credit, face high transaction costs, and in many cases lack appropriate collaterals to comply with banking requirements. As these SMEs employ approximately 47% of the country's labour force, the lack of credit has a direct impact on creation on new employment, as insufficient investment funding has an impact in productivity, innovation, equipment obsolescence, and capital stock. In addition, there is usually an incompatibility between the time it takes for firms to see a return on longer-term investments and the structure of the conditions offered by the banking system, generating mismatches in loan amortization periods for those SMEs.

32. Comparatively, the ratio of liquid assets to total system assets is 31.3% for Paraguay, as compared to 20% for Latin America and the Caribbean. In keeping with their conservative risk management policy, and in line with the Central Bank regulatory guidance, the banks in the system have elected to maintain high liquidity levels, in part to prevent the deleterious effects of previous recurrent financial crisis. This liquidity, however, is generally only short-term, given the

²⁰ Finance companies differ from banks in that they have lower capital requirements, operate as financial intermediaries that do not offer checking accounts, and do not perform foreign trade transactions. AFD works with LFIs they accredit and lend to by assessing the LFIs' financial institution risk. AFD accredited 14 banks and 8 Finance companies (See <https://www.afd.gov.py/ifis>). Accreditation of local financial institutions is an annual process. Local financial institutions, which have not made the accreditation in the past have received technical assistance, for instance by the IDB's Multilateral Investment Fund (MIF). To receive finance from the proposed credit line, LFIs will present a portfolio of projects that they financed for rediscounting to AFD. Only projects that meet the conditions of the operational regulations to be concluded between IDB and AFD will be eligible. AFD as well as the LFIs are supervised by the Central Bank. The final lending conditions cannot be fixed and will be dependent on the credit risk of the final end-beneficiary and is subject to supervisory limits imposed by the Central Bank and the Superintendency of Banks.

AFD does thus cover a large set of local financial institutions and accreditation processes safeguard the financial health of AFD. Due to AFD's mandate to provide access to finance for SMEs, AFD aims at maximizing the set of SMEs served through financially healthy LFIs.

²¹ Centro de Investigaciones Económicas [Center for Economic Research] study, 2011

structure of the terms of deposits. Nevertheless, the supply of long-term funding remains very limited and is closely associated with long-term liabilities, most of which originate in first tier operations with AFD. Moreover, as an additional indicator of the scarcity of credit being provided by Paraguay's financial sector, domestic credit was 38.3%, compared to the Latin American regional average of 74.1% in 2013. Loans from private banks have an average total portfolio in arrears of 2.1%.

33. The main problem of SMEs in Paraguay is access to credit whose difficulties are related to the lack of enough collateral by SMEs to back up loans, high interest rates from LFIs, "excessive" information and documentation requirements which pose an entry barrier, high overall transaction costs, which is exacerbated by a lack of business plans by SMEs. It is worth noting that there is a high proportion of enterprises that operate informally and usually cannot satisfy formal requirements by financial institutions (see Annex II for more details).²²

34. Although there is a gradually increasing access to credit in the sector, the amounts allocated are scarce and are usually designed to finance working capital needs. Inadequate access to finance is a critical obstacle to narrowing technology gaps and boosting the productivity and growth of industrial firms both large and SMEs. Access to finance in Paraguay is limited by factors including: (i) the informal nature of economic activities among small- and medium-scale firms, making it difficult for them to furnish collateral; (ii) a lack of credit history that could be used to assess the risk for each producer; (iii) the highly-fragmented nature of the client base as regards SME.

²² The potential demand for credit undertaken by IDB has considered the existing appetite of firms to take credit to invest in technology improvements that result in energy efficiency. This appetite for finance is determined not only by the cost of energy, but also other factors such as the potential productivity gains and modernizations improvements that SMEs are expected to pursue with technological changes.

C.1. Strategic Context

Paraguay National Context

35. Executive Decree 6092 on **Paraguay's National Energy Policy** was signed on October 2016. The policy defines the country's energy mix in the short, medium and long-term (25 years) and acknowledges the importance of energy as a factor of economic growth, industrial development and social progress, as well as the basics of State policy-making geared towards tending for the energetic needs. The policy outlines EE as one of its prioritized objectives and states an Action Plan composed of ten (10) elements to encourage the growth of this sector including a plan to promote EE in industry and a program for the support in the improvement of technology, equipment and processes. The policy also states an Action Plan to ensure mobilization of capital for energy-related investments such as EE.

36. As part of the **National Development Plan 2014-2030** (*Plan Nacional de Desarrollo, NDP*), the Government of Paraguay supports economic diversification strategies and a strong public investment effort to alleviate binding infrastructure constraints. One of the pillars of the **National Energy Efficiency Plan** (2014)²³ is the implementation of programmes on the efficient and rational energy use, supporting the prioritization and development of specific measures in all sectors. Specifically, the Action Plan of the National Energy Efficiency Plan seeks to introduce EE measures in the use of steam and heat, focused on promoting cogeneration (technology innovation), promote technology improvements in equipment and processes (promoting measures of equipment substitution and modernization) to incorporate new technologies with higher efficiency levels, promote technical assistance and capacity building in EE project implementation and promote the implementation of energy audits and systems of energy management.

37. At the same time, the **Nationally Determined Contribution** (NDC) of Paraguay (2015) established a unilateral goal of 10% of national GHG emissions reduction by 2030 and an additional 10% conditional of access to climate finance by 2030. The NDC also refers to the diverse objectives proposed in the NDP, including, inter alia, the effective control of deforestation, increasing consumption of renewable energy, increasing efficiency in the agricultural system, and reducing deforestation and forest degradation, amongst other actions. Initiatives under development targeting climate change mitigation and energy efficiency also include National Appropriate Mitigation Actions (NAMAs) schemes.

38. To achieve the goals set under the NDC, Paraguay had developed a **National Climate Change Plan** and a **Mitigation Strategy** (2014), which includes among its strategic lines of action the following areas:²⁴ i) Promote EE measures and provide financial incentives and facilitate access to finance to those that foster renewable energy generation; ii) Strengthening institutional capacity to coordinate actions towards EE and sustainable use of energy; iii) Promote and adopt sector policies towards clean energy through measures oriented to private sector investment in efficient energy equipment; iv) Access to and mobilization of financial resources to improve energy systems including in the industry sector; v) Promote reforestation with energy purposes to diminish pressure on native forests in particular in the Eastern region.

39. As far as adaptation is concerned, Paraguay includes it as a priority in the National Development Plan 2014-2030, that will inform the design of the National Plan on Adaptation expected to be finalized by 2017. The NDC prioritizes adaptation actions in key sectors that are included in the proposed GCF package, such as land use planning, health and sanitation, risk management and natural disasters, and infrastructure.

40. Responding to some of the strategic priorities set up by the Government of Paraguay in the NDC related to Adaptation, the Government of Paraguay and IDB are preparing an additional Funding Proposal focusing on riverside and urban development resiliency in Asuncion's historical downtown district.

Energy Consumption

41. At the industrial level, Paraguay heavily relies on firewood and biomass waste as energy sources. This energy source represents approximately 83% of the energy consumed by the industrial sector in 2011 and averages 74% between the year 2013 and 2016²⁵. This is, in large part, an unsustainable

²³ Vice minister of Mines and Energy, 2014, National Energy Efficiency Plan.

²⁴ The new 2017 Third National Communication (TNC) to the United Nations Framework Convention on Climate Change (UNFCCC), in its mitigation section focuses on creating effective incentives for energy efficiency and renewable energy, technology transfer, as well as the adoption of policies for energy efficiency

²⁵ "National Energy Balance of Available Energy of the Republic of Paraguay [*Balance Energético Nacional en Energía Útil de la República del Paraguay*]", Itaipú Binacional, 2011. See also National Energy Balances 2013-2016. The fuel wood energy demand and the electricity supply centers are largely overlapping, while some facilities continue to be without electricity connection and will continue to be dependent on the use of fuelwood and agricultural residues. The Zero deforestation law applies to the Atlantic Forest in the East of Paraguay. The available data from the National Energy balances and cross-checking with IEA disaggregation tables, indicates that between the year 2013 and 2016, industrial and commercial facilities utilized 74% biomass (with almost identical shares for fuelwood and vegetal residues), 23% electricity, and 3% fuel oil. Total energy consumption has grown at an annual rate of 3.2%, while fuel oil consumption has grown at five times (9.6%), and electricity consumption has grown at more than three times (6.9%) the

42. energy use, as it is primarily supplied by non-sustainable systems of production since they originate from the deforestation of virgin forests. This biomass supply has been restricted by the new Zero Deforestation Law, that bars deforestation on the Oriental region of Paraguay (where most of the industrial sectors are located). That restriction has shifted deforestation to the Chaco region, affecting the supply of firewood, and increasing firewood prices.²⁶ Further increases in firewood prices are expected as new restrictions on deforestation in the Chaco region come into force in 2018. The use of hydroelectricity is relatively a small portion of the energy use in the industrial sector, despite its abundance.

43. One of the unique features of the Paraguayan economy is that a large portion of its energy matrix (approximately 70% of primary energy production) comes from large bi-national hydroelectric projects shared with Brazil and Argentina. Paraguay shares Itaipú (14,000 MW) with Brazil and Yacyretá (3,200 MW) with Argentina. At the same time, energy demand in Paraguay reached in March 2017 3,095 MW (2,476 MW (80%) from Itaipú, 528 MW (17%) from Yacyretá and 115 MW (3%) from Acaray),²⁷ and thus the country has substantial surpluses to comfortably supply its domestic market over the long term. However, until only a few years ago, high-tension transmission projects in Paraguay's economically active regions of Asuncion and the country's South-East corridor have been excessively delayed, which has been a barrier to benefit from this enormous potential. More recently, the Government has re-prioritized investments in the development of medium- and high-tension transmission networks, which would further increase access to hydroelectricity.

44. It is not only until very recently that the transmission systems that link Asuncion and the country's main economic activity areas with the large hydroelectric plants at Itaipú, Yacyretá and Acaray have been completed and operationalized. This means that there are generally no problems with electricity supply. Remaining difficulties are manifested primarily over the short term in the development of distribution grids with tensions below 66 kV, that is, in medium and low tension. The policy of growth and expansion of energy access in Paraguay is an objective of the current Government and its electrical utility company, and the National Electricity Authority's (ANDE) Master Works Plan is currently being implemented (covers the period through 2023), in which it is estimated that the country will have a robust electrical system that will allow it to supply future industrial clients in a competitive manner and with a high quality of service. ANDE's Master Works Plan foresees investments of US\$2.9 billion through the year 2018, reaching US\$5 billion in 2023, with financing from multilateral credit institutions. Investments in transmission and distribution can be significantly lowered by energy efficiency and distributed renewable energy solutions such as by the proposed Project.²⁸

45. It is also worth noting that Paraguay's energy efficiency potential is estimated at around 1000 GWh/year until 2023. To unlock this potential substantial private investment is necessary. Currently, 52% of total energy consumption is based on biomass (i.e. wood, bagasse) and 70% of industrial energy consumption is based on biomass (non-renewable biomass), often used very inefficiently, especially in SMEs servicing the domestic market rather than the more competitive international market. Reaching the country's full energy efficiency potential thus requires a well-designed financial strategy that incorporates in-depth analysis and reaches and coordinates with relevant actors to incentivize private investment in energy efficient projects.

46. The project seeks to capitalize in the supply of abundant renewable energy from hydropower, which is been made available through a reliable energy transmission network through current and planned government investments. This hydroelectricity will be made available to energy inefficient industries at lower costs, thus reducing the consumption of firewood by these industries.

annual growth rate of biomass consumption (1.8%). This indicates the partial availability of electricity in the fuelwood demand centers, the increasing acceptance of electricity as an alternative fuel, as well as the potential to fuel switch from fuelwood to vegetal residues alternatives or to electricity where possible. The proposed project aims at supporting this process.

²⁶ Firewood prices have increased around 580% between 2008 and 2017.

²⁷ Energy exports to Brazil accounted for 4,315 MW, 63% of total energy produced by the Paraguayan side.

²⁸ Currently industrial electricity costs are available at lower costs than firewood. In March 2017 industrial consumers faced a one-off 50% increase in electricity costs to enable ANDE to pay generation costs for Itaipu. The current peak electricity price expressed is USD 708 per ton of oil equivalent (~ USD 0.06/kWh). Peak time is between 5 PM-9 PM in the winter and starts/ends an hour later in the summer. Non-peak electricity is considerably cheaper at USD 289 per toe (~ USD 0.06/kWh). However, this is still currently more expensive than the price for firewood USD 112/toe (USD 33/ton of firewood). Based on historical price increases for firewood, increasing transportation distances and resulting costs between fire wood supply and industrial demand in the eastern part of Paraguay close to Asuncion, and a supply gap according to [Rios et al 2016](#) firewood will continue to increase significantly in price. Based on industrial policy and the recent [high 50% increase in industry electricity prices](#) in Paraguay, electricity prices will not increase in the same manner. Based on this analysis firewood prices will be on par with industrial electricity prices in the medium-term. This scenario makes financial viable the exchange of firewood as fuel for electricity. Therefore, electricity based equipment will become be financeable during the second half of the Project's execution period. To ensure that other energy efficiency measures are implemented in the meantime the Project contemplates as financeable activities the retrofit of existing equipment and the exchange with more efficient firewood-utilizing equipment ensuring that the firewood is of legal origin and of sustainable basis, excluding excluding eucalyptus plantation (this requirement will be applied as condition for credit access and be monitored throughout sub-loans implementation). We expect this strategy to increase awareness, capacity and experience so that a transition to electricity becomes increasing more viable in the process and enable a paradigm shift tailored to the situation in Paraguay.

Financial System in Paraguay and context for SMEs

47. As explained in section B.3, despite the progress in recent years, Paraguay's financial system still has structural weaknesses that prevent it from meeting the demand for credit among domestic production sectors. The unmet demand for medium and long-term credit is particularly acute despite gradual increases in the loan portfolio of LFIs. Firms require considerably more financing than the amount effectively available in the financial sector. As mentioned before, loan maturities in the financial system reveals that more than half of loans are concentrated in less than 3 years. The financial system does not meet the need for productive lending, especially long-term investment lending, defined as credit with maturities longer than one year. The lack of availability of long-term credit directly undermines firms' capacity to invest in new projects. Lack of investment translates into low competitiveness, especially for SMEs, which have very limited access to credit, face high transaction costs, and in many cases lack appropriate collaterals to comply with banking requirements. In addition, the time it takes for firms to see a return on longer-term investments is incompatible with the structure of the conditions offered by the banking system, generating mismatches in loan amortization periods.

48. In this context, the main problem of SMEs is access to credit whose difficulties are related to the lack of sufficient collateral, high interest rates, "excessive" information and documentation requirements, high overall transaction costs and lack of business plans by firms. There are also a high proportion of enterprises that operate informally and cannot satisfy formal requirements by financial institutions. Although there is a gradually increasing access to credit in the sector, the amounts allocated are scarce and are usually designed to finance working capital needs. Inadequate access to finance is a critical obstacle to narrowing technology gaps and boosting the productivity and growth of industrial firms both large and SMEs. Access to finance in Paraguay is limited by factors including: (i) the informal nature of economic activities among small- and medium-scale firms, making it difficult for them to furnish collateral; (ii) a lack of credit history that could be used to assess the risk for each producer; (iii) the highly-fragmented nature of the client base as regards SME.

49. The overall Project objective is to incentivize LFIs to provide sufficient tenor post-GCF once LFI risk departments have assessed the risk and viability of these projects through the help of demonstration projects financed by the GCF that enable a track record building. This would result in a sustainable EE financing market in Paraguay for SMEs.

C.2. Project / Programme Objective against Baseline

Project Objective and General Overview

50. The project **objective** is to increase energy efficiency in the industrial sector in Paraguay, in particular SMEs, by providing medium and long-term financing for EE investment projects. The successful implementation of the sub-projects financed will contribute to reduce GHG emissions, supporting the achievement of the country's climate change goals. Program activities include financing and non-financing mechanisms that aim to improve the local technical capacity and knowledge on EE investments by LFIs and SMEs. The project applies the ESI model experience of IDB with NDBs (see *the Global Innovation Lab for Climate Finance* Annex XI) which has been piloted successfully in several countries in LAC (Colombia and Mexico) for promoting EE investments; the ESI approach has been approved previously by the GCF Board in the case of BANDESAL in El Salvador.²⁹

51. A significant potential for energy efficiency (USD 66.5 million potential demand) was identified in the industrial sector of Paraguay (see Annex II), linked to: a) technological modernization; b) the replacement of equipment that is outdated, obsolete and inefficient, most of which is considerably more than 10 years old; and c) the substitution of energy sources, incorporating electricity as a replacement for non-renewable biomass, as convenient. While the Project will be open to any EE activities with all SME industries that reduce GHG emissions, considering other incentives for SME credit demand such as such as increase in productivity, the industrial sectors with the greatest credit demand potential (USD 56.5 million) and which, therefore, were given priority in the analysis of cost benefit and proposed program interventions are the following³⁰:

i) **Sugar industry.** Replacement of biomass waste for power generation with electricity and agriculture waste, technological modernization and replacement of highly obsolete equipment; co-generation of electricity and steam is one

²⁹ See GCF project in [El Salvador](#) (BANDESAL).

³⁰ The potential demand for credit undertaken by IDB has considered the existing appetite of firms to take credit to invest in technology improvements that result in energy efficiency. This appetite for finance is determined not only by the cost of energy, but also other factors such as the potential productivity gains and modernizations improvements that SMEs are expected to pursue with technological changes. In order to be conservative, the program focused the demand dimensioning and cost benefit analysis sectors with higher investment appetite. However, it should be noted that the program is open to any energy efficiency improvements and additional technologies, from those included in the cost-benefit analysis will be financeable, which means that the potential of demand for credit can actually be even higher. For instance, a recent study (Briano et al 2017) indicates the potential for investments in efficiency improvements in electronic velocity variators for motors and ovens in Paraguay of about USD 3 billion (USD 399 million for Motor Speed Variators and 2.6 billion for ovens). If the program focuses on supporting about 6% of the potential exclusively in Motor Speed Variators this would reach a total demand for credit of about USD 24 Million.

of the most effective tools for energy efficiency in this industry, simultaneously allowing for the sale of surpluses to the public grid.

- ii) **Brickmaking and ceramics industries.** Technological modernization and replacement of obsolete equipment.
- iii) **Drying processes for grains.** Replacement of firewood with electricity and agricultural waste and technological modernization.

52. It is estimated that the direct effects of these actions could account for an immediate reduction in energy consumption by the industrial sector of approximately 10% of the total. However, this estimate of the savings underestimates the consumption of firewood in the economy and its impact on uncontrolled deforestation processes, which are deemed to be significant.

53. There are technological solutions and qualified suppliers in all the proposed EE improvement processes, for which there are no significant risks regarding the delivery of technology, given the experience and potential of companies present in the international market, and the limited barriers for the introduction of technologies and capital goods, as well as Paraguay's opening to import this equipment and the services required for their operation.

54. The impact on the overall business sector of financing lines for technological modernization and the replacement of boilers, furnaces and other highly obsolete equipment currently in use, is deemed a significant part of the information derived from the "National Energy Results in Usable Energy for the Republic of Paraguay".

Energy Consumption in Industrial Sectors in Paraguay

55. The focus of the Project on industrial SMEs considered several factors, including participation in Gross Domestic Product, inclusion of relevant value chains for Paraguay, impact on generating positive foreign trade and job creation, among others. The industrial sector's energy demand in Paraguay, in 2011, was 1,167 kToe (1,259 ktoe in 2014), which came primarily from biomass waste (44%) and firewood (39%). In 2011, 98% of energy demand from the Paraguayan industrial sector was dedicated to the following uses: power (42%), direct heat (31%), and steam (25%). Comparatively industrial electricity use in 2011 was 115 ktoe (173.7 ktoe -17% growth/year).

56. While the Project is open to any energy efficiency improvements and additional technologies in the industrial sector. The market analysis undertaken in preparation of the Project identified largest consumers by industrial segment as: "Rest of Food Producers", which comprises the **sugar industry**, with 49% of net total energy demand; followed by "Non-Metals", with a strong concentration in **ceramics and brickmaking activities**, accounting for 25% of net energy consumption. Industries within "Rest of Food Producers" in 2011 consumed 87% of industrial demand for energy for use as power, and 36% in energy demand to generate steam.

57. Based on data available in the report on the National Energy Balance in Usable Energy of the Republic of Paraguay (*Balance Energético Nacional en Energía Útil de la República de Paraguay*), it is estimated that 51% (in terms of energy) of the boilers employed in the sugar industry were in use for more than ten years in 2011. It is important to note that 100% of the boilers powered with bagasse are more than ten years old representing a large energy savings potential.

58. Most sugar mills are in the Department of Guaira. This industry is highly complementary with the production of ethanol, which is also concentrated in the country's central-eastern region, which affords good access to high-tension electrical grids from the Itaipú y Yacyretá Binational Hydroelectric Projects. This would facilitate the substitution of energy sources in the uses detected, notably improving their efficiency.

59. Industries classified as "Non-Metals" concentrated 74% of total energy demand to produce heat. Due to these factors, and to the potential for increased efficiency, both industrial segments present an interesting potential for improvements, given the high-energy consumption and low yields. In 2011, energy consumed by these industries mainly from firewood (73%), with the brickmaking industry using firewood for 100% of the energy it consumed. An analysis on the age of brickmaking kilns in 2011 revealed that out of the 58% of kilns that had information on age 57% were more than 10 years old, and 34% were between 5 and 10 years old.

60. In addition to these industries, there is the refrigerated food-packing industry which, despite having a relatively high yield compared to other industries, due to its intrinsic characteristics in its use of steam, would present opportunities for improvement in yields, and includes an analysis on the **drying process for grains**, in which there can also be obtained a substantial improvement in energy efficiency. A total of 81% of the energy consumed by the refrigerated food-packing industry was produced with firewood. The generation of steam through firewood combustion provides opportunities for improvement compared to the standards attainable with new equipment. Approximately 38% of firewood boilers in this industrial segment were more than 10 years old.

61. Firewood is used almost exclusively as fuel in the drying processes for grains, with an energy yield of 37%, which is far below the 81% usable energy/net energy ratio achieved with electric dryers. Thus, there is a significant margin for improvement in energy efficiency in these processes.

Potential Energy Savings against Baseline

62. In order to have a conservative estimate of credit demand, the Project has considered mainly potential energy savings from SME industries described above, which are those with largest potential to obtain energy savings and appetite to undertake investments for technology improvements (i.e. sugar industry, ceramics and brickmaking activities, refrigerated food-packing industry). It should be noted that the Project could benefit a broader spectrum of industrial SMEs and technologies that could result in energy efficiency savings and GHG reductions. For instance, a recent study (Briano et al 2017) indicates the potential for investments in efficiency improvements in electronic velocity variators for motors and ovens in Paraguay of about USD 3 billion (USD 399 million for Motor Speed Variators and 2.6 billion for ovens).

63. In the case of the small-scale generation in the sugar industry, the incorporation of energy-savers in furnaces could increase yields by 4.5%, with said furnaces attaining a yield of 91.6%. In the case of the grinders, electric models present yields that are far above those of grinders powered by biomass waste, achieving a yield of 87%, and freeing up bagasse that can be used to replace firewood to generate steam.

64. In the brickmaking industry, using ovens with improved insulation fueled with biomass waste could help achieve yields of 78%.

65. The total savings potential in these industries would amount to 56.5 kToe. The greatest savings potential is in the bricks industry (25.5 kToe) and in through co-generation (12.3 kToe), in line with their participation in the industrial sector's total energy consumption.

66. From the data presented, the potential energy savings that can be achieved through actions in these industries and preselected uses could reach at least 10% of net energy industrial demand in Paraguay.³¹ The displacement of firewood as the second-largest fuel source for the industrial sector, or at least a reduction in its usage, would produce, along with the increases in yields described herein, benefits aligned with objectives to reduce greenhouse gas emissions and deforestation, thereby contributing to the long-term sustainability of the industrial sector in the Republic of Paraguay.

67. The displacement of firewood as the second-largest fuel source for the industrial sector, or at least a reduction in its usage, would produce, along with the increases in yields described herein, benefits aligned with objectives to reduce greenhouse gas emissions and deforestation, thereby contributing to the long-term sustainability of the industrial sector in the Republic of Paraguay.

68. With the high availability of hydroelectricity, with low impact in greenhouse gas emissions, and the new transmission systems that link Asuncion and the country's main economic activity areas with the large hydroelectric plants at Itaipú, Yacyretá and Acaray means that there are generally no problems with electricity supply. Remaining difficulties are manifested primarily over the short term in the development of distribution grids with tensions below 66 kV, that is, in medium and low tension. This will be tackled by ANDE's Master Works Plan that will invest US\$2.9 billion through 2018, reaching US\$5 billion by 2023, with financing from multilateral credit institutions.

69. It is worth noting that with regards to high-tension electricity prices, they are currently extremely competitive in comparison to other sources, including firewood, and it is estimated that this comparison will continue to favor electricity as more restrictive measures are taken to reduce the strong deforestation process that currently affects Paraguay.

Table C.2 Indicative Project Financing Line Flow from GCF to SMEs Estimated Reductions in Greenhouse Gas Emissions

³¹ As part of the project design, this will focus on uses and technologies that are commonly used in different industries, through which greater energy savings could be attained in Paraguay.

FIRR@6Years		With GCF Concessionality				Without GCF Concessionality (despite suitable IRRs, projects are not happening)			
		Oven EE	Boilers	Drying EE	Co-Generation	Oven EE	Boilers	Drying EE	Co-Generation
Year 0	Retrofit existing equipment (Wood as fuel)	187.0%	7.0%			184.6%	4.8%		
Year 0	Change to efficient equipment (Wood as fuel)	34.5%	45.5%			32.4%	43.3%		
Year 3	Change to Electricity equipment*	41.7%	18.5%	33.2%		39.5%	16.4%	31.0%	
Year 0	Replacement of fuel				175.1%				172.7%
EIRR@6Years									
Year 0	Retrofit existing equipment (Wood as fuel)	160.3%	25.9%			110.9%	10.2%		
Year 0	Change to efficient equipment (Wood as fuel)	151.8%	150.2%			149.2%	147.6%		
Year 3	Change to Electricity equipment*	115.0%	74.6%	100.6%		112.5%	72.2%	98.1%	
Year 0	Replacement of fuel				199.6%				195.8%
Payback Period in Years									
Year 0	Retrofit existing equipment (Wood as fuel)	0.6	6.3			0.6	6.5		
Year 0	Change to efficient equipment (Wood as fuel)	3.6	2.8			3.8	2.9		
Year 3	Change to Electricity equipment*	3.0	5.3	3.7		3.2	5.5	4.0	
Year 0	Replacement of fuel				0.7				0.7
Emissions Reductions in tCO ₂ e									
Year 0	Retrofit existing equipment (Wood as fuel)	10,887	3,682						
Year 0	Change to efficient equipment (Wood as fuel)	81,649	27,615						
Year 3	Change to Electricity equipment*	129,602	43,833	35,195					
Year 0	Replacement with bagasse				58,345.5				

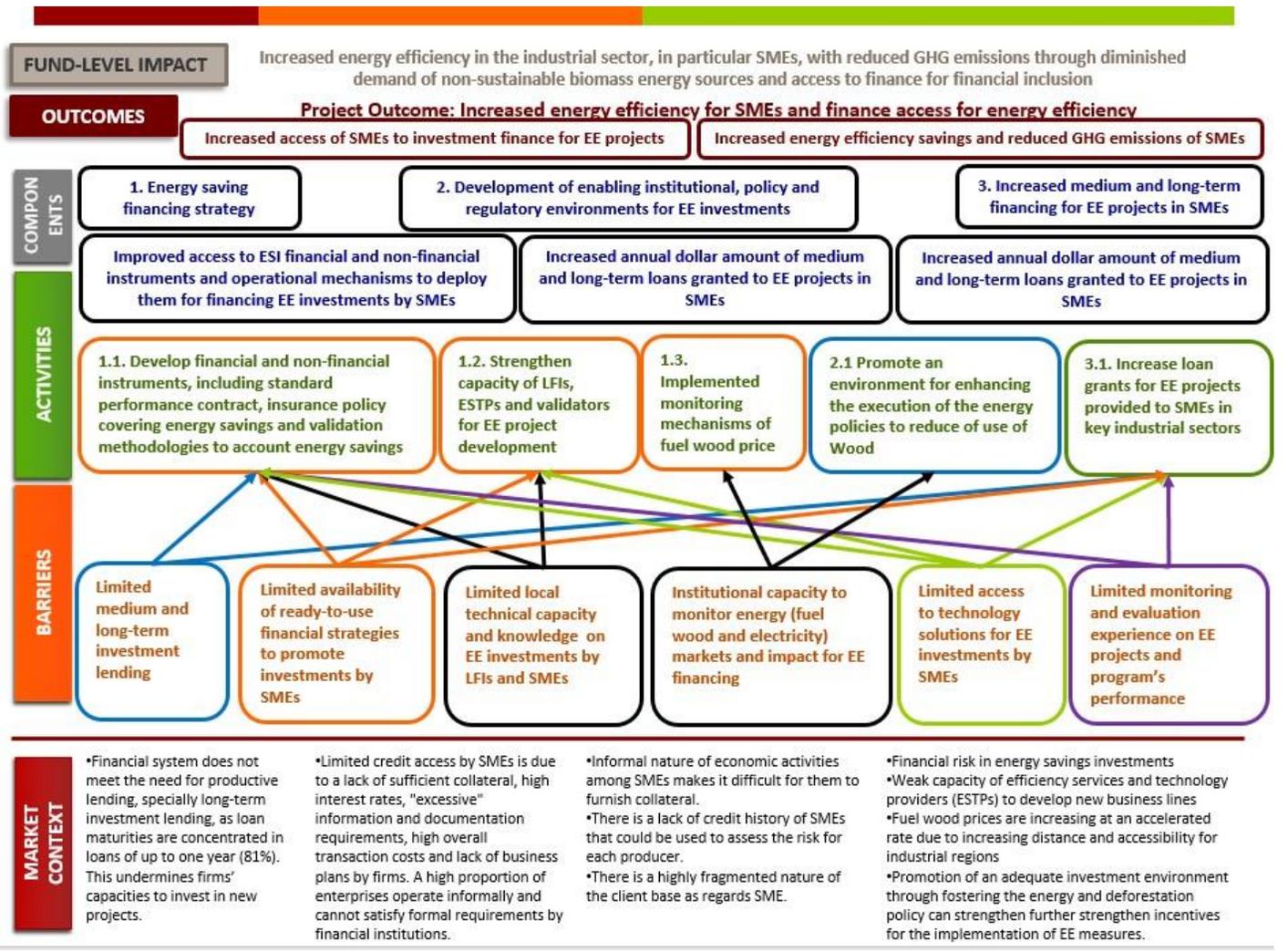
* Emission reductions cannot be aggregated by simple summation as they occur in different years

Key Barriers Identified in accessing medium and long-term finance for EE Investments in Paraguay

70. Despite high relative energy costs, and SME's interest in renewing old technology with newer, more energy-efficient technologies, EE investments in Paraguay are in the baseline scenario hindered by constraints and perceived risks by SMEs and financial institutions. As explained before, the lack of availability of long-term credit directly undermines Paraguayan firms' capacity to invest in new projects. The main problem of SMEs is access to credit whose difficulties are related to the lack of enough collateral by SMEs to back up loans, high interest rates from LFIs, "excessive" information and documentation requirements, high overall transaction costs, which is exacerbated by a lack of business plans by SMEs.
71. As shown in Figure C2.1, the barriers identified in the theory of change are: i) Limited medium and long-term investment lending; ii) Limited availability of ready-to-use financial strategies to promote investments by SMEs; iii) Limited local technical capacity and knowledge on EE investments by LFIs and SMEs; iv) Limited access to technology solutions for EE investments by SMEs; v) Limited monitoring and evaluation experience on EE project and program's performance. Additionally, the limited information and transparency in the functioning of energy markets - including with respect to the availability, ease of access and reliability of electric power and the development of fuel wood prices in the context of policy enforcement - hinder private long-term investment decisions.
72. **Limited medium and long-term investment lending.** Although there is a gradually increasing access to credit in the sector, the amounts allocated are scarce and are usually designed to finance working capital needs. Inadequate access to finance is a critical obstacle to narrowing technology gaps and boosting the productivity and growth of industrial firms both large and SMEs. Access to finance in Paraguay is limited by factors including: (i) the informal nature of economic activities among small- and medium-scale firms, making it difficult for them to furnish collateral; (ii) a lack of credit history that could be used to assess the risk for each producer; (iii) the highly-fragmented nature of the client base as regards SME.
73. **Limited access to technology solutions for EE investments by SMEs.** From the customer/firm perspective, there are perceived risks associated with EE technologies are related to their higher up-front costs, lack of information on their actual performance, their unavailability in the local market, and uncertainty over the reliability of their installation by ESTPs (see Annex II). Paraguay would benefit significantly from increased EE in the industrial SMEs for the identified sectors, but the market is currently underserved. The most important barriers for firms' investments in EE equipment is the lack of trust by potential beneficiaries. There is the belief that EE investments are not likely to result in enough energy savings to repay the initial investment in a reasonable period of time. In addition, firms are usually concerned about equipment performance and quality of service by ESTPs.
74. **Limited local technical capacity and knowledge on EE investments by LFIs and SMEs.** As in other countries, Paraguay LFIs tend to apply a traditional "asset-based" lending approach when financing EE projects, limiting the loan amount to a maximum reference value of the assets financed. Those institutions give little or no collateral value to EE equipment and, in spite of the positive cash flow generated by EE investment projects to investing firms, most LFIs typically do not recognize and/or are not willing to rely upon those cash flows as a basis for those firms to repay their loans or increase their borrowing capacity. Furthermore, even if they would accept to consider such value, the inability to validate the risks involved in generating those positive cash flows restrains LFIs from considering EE projects as financially viable business opportunities. Consequently, LFIs tend to assign little or no value to the cash

flow generated by EE investment projects, and thus require firms to encumber their internal credit capacity to finance such projects.

Figure C2.1. Theory of Change of Energy Efficient Investments in the Industrial Sector in Paraguay*



*The ToC is based on successfully addressing the barriers stated as well as mitigating the risks stated in Section G through the project activities.

75. **Limited availability of ready-to-use financial strategies to promote investments by SMEs.** The lack of understanding by clients and LFI of the potential returns of EE projects, the high perceived risk of new, more efficient technologies, and the need to secure external guarantees of a certain level of energy savings (mistrust in the performance of EE projects and ESTPs) are typical barriers to investments in EE projects in Paraguay as well as in many other countries in the region. In more advanced countries (e.g. USA), these types of investments are directly undertaken by specialized Energy Service Companies (ESCOs) under a performance contract.³² However, in Paraguay there are neither ESCO firms, nor standardized performance contracts for EE investments.

76. **Limited monitoring and evaluation experience of EE project and program's performance.** Finally, there is limited experience for EE project monitoring and evaluation at AFD, which restricts the demonstration of project results and effectiveness. AFD has its own monitoring and evaluation system as per IDB requirements; however, the monitoring capacity improvement is needed to address limited information on the risks and results associated with EE investment projects. This would allow to reduce the information limitations for LFIs and SMEs. Project activities would support the monitoring and evaluation of EE investment projects and internal barrier to follow up and evaluate the results of the financing strategy.

77. The Project with GCF funding will address those barriers by providing a concessional line of financing to kick start the promotion of this type of investment and by creating risk-sharing instruments *and* non-financial mechanisms that could help to build trust among investors and their financiers, paving the way for the sustainable development of the EE market once the project is over. It is hoped that once EE investors and their financiers are aware of the low risks and high returns of these projects, they would continue to invest in and finance them, respectively, with little or no recourse to additional concessional public support. Table C2.1 summarizes how the proposed project addresses the barriers and risks that hinder EE investments by SMEs in Paraguay, relating those constraints to the proposed components, activities and sub-activities, and the instruments and mechanisms under each Project Component.

Table C2.1. Key barriers addressed by each project component and activity

Component	Activity	Sub-Activity	Barrier	Description
1. Improved access to financial and non-financial instruments and operational mechanisms to deploy them for financing EE investments by SMEs	1.1. Develop financial and non-financial instruments, including standard performance contract, insurance policy covering energy savings and validation methodologies to account energy savings	1.1.1. Development of a standard performance contract for risk sharing between SMEs and ESTPs	Limited availability of ready-to-use financial strategies: Lack of trust by investors and financiers in the returns of EE projects and in the ability of ESTP to deliver promised energy savings.	Contract with retention provision and the possibility of an insurance/surety product aligns incentives of ESTP with interests of investors and financiers.
		1.1.2. Development of insurance policy covering energy savings	Limited availability of ready-to-use financial strategies: No experience by SMEs and LFIs in the risks and returns associated with EE projects.	Insurance / security product partially mitigates non-performance risks perceived by investors and their financiers.
		1.1.3. Develop methodologies accounting for technology / project level energy savings	Limited access to technology solutions for EE investments by SMEs: Technical risk of the project and technical capacity of the ESTPs.	Third party experts on EE validate ESTPs and their project proposal, ensuring that they are strong from a technical perspective.
		1.1.4. Development of a Business Plan for the Project promotion and execution	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs: Institutional capacity to effectively promote the Project and support the development of the market for EE financing	A business plan to strengthen the institutional capacity of AFD and other relevant market players is developed, including the establishment of a dedicated group with its budget, work plan and internal guidelines to

³² Fang, W. S., Miller, S. M., & Yeh, C.-C. (2012). [The effect of ESCOs on energy use.](#); Panev, S. et al. (2014). [The European ESCO market report 2013 for non-European countries.](#) Sorrell, S. (2007). [The economics of energy service contracts.](#)

				support and implement the ESI financing strategy.
		1.1.5. Hiring and operationalization of two (2) validators	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs: Inertia on the demand side and lack of knowledge and awareness on investment opportunities in EE.	Strengthen the knowledge of validators to support and implement the ESI financing strategy.
		1.1.6. Establishment at AFD of a business unit dedicated for EE financing and project and pipeline development. This component establishes the project management unit (PMU) in AFD.	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs: Institutional capacity of AFD to effectively promote the Project and support the development of the market for EE financing. Initial transaction costs to incentivize investors. The risk of limited market uptake due to upfront transaction costs to mobilize investments is addressed through project and pipeline development resources	Strengthen the institutional capacity of AFD and other relevant market players.
		1.1.7. Establishment of electronic registry system for monitoring and evaluation of projects and program's results	Limited experience on monitoring and evaluation of EE project and program's performance: Supports the monitoring and evaluation of the proposed project and internal barrier to follow up and evaluate the results of the financing strategy: Monitoring capacity addresses limited information on the risks and results associated with EE investment projects.	The monitoring and evaluation system of AFD is strengthened to track the implementation progress of the project, it's leverage of EE investments and the energy savings and GHG emission reductions.
	1.2. Strengthen capacity of LFIs, ESTPs and validators for EE project development	1.2.1. Training of AFD staff (at least 20% women) on Project mechanisms and methodologies.	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs: Institutional capacity of AFD to effectively promote the Project and support the development of the market for EE financing.	Strengthen the institutional capacity of AFD and other relevant market players.
		1.2.2. Training activities (workshops, seminars, etc.) to inform and train five (5) LFIs and its staff (2 per LFI) on financing EE projects	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs: Institutional capacity of LFIs to effectively promote the Project and support the development of the market for EE financing.	Strengthen the institutional capacity of AFD and other relevant market players.
		1.2.3. Two (2) local technical validators (total of 6 staff) informed and trained (at least 20% women) about Project methodology.	Limited access to technology solutions for EE investments by SMEs: Institutional capacity to effectively promote the Project and support the development of the market for EE financing.	Strengthen the institutional capacity of technical validators to support and implement the ESI financing strategy.
		1.2.4. Training thirty (30) technology solution providers (at least 20% women) about Program mechanisms	Limited access to technology solutions for EE investments by SMEs: Institutional capacity to effectively promote the Project and support the development of the market for EE financing.	Strengthen the knowledge of technology solution providers to support and implement the ESI financing strategy.
		1.2.5. Workshops and seminars for targeted 160 SMEs to inform about Program mechanisms	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs:	Despite reduced investment risks and higher availability of financing, inertia may still limit the

			Inertia on the demand side and lack of knowledge and awareness on investment opportunities in EE.	uptake of EE investment. However, demand is fostered through targeted outreach to key business stakeholders.
		1.2.6. Development of six (6) products/publications, knowledge sharing events, country market reports published, and webinars	Limited local technical capacity and knowledge on EE investments by LFIs and SMEs Limited knowledge of EE opportunities and of results of the proposed project at the national and regional level.	Knowledge sharing through publications and events increases the dissemination of lessons learnt and of the benefits resulting from the proposed project, paving the way for the replication and scaling up of investment in other sectors of the country and at the regional level.
	1.3 Implemented monitoring mechanisms of fuel wood price	1.3.1 Assessment of fuel wood market structure. Develop methodology for assessing fuel wood market structure and price drivers to inform market actors.	Institutional capacity to effectively track the price developments of fuel wood and electricity and support the development of the market for EE financing. Limited data information to track national energy matrix to support execution of the energy law	The monitoring of fuel wood market is strengthened to track the fuel wood market developments and informing market actors.
		1.3.2 – Inclusive Dialogue roundtable discussions. Organize inclusive Dialogue roundtable discussions and develop report on challenges and opportunities for efficient industrial energy consumption	Institutional capacity to effectively understand and support the development of the market for EE financing.	Strengthen inclusive roundtable discussions with local stakeholders from national authorities, ANDE, private sector actors and the relevant NGO community working on fuel wood markets
		1.3.3 - Capacity Building and Awareness Campaign. Develop a targeted awareness and socialization campaign to disseminate project results to inform investment decisions utilizing appropriate communication channels, including the promotion of use of certified sustainable biomass.	Institutional capacity to effectively understand and support the development of the market for EE financing.	Awareness and socialization campaign to disseminate results to inform investment decisions.
2. Development of enabling institutional, policy and regulatory environments for EE investments	2.1 Promote an environment for enhancing the execution of the energy policies to reduce of use of Wood	2.1.1 Institutional strengthening to promote EE... including consultancies to review and/or update legal, regulatory, policy and institutional frameworks relating to EE with a focus on but not limited to the use of biomass as energy source	Limited data information to track national energy matrix to support execution of the energy law	Strengthen the institutional capacity of the Government and relevant market players.to facilitate the replacement of use of fuel wood by sustainable alternative sources.
		2.1.2 Efficiency and sustainability of biomass as energy source .Targeted studies to assess further relevant technological improvements and practices to transition to more efficient and sustainable uses of biomass as an energy source across sectors building on the lessons learnt from the project and, the collection and management of data relating to the use of biomass as an energy source across sectors/subsectors	Limited data information to track national energy matrix to support execution of the energy law	Strengthen the institutional capacity of the Government and relevant market players.to facilitate the replacement of use of fuel wood by sustainable alternative sources.

		2.1.3 Capacity building and dissemination. Workshops and seminars to relevant stakeholders on EE practices with a focus on but not limited to biomass and relevant dissemination activities	Institutional capacity to effectively promote EE.	Strengthen the institutional capacity of the Government and relevant market players to facilitate the replacement of use of fuel wood by sustainable alternative sources.
3. Increased annual dollar amount of medium and long-term loans granted to EE projects in SMEs using the ESI strategy	3.1 Increase second tier medium and long term credit line for EE projects provided to SMEs in Paraguay's economy	3.1.1 Support of SMEs to have access to credit from the Project's financing to invest in EE projects	Limited medium and long-term investment lending: Availability of credit at adequate maturities to finance EE projects with high upfront costs	The risk of limited market uptake due to upfront transaction costs to mobilize investments is addressed with the introduction of temporary financial support measures to create demonstration effect.
				Availability of a credit line with adequate maturities at interest rates so that LFI's can provide sub-loans to SMEs to undertake EE investment projects.

78. The Project encourages changes in current industrial practices by fostering EE investments, reduce GHG emissions, and diminish demand for non-renewable biomass. The project will support: i) Investment in new equipment (i.e. boilers, furnaces and motors, and supplementary equipment) in three industries, and introduction of improved processes and practices in the industrial sector³³; and ii) Substitution of non-sustainable biomass (firewood) by electricity, as feasible. Avoiding or diminishing the consumption of non-sustainable biomass and thus achieving GHG emissions reductions or the avoidance of GHG emissions from deforestation and forest degradation.

79. The Project will thus contribute to: i) The gradual shifting towards electricity consumption from renewable resources, benefiting from the large supply of hydroelectricity, in line with the national long-term energy strategy and with the vast investments underway to improve the transmission and distribution electricity grid; ii) Support the development of green commercial finance and engage the industrial sector in green growth oriented practices; iii) to develop actions with the Energy Ministry to update the information on the subject, better monitoring of the evolution of biomass consumption, to identify opportunities for a more efficient use of biomass, and facilitate their replacement by sustainable alternative sources, and iv) Support the initiatives of the Government of Paraguay to address deforestation and forest degradation, in particular those under the UN REDD Programme by reducing the use of firewood for energy production.

80. The Project will benefit a range of institutions and key stakeholders that are at the core of an incipient EE market – namely, micro, small and medium enterprises oriented to serve domestic markets, large industries oriented towards international commodity markets, technology and service providers and the commercial banking sector, including non-bank financial entities and cooperatives. As such the Project supports a transformational effort led by key governmental agencies- in shifting a distinctive ingrained productive pattern prevalent in Paraguay: the notion that firewood is cheaper and more efficient than electricity.³⁴

C.3. Project / Programme Description

³³ Through its activities the Project will foster a reduction in Paraguay's reliance on fuel wood and fossil fuels by promoting: (i) first, a switch from fuel wood to electricity; (ii) where transmission lines are currently not accessible, and agricultural residues are available close-by, switch from fuel wood to agricultural residues; and (iii) where the first two options are not available, not feasible or not bankable, promote a change to more efficient equipment that utilizes less and more sustainable fuel wood. For projects that will promote energy efficiency technologies that reduce the use of fuel wood, AFD will require as eligibility criteria to access the credit that the beneficiaries certify and provide proof that the fuel wood used by the project will be of legal and sustainable origin. At the monitoring stage, eligible SME projects will be further requested to demonstrate annually and when requested that the fuel wood used in their projects remain from legal and sustainable origin. In case a sub-loan would not comply with this requirement AFD would cancel the sub-loan. In addition, as part of its Environmental and Social supervision processes, the IDB will be reviewing the origin of the fuel wood and ensure that it is legal and sustainable.

³⁴ The current productive pattern suggests that there is no need to shift to electricity consumption given the country's natural resource endowment, in particular native forests. Instead, the use of non-renewable biomass that was formerly abundant and accessible persists, despite its depletion of non-renewable biomass which translates in rapidly increasing cost and uncertainty in supply (see Market Study in Annex 2).

81. The objective of the Project is to promote energy efficiency (EE) in Paraguay's economy, by providing medium and long-term finance for EE investment projects. The successful implementation of projects financed will contribute to reduce GHG emissions, supporting the achievement of the country's climate change goals. The expected project outcome is increased energy efficiency in the industrial sector, in particular SMEs, with reduced GHG emissions through diminished demand of energy sources and access to finance for financial inclusion.

82. To support the achievement of this outcome and objective, the Project aims to:

- i. Empower AFD to structure and coordinate innovative financing mechanisms for EE through: i) assessment and development of niche markets opportunities; ii) development and combination of tailored risk sharing and financial and non-financial instruments to stimulate and scale up investments in EE; iii) promote the engagement of local financial institutions (LFIs) in deployment of new innovative financial products; iv) identification and participation of technology providers and key market stakeholders to structure demand for financing by bankable sub-projects; and, v) development of standards and procedures for monitoring and reporting and quantifying monetary benefits from EE improvements.
- ii. Address various market barriers that impede energy efficiency investments and shift current fuel consumption patterns in the industrial sector by means of an innovative, tailored and ready-to-use financing strategy for EE investment projects in Paraguay.
- iii. Assist Paraguay in raising physical productivity and improving competitiveness in key activities in the industrial sector by increasing EE, achieve significant GHG emissions reductions and enhancing GHG sinks, and contributing to abate drivers of deforestation and forest degradation, through the mobilization of national and international climate finance resources.

83. Under the proposed Project, GCF resources will be used to support the structuring of financing mechanisms and instruments that are required to enhance awareness and knowledge on the advantages of EE investment projects, as well as building trust among industrial firms, in particular SMEs, and first-tier LFIs on the potential benefits of EE measures in order to further develop a growing pipeline of technically-robust, bankable EE investment projects in industrial firms and key economic sectors.

84. To address existing barriers to EE investments by SMEs in Paraguay (as presented in section C.2) and build confidence among key market actors, the project will develop an innovative business model consisting of a "package" of financial instruments and non-financial mechanisms. A feasibility study and a market analysis have been completed and indicate overall potential for investments in EE in industrial SMEs, and in particular a high potential for EE investment in Paraguay in the three industrial sectors (brick making, grain drying and cogeneration in sugar cane facilities)³⁵. These technologies, among others, have been identified as having a large energy savings potential for the replacement of the use of biomass for electricity. The result of the market study has been presented to public and private actors³⁶ and their feedback has been taken into account in the development of this proposal. The following components make up the main activities that will be financed under the proposed program.

85. **Component 1. Improved access to financial and non-financial instruments and operational mechanisms to deploy them for financing EE investments by SMEs.** Under this first component, GCF grant resources will help to structure the demand for EE financing as it supports the development of standardized instruments (performance contracts; monitoring, reporting and verification methodologies; and insurance/surety products) which will establish the rules for all relevant market players and hence will help to build trust among them. This component has two main activities. The first is the development of financial and non-financial instruments, while the second is the capacity building of interested parties on project instruments and knowledge dissemination of the lessons learned from the project.

86. **Activity 1.1. Develop financial and non-financial instruments, including standard performance contract, insurance policy covering energy savings and validation methodologies to account energy savings** This activity will support the development of a ready-to-use strategy that blends financial and non-financial instruments to promote investment by SMEs. The development of financial and non-financial instruments includes standard performance contract, insurance policy covering energy savings and validation methodologies to account energy savings.

³⁵ The potential demand for credit undertaken by IDB has considered the existing appetite of firms to take credit to invest in technology improvements that result in energy efficiency. This appetite for finance is determined not only by the cost of energy, but also other factors such as the potential productivity gains and modernizations improvements that SMEs are expected to pursue with technological changes. In order to be conservative, the program focused the demand dimensioning and cost benefit analysis sectors with higher investment appetite. However, it should be noted that the program is open to any energy efficiency improvements and additional technologies, from those included in the cost-benefit analysis will be financeable, which means that the potential of demand for credit can actually be even higher. For instance, a recent study (Briano et al 2017) indicates the potential for investments in efficiency improvements in electronic velocity variators for motors and ovens in Paraguay of about USD 3 billion (USD 399 million for Motor Speed Variators and 2.6 billion for ovens). If the program focuses on supporting about 6% of the potential exclusively in Motor Speed Variators this would reach a total demand for credit of about USD 24 Million

³⁶ Several IDB missions took place between November 2013 and March 2015 to assess the market potential and to present along with AFD the results of the study with market actors. The results of those consultations have been incorporated in this document.

87. 1.1.1 Development of a standard performance contract for risk sharing between SMEs and ESTPs. Standard performance contract for risk sharing between SMEs and ESTPs will be developed by a legal consultant. (i) As part of the development of this contract, it will be discussed and will incorporate stakeholder feedback. The contract will be available and disseminated among ESTPs, SMEs, LFIs and local insurers. As explained before, there is virtually no EE market in Paraguay, and there are no clear and established processes and contractual arrangements on how to assess and implement projected energy savings and reduce demand for non-sustainable biomass and subsequently allocate the risks to market actors best able to manage these risks related to achieving those savings. The proposed Project introduces a contractual arrangement between a potential client (e.g. SME) and an EE services and technology providers (ESTP) in which the risks associated with achieving those future energy savings are transparently and efficiently shared by both parties in the contract. A standardized contract not only gives confidence to the SME that the ESTP will deliver the contracted energy savings but also provides the ESTP with the incentive to deliver the contracted energy savings. Furthermore, the existence of a standardized contract allows LFIs to process loan applications in a standardized manner, reducing not only their transaction costs but allowing them to develop standardized approaches to assess the risks associated with EE projects. (ii) Meetings with stakeholders will be held for coordination of development of standard performance contract. There will be consultations with all stakeholders to incorporate any comments or recommendations to develop a standardized contract adjusted to the legal framework in Paraguay.

88. 1.1.2. Development of insurance policy covering energy savings. (i) An insurance policy covering energy savings will be developed by a legal consultant. The insurance policies will be developed, discussed, incorporating stakeholder feedback; it will be available and disseminated with ESTPs, SMEs, LFIs and local insurers. The insurance policy will be a financial risk mitigation instrument in the form of a surety that partially covers the energy saving commitment made by the ESTP under the contract. It will help minimize the performance risk of the project for industrial firms and their potential financiers. (ii) Coordination meetings with key stakeholders for insurance/surety product development. As with the development of the standardized contract, there will be consultations with all stakeholders to incorporate any comments or recommendations to develop an insurance policy adjusted to the legal framework in Paraguay.

89. 1.1.3 Develop methodologies accounting for technology / project level energy savings. (i) Develop MRV system. This will include the development of methodologies accounting for technology / project level energy savings, validation procedures, protocols, formats and reporting and monitoring procedures. Methodologies and templates will be developed and readily available for project developers (ESTP and SMEs) to apply to the Project and validators to verify project and monitoring of energy savings quality. (ii) Independent validation procedures will be carried out by an independent third party with strong credentials on EE normalization and certification processes. Its role will include: a) validation of the ability of each EE sub-project to deliver expected and contracted energy savings; b) validation of the capacity of the ESTP to realize the contracted EE sub-project and to realize necessary service; c) verification that the equipment has been installed according to the EE project proposal (under a)) and that the old equipment has been properly decommissioned and disposed of to avoid GHG emissions leakages and other negative environmental impacts; d) verification of realized energy savings; and e) arbitration in case of conflict between the SME and the ESTP on the actual energy savings. The validation mechanism provides the investing firms, as well as the LFI, with the assurance and trust that the energy savings proposal is attainable, that the technology provider has adequate capacity, and that potential conflicts on the project's energy saving performance would be solved through arbitration by an independent, technically qualified party. This assurance is expected to increase the willingness of SMEs and LFIs to invest in and finance EE projects, respectively. It is important to note that the design of the formats, protocols and methodologies which will be developed by the independent technical validator for each of the technologies eligible under the program, with feedback from AFD and the IDB will be based on international best practices and standards, and, as applicable, on the technical regulations on EE for those technologies in Paraguay at the outset of the Project. (iii) Coordination with key stakeholders for MRV system development. Similar to the previous activities, there will be consultations with local actors on the development of the methodologies, validation procedures, protocols, formats and reporting and monitoring procedures.

90. 1.1.4. Development of a Business Plan for the Project promotion and execution. A business plan with budget, human resources, timeline and milestones will be identified and approved internally in AFD for the Project's execution and promotion. The planned business plan primarily addresses a key obstacle to EE investments, namely the lack of prioritization of EE investments by SMEs, larger firms and generally by key economic actors. By connecting those relevant actors, the strategy aims to close the existing information gap on the opportunities for creating economic benefits through EE measures and providing information on realistic cost savings that EE investments would allow. Potential investors, i.e. industrial firms in different sub-sectors, in particular SMEs, and LFIs, are thus targeted, reached and connected.

91. 1.1.5. Hiring and operationalization of project validators. As part of this sub-activity, two validators and verifiers will be hired to verify the quality of proposed sub-projects for credit from the Project and verify the energy savings monitored by the Project. This will allow to control the quality of the projects to minimize the risk of project investment.

92. 1.1.6. Establishment at AFD of a business unit (PMU) dedicated for EE financing and project and pipeline development. A dedicated business unit will be created in AFD to execute the program, including necessary budget and

human resources. This will be coupled with training activities of AFD staff (sub-activity 1.2.1), as well as the establishment of the electronic registry system (1.1.7). The business unit will support in the selection and launching of projects. As part of the proposed Project, a pipeline of technically-robust, bankable EE sub-projects will be developed to demonstrate the viability of the proposed financing strategy and thus attract the interest of relevant actors in the selected market segment, reinforcing the possibility of having those projects being replicated economy wide. Funds project and pipeline development (USD 500,000) will be used to further support SMEs and TSPs in developing bankable projects. It will mainly develop a series of initiatives encourage demand for credit by SMES, engagement of energy service and technology providers in the program, enhanced understanding of the ESI program methodologies and technical backstop for the design of quality project proposals. In particular the USD 500,000 grant resources will be utilized to hire consultancy services to (i) training and capacitating project developers; (ii) provide technical backstopping to project developers for understanding the methodological framework of the ESI and filling up templates, (iii) strengthen the quality of control of project proposals presented before validation, (iv) support further analysis and engineering studies needed for specific project needs, (iv) collecting lessons learned in project preparation to develop toolkit's and further improve methodologies and templates available; and (iv) tracking and prompting co-benefits of projects, including productivity gains, products quality improvements, etc and making recommendations on how these can be used in the program further promotion

93. 1.1.7. Establishment of electronic registry system for monitoring and evaluation of projects and program's results. The monitoring and evaluating system of AFD, should be based on an electronic registry system capable of collecting / indexing information stemming from supported EE projects intermediated by first tier LFIs. 37 AFD monitoring and evaluation system will track: i) private investments in promoted technologies stemming from the financing strategy developed; ii) their energy savings; iii) their respective GHG emission reductions; and iv) for projects relying in use of fuel wood that the fuel wood is from legal provenance and sustainable.

94. Activity 1.2. Strengthen capacity of LFIs, ESTPs and validators for EE project development. The Project will strengthen the capacities of ESTPs to develop a new line of business, namely, the sale of guaranteed energy savings rather than just the sale of technologies. Also, the Project is expected to support the development, diffusion and dissemination of information on new risk mitigation products, such as the standard performance contracts, insurance products and the monitoring, reporting and verification methodologies, among relevant stakeholders. As part of this activity, there will be training and dissemination of information to LFIs, ESTPs and validators on project mechanisms and methodologies, as well as disseminate the knowledge generated at the local and regional level.

95. A key aspect of making EE markets take off, is to raise awareness of its significance and the opportunity for economic benefits, as well as to engage key actors in being able to benefit from EE opportunities despite existing barriers. Potential investors (industrial firms, in particular SME clients), LFIs and ESTPs will be targeted, and initially connected to facilitate subsequent market transactions. As part of the proposed project, an initial pipeline of technically robust, "bankable" EE projects will be supported to demonstrate the viability of the proposed financing strategy and attract the interest of market actors (ESTPs, LFIs, and SMEs). These actions address primarily the lack of prioritization for EE investments by SMEs and LFIs. By connecting the relevant actors, it closes the information gap on opportunities and realistic cost savings that EE investments would allow in the Paraguayan economy.

96. For this activity, it is expected that two consultants (national or international) will be hired to conduct capacity building activities and project information dissemination. The profile of these two consultants will be both financial and technical, one covering the capacity building aspects of the project on financial and non-financial mechanisms offered by the project, while the second consultant will be an EE expert for support in awareness raising and capacity building. A series of capacity building events will be undertaken under each sub-activity (1.2.1 to 1.2.5) for each of the stakeholders and market actors in Paraguay. The detail of each of those sub-activities is as follows:

97. 1.2.1. Training of AFD staff (at least 20% women) on Project mechanisms and methodologies³⁸. AFD staff (at least 20% women) will be trained and informed on Project mechanisms and methodologies to improve its promotion and execution. This activity will include workshops and seminars to educate on EE investments and the financial and non-financial mechanisms of the project.

98. 1.2.2. Training activities (workshops, seminars, etc.) for LFIs to inform and train five (5) LFIs and its staff (2 per LFI) on financing EE projects. This activity will inform and train at least five (5) LFIs and its staff (2 per LFI) on financing EE projects. LFIs in Paraguay will be informed and trained so that they provide financing to firms for EE projects investments. As with 1.2.1, this activity will include workshops and seminars to educate on EE investments and the financial and non-financial mechanisms of the project.

³⁷ Such registry should also have clear format, templates and methodologies for collecting, maintaining and analysing data. The system should rely also on publicly available data systems and other relevant information needed to evaluate impacts, in particular the national emissions factor, the national energy generation plan and matrix, as well as promoted technology standards. The IDB will be tracking the development and establishment of the monitoring and evaluation system and compliance with best practices in this area and the Project's requirements in order to collect and maintain data relevant to the financing strategy being promoted.

³⁸ See Annex X for Gender Action Plan and section H2 for gender-sensitive data collection and baseline development.

99. 1.2.3. Two (2) local technical validators (total of 6 staff) informed and trained (at least 20% women) about Project methodology. Training of technical validators. At least two (2) local technical validators (total of 6 staff) (of which at least 20% women) will be trained about Project methodology so that they can support the Project quality control scheme. Capacity building workshops are included under this activity.
100. 1.2.4. Training thirty (30) technology solution providers (at least 20% women) about Program mechanisms. Training of ESTPs about program mechanisms. Thirty (30) technology solution providers (at least 20% women) will be trained about Program39 mechanisms. As a result, ESTPs in Paraguay informed and trained so that they can promote and identify projects to participate in the program.
101. 1.2.5. Workshops and seminars for targeted 160 SMEs to inform about Program mechanisms. Training of SMEs about Program mechanisms. Targeted firms (at least 160 SMEs) will be provided technical support with workshops and knowledge dissemination activities to provide information on the program's financial and non-financial mechanisms to promote EE investments.
102. 1.2.6. Development of six (6) products/publications, knowledge sharing events, country market reports published, and webinars. Knowledge dissemination. This sub-activity includes the development of six (6) products/publications, knowledge sharing events, country market reports published, and webinars. Publications and events with national and regional expert interest and participation.
103. **Activity 1.3 Implemented monitoring mechanisms of fuel wood price.** While demand and pricing for fuel wood is likely to increase, the interaction between the enforcement of the Zero Deforestation Law and the information provision about fuel wood price developments is important for private sector actors to take into account in their long-term investment decisions. To support tracking the fuel wood price and as a risk mitigation strategy the following activities will be implemented:
104. 1.3.1 Assessment of fuel wood market structure. Develop methodology for assessing fuel wood market structure and price drivers to inform market actors: (i) Development of a methodology for monitoring of fuel wood market developments building on existing national and regional practices, and methods applied in the literature, as well as by inviting input by international experts; (ii) Develop a phase-in plan with human and technological capacity needs collaborating with and strengthening the National Committee on Energy Efficiency (CNEE).
105. 1.3.2 Inclusive Dialogue roundtable discussions. Organize inclusive Dialogue roundtable discussions and develop report on challenges and opportunities for efficient industrial energy consumption: (i) Organize in coordination with CNEE a working group for inclusive roundtable discussions with local stakeholders from national authorities, private sector, and the NGO community with a focus on fuel wood and electricity markets for industrial consumers and regulatory best practices to promote a more efficient and sustainable use of biomass as an energy source. (ii) Transparently report on challenges and opportunities for efficient industrial energy consumption taking into account stakeholder perspectives and interests as well as methodologies and practices being developed through the Energy Savings Insurance approach and application of international practice (such as ISO standards).
106. 1.3.3 Capacity Building and Awareness and socialization campaign. Develop a targeted awareness and socialization campaign to disseminate project results to inform investment decisions utilizing appropriate communication channels, including the promotion of use of certified sustainable biomass excluding eucalyptus monocultures.
107. **Component 2. Development of enabling institutional, policy and regulatory environments for EE investments** This component will support the Ministry of Energy in promoting execution of the energy law and policies relating to reduction of use of fuel wood. Biomass accounts for 43% of demand in Paraguay's energy matrix. A significant part of the rural population and some activities of the productive sector continue to use biomass as one of its main energy sources.
108. **Activity 2.1 Promote an environment for enhancing the execution of the energy policies to reduce of use of Wood.** It will support the Vice Ministry of Mining and Energy of Paraguay in promoting an institutional, policy and regulatory enabling environment for private investments in EE, in particular to enhance the execution of policies to reduce energy intensity across the economy and improve the efficiency and sustainability of biomass as energy source. Sub-Activities under component 2 will include:
109. 2.1.1 Institutional strengthening to promote EE., (1) Consultancy to review and/or update legal, regulatory, policy and institutional frameworks relating to EE with a focus on but not limited to the use of biomass as energy source. This sub-activity will finance technical assistance to support the following activities: (i) Review and/or update legal, regulatory, policy and institutional frameworks relating to EE with a focus on but not limited to the use of biomass as energy source; and (ii) Develop related EE programs and initiatives.
110. 2.1.2 Efficiency and sustainability of biomass as energy source Targeted studies to assess further relevant technological improvements and practices to transition to more efficient and sustainable uses of biomass as an energy

³⁹ The training and outreach events for EE energy services and technology providers will be made through existing AFD's promotion systems and capacity. See Annex X for Gender Action Plan and section H2 for gender-sensitive data collection and baseline development.

source across sectors building on the lessons learnt from the project. And, the collection and management of data relating to the use of biomass as an energy source across sectors/subsectors.: This sub activity will finance technical assistance to support (i) The collection and management of data relating to the use of biomass as an energy source across sectors/subsectors, and (ii) Targeted studies to assess further relevant technological improvements and practices to transition to more efficient and sustainable uses of biomass as an energy source across sectors building on the lessons learnt from the project. And (iii) - Assess best practices and alternatives in terms of effectiveness, sustainability, financial impacts on public budgets.

111. 2.1.3 Capacity building and dissemination: Workshops and seminars to relevant stakeholders on EE practices with a focus on but not limited to biomass and relevant dissemination activities. This sub-activity will finance capacity building to relevant stakeholders on EE practices with a focus on but not limited to biomass and relevant dissemination activities. Activities to be supported include: (i) dissemination of activities in workshops and regional events organized by the IDB and/or government (ii) Adequate dissemination channels, as well as webinars, online media and on-the-job training on EE. This component will also support workshops to promote knowledge-sharing of experience, including the public and private sector.

112. **Component 3. Increased medium and long-term loans granted to EE projects in SMEs using the ESI strategy.** This component addresses the provision of medium and long-term credit lines to first-tier LFIs so that they can on-lend those resources to SMEs interested in financing EE eligible investment projects. The credit line will be co-financed by the GCF's reimbursable resources (USD 20 million) and AFD resources (USD 20 million).

113. The proceeds of the GCF loan will be blended with an equivalent amount of AFD's own resources to structure and establish a dedicated concessional financing line that is to be made available to first-tier LFIs in the local credit market so that they would have the incentive to, in turn, offer sub-loans at medium and long term maturities required for the payback period of EE technologies and concessional conditions to firms, in particular SMEs interested in investing in EE technologies in selected key sectors and economic activities. In order to also ensure higher participation of industrial firms in the program, the medium and long-term financing will be complemented by project and pipeline development resources in addition to capacity building and awareness raising activities. The rest of the investment will be funded by the SMEs and firms. The grace and maturity periods of the sub-loans will be established considering the costs and returns of appropriate technologies, ensuring that those periods are sufficiently long so as to allow the monetized energy savings to cover loan servicing obligations of the SME.

114. Also, the concessional nature of GCF loan resources will be passed onto final beneficiaries through lower interest rates than the ones currently offered in the market in order to stimulate EE investments and hence generate a powerful demonstration effect in the local credit market. The specific conditions of the credit line and sub-loans will be established and defined through the contractual agreement and the Project's OR, the latter to be agreed between the IDB and AFD.

115. **Activity 3.1. Increase second tier medium and long-term credit line for EE projects provided to SMEs in key industrial sectors.** This activity will seek to open credit lines at lower cost to LFIs, so they can pass it down to SMEs. This activity will cover the credit demand and investments of approximately 365 SMEs.

116. 3.1.1. Support of SMEs to have access to credit from the Project's financing to invest in EE projects. A total of 160 SMEs to have access to credit from the Project's financing to invest in EE projects. Based on the market assessment in Annex II.

C.4. Background Information on AFD and the IDB

117. **Origin.** AFD was created as an autonomous public institution, of indefinite duration, with legal personality, and its own patrimony, through Law 2640 of 2005, enacted by the National Congress of Paraguay. AFD is the only second-tier bank in Paraguay.

118. **Mandate.** It is the sole executing agency for loan agreements or grants that provide financing for development programs and projects, with the financial intermediation and sovereign guarantee of the State. The AFD is the only channel for loans from the public sector to public and private first-tier intermediary local financial institutions (LFIs), credit unions supervised and regulated by Paraguay's National Credit Union Institute, and other entities established by Law 51. AFD also has the authority to transfer technical assistance funds that might be associated with these programs through trust funds created for that purpose and administered by the AFD, who will act as trustee.

119. According to its mandate, AFD funds to be awarded to intermediary local financial institutions, may only be used for: i) Rural development projects; ii) Credits for micro, small and medium enterprises (SMEs); iii) Creation and business development, with emphasis on SMEs; iv) Exports of goods and services and imports of capital goods in the medium and long term, especially for small and medium enterprises; v) Projects for the development of tourism; vi) Investment projects in basic infrastructure by the private sector or for its execution; and vii) Development of housing and urban programs and other actions aimed at reducing the housing deficit.

120. **Objective.** AFD is a second-tier development bank that promotes economic development and job creation. Its objectives are fulfilled by channeling loan resources targeted to investment projects for firms and loans for the households through LFIs. AFD aims to extend credit, in any form, to complement the funding structure of the first-tier financial

intermediaries, cooperatives and other financial entities created by law. These funds will be granted to enable the implementation of short, medium and long-term development programs, with internal or external funds from loans guaranteed by the Paraguayan State, donations from third parties, endowment budget funds, own capital and funds obtained from the issuance of bonds. The AFD does not take deposits.

121. **Recent financial situation.** As of December 2014, the AFD had US\$527 million in assets with a loan portfolio totaling US\$362 million (68% of its assets). Between July 2015 and April 2016, AFD approved credits for a total of US\$ 207 million.⁴⁰ Of that amount, 83% (US\$ 172.5 million AFD operations as a second-tier development bank are funded by US\$363 million in financial obligations, primarily bonds (55%), multilateral loans (40%), and retained earnings and capitalizations. AFD currently accounts for only 2% of all the Paraguayan financial system assets. Given the role and importance of AFD as a development institution and the evolving nature of the Paraguayan financial system there is further room to increase its total assets for to foster development impact the institution.

122. **Operations.** The creation of AFD was intended to mitigate the structural flaws verified in market terms in order to spur economic development and promote job creation.

123. Through the AFD's provision of long-term finance it helped lengthen loan terms in the system. Longer terms allow firms to make larger and long-term investments, thereby promoting job creation and higher competitiveness. Despite the extension in the tenor of credits, AFD's funding is nevertheless insufficient to meet the growing structural needs of Paraguay's productive sector, in the context of a sustained cycle of economic growth and despite annual fluctuations related to the effects of external shocks.

124. Over its nearly eleven years of operation, AFD has succeeded in becoming the main source of long-term financing in the Paraguayan financial system while at the same time offering terms that are considerably longer than the average for the system. It has significantly expanded its lending activities, demonstrating with its supply of long-term financing to the financial system that there is a demand for that type of product and that the participating LFIs have been able to allocate it effectively and responsibly.

125. As public entity AFD interacts with other government agencies and is part of different governmental consultative committees relating to the country's development, including to promote sustainability, the country's energy policy and plans to reduce deforestation⁴¹. Its unique position allows it to have in depth knowledge of the private sector financial intermediation and SME market and to bring their perspectives into national policy making.

126. Thus, AFD, as a National Development Bank (NDB), is in a unique position to engage LFIs and private investors, align development financing with national priority mitigation actions, and canalize international climate funding as well as mobilizing domestic financial resources to promote scaled up investments in EE projects.

127. The AFD has an extensive range of financial instruments to facilitate the development of initiatives in various sectors; notwithstanding that, given the existing barriers to investments in EE, the pool of financial instruments needs to be supplemented by additional innovative instruments to address those specific barriers.

128. **Role of IDB as AE:** The IDB is the accredited entity and financial intermediary for channeling GCF and IDB co-finance (USD 20 Million) to AFD as well as supervise the sovereign guaranteed Project according to IDB policies (please also refer to Section E.5.2). (All Project funds will be channeled through the IDB)

C.5. Market Overview

129. The Market Study (Annex II) analysed the potential sectors and estimated the market size for projects with environmental benefits⁴². Based on that analysis, specific technologies were selected based on their large potential for EE investments by SMEs and other factors such as potential productivity gains. This section provides an overview of the main selected market segments and niches in the industrial sector and in economic activities in Paraguay to be addressed

⁴⁰ Presidential Annual Report, 2016. <http://www.informepresidencial.gov.py/>

⁴¹ Among the sustainable financing lines that AFD has been promoting is the PROFORESTAL credit program that promotes investments in afforestation, reforestation and sustainable agriculture. In addition, AFD is supporting other government initiatives such as the PROIEZA Project currently also presented by the government of Paraguay, in collaboration with FAO, to the consideration of the GCF.

⁴² The potential demand for credit undertaken by IDB has considered the existing appetite of firms to take credit to invest in technology improvements that result in energy efficiency. This appetite for finance is determined not only by the cost of energy, but also other factors such as the potential productivity gains and modernizations improvements that SMEs are expected to pursue with technological changes. In order to be conservative, the program focused the demand dimensioning and cost benefit analysis sectors with higher investment appetite. However, it should be noted that the program is open to any energy efficiency improvements and additional technologies, from those included in the cost-benefit analysis will be financeable, which means that the potential of demand for credit can actually be even higher. For instance, a recent study (Briano et al 2017) indicates the potential for investments in efficiency improvements in electronic velocity variators for motors and ovens in Paraguay of about USD 3 billion (USD 399 million for Motor Speed Variators and 2.6 billion for ovens). If the program focuses on supporting about 6% of the potential exclusively in Motor Speed Variators this would reach a total demand for credit of about USD 24 Million.

through the Project by fostering investments in EE technologies and more efficient productive processes. This section also provides an overview of the key barriers faced by SMEs in accessing long term financing for EE projects.

130. **Sectors.** Whereas the program has conservatively focused its analysis on a set of SMEs and technologies, it is open to any energy efficiency improvements and additional technologies that industrial SMEs would adopt. The origination of innovative financial and non-financial instruments will allow for the introduction of EE technologies and processes eligible for the projects (boilers, furnaces, electric motors, and ancillary equipment). For additional detail, please see the pre-feasibility and market study in Annex II.

131. The Project includes the development of a pipeline of activities that includes, among others, the following technologies. It is important to note that the project will be open to other sectors of the economy and that funding resources are not pre-allocated to any sector:

Table C5.1. Target technologies and project descriptions

Target Sector	Beneficiaries	EE objective	Description
Oven in the production of bricks and roofing tiles	120 micro and SMEs. ⁴³	30/21/8% of energy savings	Reduction in the consumption of non-renewable biomass through (retrofit) investments on more efficient furnaces using firewood as energy input. Reduction in the consumption of non-renewable biomass through investment in the replacement of existing furnaces by electric furnaces
Grain Drying Equipment: Grain dryers (drying and cleaning of seeds). ⁴⁴	37 SMEs	44% of energy savings	Reduction in the consumption of non-renewable biomass through the introduction of electrical installations for grain drying
Boilers	200 micro and SMEs	30/21/8% of energy savings	Reduction in the consumption of non-renewable biomass through (retrofit) investments on more efficient furnaces using firewood as energy input. Reduction in the consumption of non-renewable biomass through investment in the replacement of existing boilers by electric boilers
Small-scale Co-generation in the sugar Industry. ⁴⁵	8 Medium-sized firms	Increased efficiency in the use of biomass	Joint production of electricity and steam resulting in the development of a total generation potential of approximately 4-6 MW

132. Growth potential of each market segment in the period 2016-2021 has been conservatively estimated as follows:

- Bricks and roofing tiles: Between 5.2 and 8.2%, given growth trends in the building sector.
- Grain drying: Between 3 and 5%, given the constraints for higher growth due to insufficient infrastructure of roads, transport and storage facilities.
- Sugar industry: estimated at between 4 and 6%, encouraged by international demand for organic sugar.

133. **Key risks for the analysed sectors in Annex II and III.** An important risk associated with some of the types of energy efficiency projects aimed at promoting fuel switch from biomass, has to do with the availability of firewood currently used in an unsustainably manner, with a horizon of exhaustion relatively close, threatening the costs and competitiveness of industrial activities in Paraguay.

134. The price of firewood has increased by 580% between 2008 and 2017, reaching in March 2017 a value of 33 USD / ton of firewood. In some regions of Paraguay, especially in the grain producing regions such as Alto Parana region, which encompasses the Atlantic Forest, the prices of firewood has increased to 34 USD/ton of firewood. The main reason is the lack of supply in those regions, and the increased demand from regions such as el Chaco. More recently (March 2017), ANDE increased the prices of electricity between 8 and 108 percent, with prices of electricity for the industrial sector increasing between 40 and 48 percent. Although firewood and wood chips still remain cheaper than electricity or

⁴³ According to ISIC Rev.4, code 2392: manufacture of structural non-refractory clay building materials: manufacture of ceramic bricks, roofing tiles, chimney pots, pipes, conduits etc. Section C, manufacturing: Division 23, Manufacture of other non-metallic mineral products.

⁴⁴ According to ISIC Rev.4, code 0164: This activity includes the drying, cleaning, grading and treating of seeds until they are marketed.

⁴⁵ According to ISIC Rev.4, code 1072: Manufacture of sugar. Section: C – Manufacturing; Division: 10 - Manufacture of food products; Group: 107 - Manufacture of other food products; Class: 1072 - Manufacture of sugar.

fuel oil, it is expected that its prices will continue to rise, as the Zero Deforestation law expands to the Chaco region by 2018. That will further restrict access to non-sustainable sources of biomass, changing the relative prices with other energy sources such as hydroelectricity.

135. Substitution of firewood by electricity is possible given current forestry regulations related to deforestation that limit the availability and price affordability of firewood (see section C.6). However, there are risks for hydroelectricity reliable supply related to infrastructure development in order to reach all potential end users, most of which are not located in the most economically active Regions.

136. Energy networks are currently available in most of the economically active regions of the country, thus the supply is available to deal with an increase in industrial demand. However, the safe provision, quality of service and interruptions in electricity supply led in the past to distrust by economic actors as their security in electricity provision is not ensured.

137. Despite this distrust the use of electricity in industry has increased annually by 17% relative to an annual 3% increase in fire-wood use and 5% annual increase in residues use by industry according to the National Energy Balance 2011, 2013 & 2014, indicating a slow, albeit over-proportional drive towards electricity.

138. The current program considers these risks and has specific activities incorporated in the technical cooperation, more information and transparency about prices to investors so that business decisions in favor of a potential fuel switch are realized. This is particularly relevant given the informality of the market, imperfect knowledge about drivers of price changes and the fact that the prices differ between regions especially with the distance between fuel wood demand and supply centers (Mautner Markthof et al, 2008)⁴⁶. Mitigating this uncertainty through price information provided through component 1.3.1 will furthermore help support industrial fuel wood users in their long-term investment decisions

139. In addition, component 2 of technical cooperation activities should support the government to promote their policies, standards and good practices that can engage further technology providers and the private sector in investing in energy efficient equipment, as well as informing the government and review the legal, regulatory, and institutional enabling frameworks for EE investments.

140. Finally, it should be noted that as the program is open to any energy efficiency improvements, and additional technologies that may not necessarily rely on biomass fuel switch would also be supported (see: Briano et al 2017)⁴⁷.

C.6. Regulation, Taxation and Insurance

141. **General Context.** The proposed Project does not require government licenses nor specific permits for promoting and facilitating through LFI the implementation of EE projects. The project is conducted through the executing entity AFD, and supporting first tier LFIs. Both AFD and LFIs are governed by the financial system legal framework and are authorized to legally operate as financial institutions under the supervision of the Central Bank. The Paraguayan financial sector is regulated by the Central Bank of Paraguay, which is responsible for supervising banks, financial and other credit institutions, to ensure these institutions comply with applicable laws. The Paraguayan financial system is regulated by Law 861/96 and by the charter of the Central Bank, which provides that the Central Bank has exclusive right to issue currency. It also controls the monetary system and regulates the monetary base. It also oversees the financial system by regulating the activities of financial institutions and provides loans to banks in financial distress. AFD was created by Law 2640, enacted in 2005.

142. Paraguay maintains a free monetary exchange policy and the purchase and sale of foreign currencies is not subject to any controls or regulations, except for transfers over US\$ 10,000 which are subject to a sworn declaration stating the origin and destination of the transfer.

143. The most relevant taxation regulation is the Value Added Tax (VAT) tax. They impact the project as follows:

⁴⁶ Fuel prices vary among different regions within Paraguay at with a factor of 3 or beyond, where supply is insufficient to meet demand, illustrating that access and transportation costs play an important role limiting profitable distances for most industrial consumers to below 100 kilometers. Paragraph 5.33 in Mauntner Markhof et al. (2008) "In this country [Brazil] wood and charcoal is needed for grain drying and in the metallurgical industries. Occasions were detected in which fuel wood buyers and intermediaries paid three or more times the normal price for fuel wood in the areas close to border with Paraguay, especially Capitain Bado and Pedro Juan Caballero." Translated from the Spanish original "[...]. En este país [Brasil] se requieren de leña y carbón para dos fines principales: el secado de granos y las industrias metalúrgicas. Se han detectado casos en donde compradores o intermediarios pagan hasta tres o más veces del precio normal por cada metro estéreo de leña en las zonas de frontera seca con Paraguay, en especial Capitán Bado y Pedro Juan Caballero." A "meter estereo" is 0.59 m3. See Triana (2001). The higher price paid by Brazilian counterparts can be a reflection of higher purchasing power, no access to fuel wood due to already deforested or regulated areas. The finding strongly suggests that prices increase significantly at the border to areas where there supply cannot meet demand and that this scenario is increasingly probable in Paraguay. Taken together these findings strongly indicate a relationship between price, accessibility of fuel wood and transportation distance which has so far not been reflected in the fuel wood price increase scenarios of 20% or more. Rather these findings suggest that in regions where supply does not meet demand prices are substantially higher than depicted in the economic and financial analysis in Annex III. With increased demand and distances to the demand centers, the number of the aforementioned regions increase which will eventually lead, even in absence of enforced regulation, to significant fuel wood price growth.

⁴⁷ Briano et al (2017) Energy efficiency in Paraguay [Eficiencia energética en Paraguay: identificación de oportunidades]. CAF – Development Bank of Latin America

144. **Taxes.** Amongst relevant taxes to be considered from the Project perspective, key ones are consumption taxes, in particular VAT that is applicable to transfer of ownership of goods from one person or company to another; rendering of personal services and importation of goods. Excluded are personal services performed under the Labor Code of Paraguay. Tax Rates: 5% for assignment of rights of use of goods; 5% for transfer of real estate; maximum of 5% for sales of basis alimentary goods; 5% on interests, commissions and charges for loans; 5% for sales of pharmaceutical products; 10% for rest (general tax rate is 10%).

145. **Environmental Regulations.** Law 294/96 and Law 1561/01 govern the treatment of and procedures for environmental issues in Paraguay. The Environment Ministry (*Secretaría del Ambiente*, SEAM), as an independent regulatory institution was created by Law 1561/00. This Law also originated the National Environment System (*Sistema Nacional del Medio Ambiente*), which is integrated by representatives of different public sectors (administrative, municipal, etc.) and private sector. The National Environment System has the role of supporting the SEAM in its policies, and agenda and strategy setting.

146. According to the Environmental Law, any natural or juridical person that performs industrial or agricultural activities must file at the SEAM an Environmental Impact Assessment to obtain an Environmental License. Said permits are required for any kind of activity that may affect the environment. This "EIA" must ensure that all environmental implications are taken into account before performing the desired activity.

147. Paraguay also enacted the "Zero Deforestation Law" as Law 2424/04 on December 2004.⁴⁸ This Law intends to promote the conservation, preservation and management of Native Forests in the Eastern Region of Paraguay (Región Oriental) by prohibiting activities such as transforming and converting surfaces covered up with forest for activities such as agriculture, livestock, etc. This prohibition was in force until December 2013, and the Paraguayan government has extended it for a further five years. This law includes the prohibition to issue permits, licenses, authorizations and/or any other legal document authorizing the transformation or conversion of these areas with native forest to areas for agriculture, and livestock activities. The implementation of this law may impact the supply (and price) of firewood, and may further incentivize the switch from biomass to hydroelectricity in the focus industries. It also prohibits the issuance of permits, licenses, authorizations and / or any other form of legally valid document, which covers the transformation or conversion of areas covered by native forests, to areas intended for agricultural use in any of its modalities, or to areas intended for human settlements. The validity of this Law was subsequently modified and extended to the Western Region of Paraguay (Chaco) and is currently valid until 2018. Afterwards, the Paraguayan government promulgated Law No. 4.241 / 10 "Restoring Protected Forests within the National Territory", where the Law declares of National Interest, the restoration and conservation of protective forests of the watersheds of the Eastern Region and the Western Region."

C.7. Institutional / Implementation Arrangements

148. All procurement will be conducted in accordance with the IDB's procurement policies and procedures. The following procedures shall apply: a) Individual Consultants – Human Resources procedures (AM-650), b) Consulting Firms –the Policies for the Selection and Contracting of Consultants financed by the IDB (GN-2350-9) using e-Sourcing; c) Non-consulting Services –Corporate Procurement Policy and procedures (GN-2303-20).

149. **Component 1 will be executed by IDB**, to support AFD in the coordination and implementation execution of this EE integrated Project. Component 1 will be executed by IDB to ensure that the following activities are put into place:

150. Developing and implementing a demand incentivization scheme, with standardized elements (contract, validation methodologies and processes, and insurance) to encourage EE investment by industrial firms, in particular SMEs;

- Supporting the institutional mechanisms and instruments that ensure the technical validation of projects and energy services and EE equipment providers;

- Supporting the design, development and implementation of a monitoring and evaluation system for the monitoring and assessment of Project results, measured in terms of energy savings and GHG emission reductions;

- Hiring of a technical coordinator to support AFD with the day to day management and coordination of proposed Project activities;

- Promoting the Project to potential clients in the selected market segments, LFIs and energy service and EE equipment providers, insurers and validators to create a pipeline of bankable EE projects.

151. **Component 2 will be executed by IDB** to promote a policy environment favorable to the Project activities. This component will support the Energy Ministry in the enhancing the execution of its policies and legislation for the reduction of use of fuel wood and promote use of standards and technologies that reduce energy consumption and increase sustainability in the use of biomass.

⁴⁸ Furthermore, Law 515/94 prohibits the export and trafficking of wood rolls, lumps and beams. More specifically, the export and international trade of timber in rolls, pieces and beams of any kind, quantity, weight or volume is prohibited. In addition, it prohibits the installation and operation of wood processing industries in rolls at a distance of less than 20 kilometers in an important strip of the border.

152. **Component 3 of the Project (loan) will be executed and coordinated by AFD.** AFD has the experience and the necessary technical, operational and administrative capacity for the effective implementation of the financial intermediation component.

153. For implementation purposes of component 3 (Loan), AFD will create, as necessary, an executing unit within its current institutional structure, and appoint a project coordinator, to be responsible for the overall execution of the project and for interaction with the IDB, the Accredited Entity.

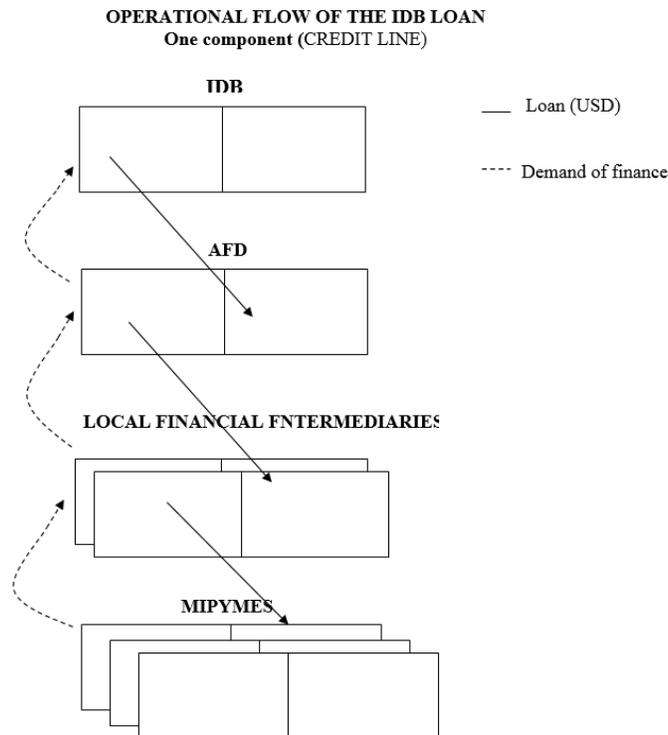
154. When acting as Executing Entity, the IDB will be responsible for the overall management, implementation and supervision of the Project, in line with its own internal policies and procedures. When not acting as Executing Entity, the IDB, as Accredited Entity and in line with the Accreditation Master Agreement (AMA) signed between the IDB and the GCF, will (a) administer and manage the use of GCF Proceeds; (b) incorporate provisions in the Subsidiary Agreements requiring the Executing Entity to require the management, implementation and supervision of each Funded Activity in line with the Accredited Entity's own internal policies and procedures; and (c) be responsible for the monitoring, evaluation and reporting responsibilities as set forth in the AMA.

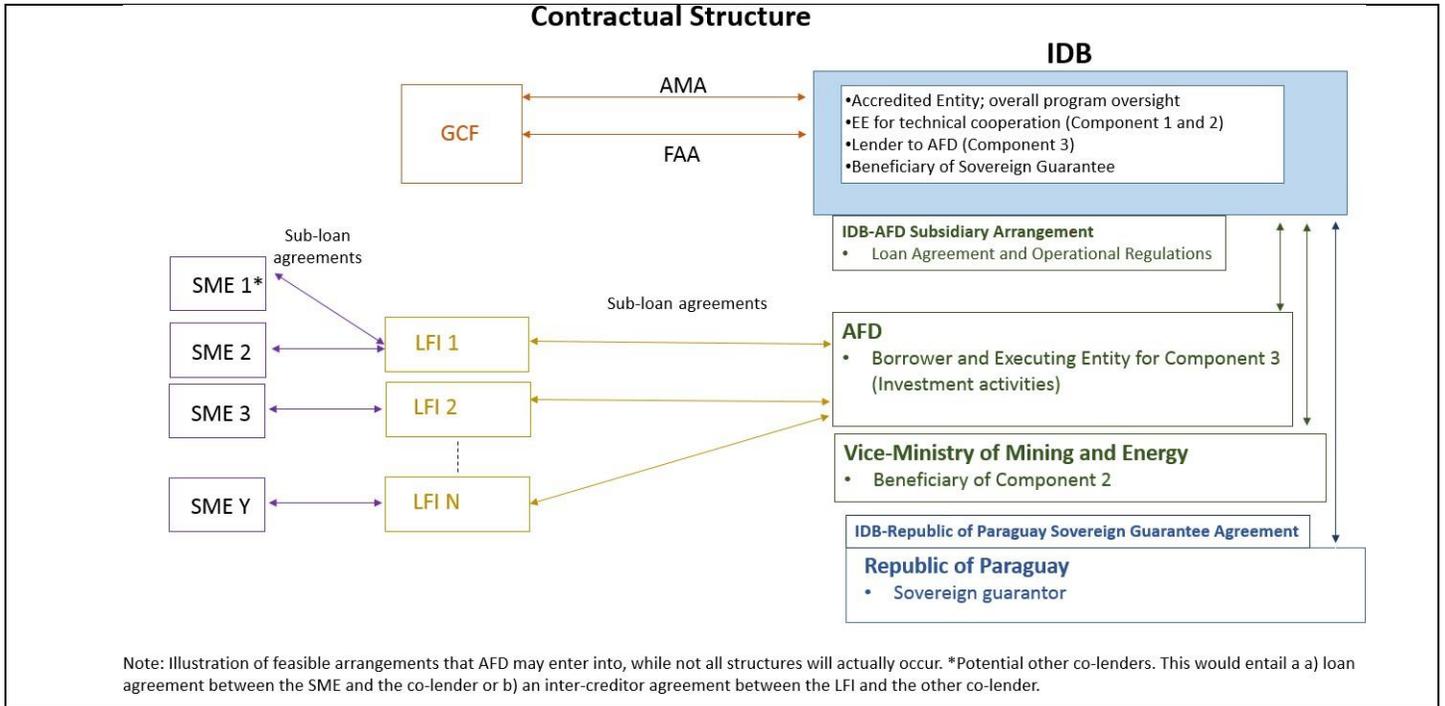
155. As part of the IDB loan approval process, a draft of the Operational Regulations (OR) will be attached to the loan package. Those regulations, to be agreed upon by AFD and the IDB, will establish the eligibility criteria of Project beneficiaries, lending limits and types of investments, as well as all relevant fiduciary arrangements and environmental and social safeguards. The approval of the Project's Operational Regulation by the Board of Directors of AFD is a necessary condition prior to first disbursement of the project's reimbursable resources.

156. Formal execution agreements will be signed with the beneficiaries (for component 1 with AFD and for component 2 with the Energy ministry.)

As detailed in the following figures, Component 3 of the Project (loan) will be executed and coordinated by AFD. AFD has the experience and the necessary technical, operational and administrative capacity for the effective implementation of the financial intermediation component.

PROMOTING PRIVATE SECTOR INVESTMENTS IN ENERGY EFFICIENCY IN THE INDUSTRIAL SECTOR IN PARAGUAY





D.1. Value Added for GCF Involvement

158. As mentioned in section B.1, the market assessment undertaken in preparation of this Project (see Annex II) has identified a number of financial and non-financial barriers to investments in EE that need to be addressed in a comprehensive manner to ensure transformational impact in the local markets. The IRR without CF support is already suitable for project implementation. However, as observed in the market projects are not happening. Thus, the value-added of the GCF and the proposed package of financial long-term and non-financial instruments will address barriers and catalyse project investment by mobilizing private actor. By financing the design and implementation of AFD's EE Financing Strategy (ESI scheme), the GCF will significantly contribute to the market development and increase of private sector investments in EE. The concessionality of GCF resources will allow to reduce the risk of LFIs to participate in EE investments with SMEs. Without the GCF's combination of grant and concessional loan contributions, financing by LFIs and local investments in EE will continue to be limited in Paraguay.

159. The proposed GCF support for AFD EE Financing Strategy is expected to build on proved lessons learned from IDB led initiatives in the region and enable the provision of a comprehensive package that would not have occurred without GCF intervention. In particular, the GCF grant resources will support the design and implementation of a set of standardized instruments (performance contract, validation methodologies, and ESI policy) adjusted to the financial and legal framework in Paraguay that should result in a more optimal risk sharing amongst market players (SMEs and energy service providers), enhanced trust of market players (LFIs and SMEs) EE technologies investment returns, and a demonstration impact that would address non-financial barriers mentioned in Table C.2.1.

160. The GCF loan resources will result in a dedicated second tier credit line (with AFD strong 1:1 co-financing) with adequate terms (interest rate and maturity) needed to match the payback of EE projects by SMEs, to engage LFIs in financing EE activities of SMEs by reducing the perceived risk by LFIs, and address the financial barriers to invest in EE projects.

D.2. Exit Strategy

161. Long-term sustainability of the Project is ensured by allowing relevant economic decision makers in each selected market segment to improve the accuracy of their EE investment risk perception (understanding clearly the actual risk/return profile of EE investments) and adequately gauge the impact of EE savings in cash flows and investment returns. AFD, with GCF support, will develop tailored financial and non-financial instruments that can spur private investments in EE in the long-run. LFIs are incentivized to broaden their support to EE investments in selected industrial sectors and economic activities as they perceived less risky to finance EE investments by SMEs. Further relevant market players (i.e. SMEs and LFIs) measure and factor in their decision-making processes the monetized results of EE investments and the benefits foster replication of the business model, even in different sectors, and the incipient paradigm is progressively consolidated. SMEs may view as more secure to take credit on credit with less risk for EE investments.

i. The proposed standardized contractual and procedural instruments, resulting from the activities in the grant component, ensure that risks are allocated to parties best able to manage these risks. These instruments, once established and proven in practice, are expected to contribute to change market behavior and investment criteria by economic actors, through a systematic formalization of the processes involved in estimating energy savings, ex ante calculation, estimates of GHG emission reductions at the micro level, verification and validation, and loan provision for EE projects, and establish a method to address lower than expected savings or delay in occurrence. These instruments help create trust and establish clear procedures for the interaction between economic actors and financial institutions engaged in channeling new and additional resources to their clients.

i. Energy prices in Paraguay, in certain cases, make EE investments economically viable without GCF support at current interest rates. However, the current lack of long-term credit to firms constitutes an insurmountable barrier as cash flows savings from EE investment do not match debt maturity. Further, those investments are not prioritized and financial resources are frequently used for increasing working capital or attending short term financial needs. The demonstration effect expected from implementing the business model aims at increasing the financing experience of LFIs with EE investments, allowing for the provision of long-term credit, and expanding the demand by firms in order to invest in EE technologies through multiplier effects. The short payback and relatively high IRR of EE technologies suggest that the model favors the transition towards a purely private market, after initial GCF support is phased out.

162. The transformation impact of the Project, once the GCF financing is repaid, should allow for LFIs to be engaged in financing EE projects, even without having then available a dedicated second tier credit line from AFD, as they would have acquired sufficient experience in financing EE projects and adequately accounting for energy savings in cash flows.

163. Equally non-financial standardized contractual instruments are expected to be adopted by key market players (SMEs, validators and insurers) in business models that allow the Project to be replicated and scaled-up further without need for further support. The expanded client base would lead to diminished transaction costs and cost of services provided by the different participants in the market.

164. By leveraging funding towards investments in EE, AFD will allow LFI lending to industrial firms. Promotion of these EE investments will be facilitated by providing financial support to firms, allowing access to medium and long-term credit, in particular through financial products with appropriate tenors, interest rates, and grace periods, and in doing so, benefiting from AFD local financial markets knowledge and extended capillarity in Paraguay's financial system that will enable and promote innovative EE markets.

165. A key element of the Project comprises the financing of actual sub-projects to demonstrate that the introduction of technological improvements, acquisition of capital equipment and more efficient processes and practices to increase energy efficiency and substitute non-renewable fuels is economically and financially feasible, and thus subsequently stimulate the adoption of those technologies, sector and economy wide. Funding for the implementation of these projects is an important component of the proposed request for a GCF contribution (non-reimbursable resources). This contribution is critical to develop a market from the demand-side against existing constraints and barriers.

166. Good practices resulting from the implementation of these projects will serve as a model to build successful business cases and hence attract further additional private sector investments in the served industrial sectors. There is a well-structured methodology to develop and implement the project, and the know-how may be transferred to other National Development Banks (NDBs) in the region with the purpose of easing replication. The demonstrative effect of removing ingrained barriers could be quite useful to channel further climate financing.

167. The Project will promote, through its eligibility criteria, monitoring system, environmental safeguards and technical support, the switch from fuel wood to electricity where possible, and the more efficient use of fuel wood that is sustainable and from legal origin where electricity use is not possible, and thus will promote in the long run the formalization of wood market.

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's [Investment Framework](#), should be addressed where relevant and applicable. This section should tie into any request for concessionality made in [section B.2](#).

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation impact potential

168. The Project will be a significant direct contribution to a transformative shift to low-emission, sustainable development pathways in Paraguay by structuring the demand and the supply for financing EE projects in Paraguay. In addition, the Project will contribute to develop a new market and employment cluster of EE in Paraguay including inter alia: equipment and service equipment providers, technical assistance consultants, independent verifiers, insurance companies, equipment importers, and local suppliers.

169. The expected results include among others the following:

- Savings from eligible projects shall be between 8-44% in terms of energy savings compared to the projects' baseline and depending on the technology GHG emission reductions. Most of the investments will be in long-lived assets, meaning that the Project will contribute to avoiding lock-in of high-emissions.
- The GHG emission reductions from the underlying projects to be implemented are expected to be around 73,650 tCO₂eq per million of US\$ invested over the lifetime of the Project.
- A total of 390,090 tons of CO₂ eq. to be avoided or reduced per annum in year 5. Due to the phase-in start of sub-projects, the weighted annual reductions are 269,393 tCO₂e. The aggregate expected emission reductions of the total financing are about 4 million tCO₂eq over 15 years.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	<i>Expected tonnes of carbon dioxide equivalent (t CO₂ eq) to be reduced or avoided (Mitigation only)</i>	<i>Annual</i>	269,393
		<i>Lifetime</i>	4,004,899
	<ul style="list-style-type: none"> • <i>Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</i> • <i>Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)</i> 	<i>Total</i>	NA
		<i>Percentage (%)</i>	NA
Other relevant indicators	<ul style="list-style-type: none"> • National Energy Savings (Expected decrease in energy intensity of buildings, cities, industries and appliances) • Firms that receive access to credit from the Project's financing to invest in EE • Participation of loans for investments channeled to SMEs managed by women 	<i>GWh</i>	2,134
		<i>Firms</i>	Around 360 firms
		<i>Percentage (%)</i>	Increase from TBD% (currently) to TBD+x% ⁴⁹

170. The methodology applied to estimate tCO₂eq reductions included the following steps:

- Surveys were applied to a representative number of typical SMEs that could invest in EE projects in Paraguay. The aim of the survey was to understand some general characteristics of EE improvements in SMEs, such as EE energy consumption, existing equipment, age of equipment, use of equipment, among other issues.

⁴⁹ Currently, there is no statistical significant information to establish a baseline of credit in the industrial sectors focus of this study. That is, at the moment, there is not enough information to establish a baseline. At the same time, and explained in the financial context of Paraguay, there are few credit lines in those sectors, which exacerbates the situation of data reliability to establish a baseline on this gender indicators. Please see more details in Annex X on business ownership and challenges in registering women led businesses led women.

- ii. From this sample of SMEs, as well as from interviews and surveys with local technology providers, specific technologies deemed for improvement were identified:
 - o Ovens. Reduction in the consumption of non-renewable biomass through (retrofit) investments on more efficient furnaces using firewood as energy input. Reduction in the consumption of non-renewable biomass through investment in the replacement of existing furnaces by electric furnaces
 - o Drying equipment. Reduction in the consumption of non-renewable biomass through the introduction of electrical installations for grain drying
 - o Boilers: Reduction in the consumption of non-renewable biomass through (retrofit) investments on more efficient furnaces using firewood as energy input. Reduction in the consumption of non-renewable biomass through investment in the replacement of existing boilers by electric boilers
 - o Small-scale co-generation. Replacement of biomass waste for power generation with electricity, technological modernization and replacement of highly obsolete equipment; co-generation of electricity and steam is one of the most effective tools for energy efficiency in this industry, simultaneously allowing for the sale of surpluses to the public grid.
- iii. Based on the information from the surveys, local statistical information and information from technology providers, estimates were undertaken of energy consumption of current equipment and the likely energy consumption (savings) of the potential new equipment if it would be replaced by a more efficient technology. Based on this, an average investment per technology and per sector was identified.
- iv. Based on estimates of needed investment per technology by typical beneficiary firms and statistics regarding number and types of SMEs per sector, further estimates were produced regarding the number of projects that can be financed for a total financing of USD40 Million by the Project and another USD14.05 Million from equity and private sector co-financing (estimated from typical behavior of sub-loans from AFD) (see Table 1 in Annex II).
- v. Based on the number of potential projects⁵⁰, an estimate of the total energy saving per technology replaced and per sector activity / characteristics was undertaken.
- vi. Further, the CO₂eq reductions per year were estimated according to the type of energy reduced (fuel or electricity). The emission factors considered for Paraguay were: for electricity 4.76 Ton CO₂/toe.
- vii. Once the calculations of potential CO₂eq reductions per year were estimated, the number was multiplied by the lifetime of the technologies (the lifetime of the technologies has been estimated averaging and weighting the surveyed technology equipment lifetime for the technologies in Paraguay by the estimated distribution of the investment demand).

171. As an example of indicators applied to a similarly structured IDB-CTF EE project, a project to follow the same scheme in Mexico with the NDB FIRA, is expected to save 723,000 tCO₂ over 10 years and 1,597 GWh over the same period. The different benchmark numbers relative to the proposed Project result from two assumptions: i) larger equipment being used in Mexico, ii) multi-measure replacements of equipment in Mexico compared to one measure per firm in Paraguay due to smaller size and credit capacity per enterprise (as there is also a larger share of medium-sized firms in Mexico).

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

172. The project could be scaled-up and replicated with the development of the standardized financial instruments and capacity development that will be implemented by the project. AFD will stimulate the development of pipelines of bankable projects and provide finance under better conditions and terms (e.g., medium and long tenors, under higher risks) to LFIs, which may, in turn, offer sub-loans under favorable terms to eligible EE investment projects. The concessionality of GCF resources would reduce the underlying perceived risk for LFIs to lend to SMEs and EE investments. In the medium term, it is expected that with an expanded market of EE developed at the industrial level, further expansion would be financed by LFIs' own-funds once investors and financiers increase their confidence in and experience with EE projects.

⁵⁰ For sector 1, Non-Metallic, Ceramic and Brickmaking Industry, it is estimated that a total of 120 firms could substitute firewood with electrical energy and/or perform improvements in thermal insulation with an average investment of USD 220,000. For the drying equipment it is estimated that a total of 37 firms could substitute firewood with electrical energy (electrical dryer), with an average investment of USD 250,000. For boiler equipment the average investment is about USD 50,000. For small-scale co-generation projects average investment is USD 1.5 Million.

173. **Paradigm Shift.** As outlined in Figure C2.1, the theory of change of the Project has at its main impact in increasing energy efficiency in the industrial sector of Paraguay, in particular SMEs, with reduced GHG emissions through diminished demand of non-sustainable biomass energy sources and access to finance for financial inclusion. The Project aims to promote a significant paradigm shift in Paraguay, one that could be scaled-up and replicated. This paradigm shift includes:

- i. EE Investments by SMEs. Internalization of the notion of EE in economic analysis of investments by LFI, including the notion of resource use efficiency as an additional relevant criterion; thereby reducing the perceived risk by LFI and improving access to credit, in particular by SMEs, for EE projects that can generate cost savings and GHG emissions reduction;
- ii. Replacement of biomass with hydroelectricity. Promoting the replacement of non-renewable biomass, as a predominant fuel, with electricity in selected industrial sectors and economic activities. By decreasing demand of non-renewable biomass, the Project will contribute to address a major driver of deforestation and transforming behavioral patterns of production that are deeply ingrained in the industrial sector firms and in overall consumption patterns;
- iii. Economic and financial viability. Demonstration that climate change mitigation as a relevant policy goal can also be economically worthwhile for the private sector. Enabling institutional, policy and regulatory environment for EE investments. Support through the institutional strengthening of government entities to promote EE and develop related EE programs and initiatives

174. There are several areas where there is **scalability and replication** in the ultimately served sectors, as well as other industries that have not been included in this project. The Project is an intervention package that addresses a range of barriers to EE investment in an integrated manner on the basis of a thorough analysis of the national context. AFD, as a NDB, can reach out to a large number of LFI in Paraguay, thereby facilitating accelerated scale-up. The potential for achieving scale is largest where a large part of Paraguay's subsectors can be reached with a standardized and scaled up approach using a channel that has an extensive reach within the given sector.

175. The intervention can be replicated in the commercial sector and in other industrial sectors of the economy, where additional efficiency gains are expected from the replacement of inefficient energy-intensive equipment by private actors. Based on demonstration effects we expect the doubling of emission reductions estimated by the Project.⁵¹

E.2.2. Potential for knowledge and learning

176. The package of standardized tools, which the Project is expected to develop, has a strong replication potential in other market segments and elsewhere. The Project implementation includes a number of consultations and capacity building process of key market players (SMEs, LFI, ESTPs) and a strong dissemination and communications strategy around these standard tools and business model. In addition, the monitoring activities during project implementation will provide information and early lessons from good practices to be further replicated in later implementation stages of the Project and disseminated to market players.

177. The Project will promote the collection of information and dissemination of lessons learned and best practices in the development of AFD's Financing Strategy. This would allow to exchange experiences and replicate results in other regions with similar challenges for investment in EE projects. The project expects to contribute in the creation and strengthening of knowledge and collective learning processes in the following areas:

- Knowledge generation. Development of studies, webinars, presentations, newsletters and guidelines showing specific experiences in structuring the AFD's EE Financing Strategy.
- Knowledge Dissemination. Organization, in collaboration with national and regional banking and energy service provider networks in Latin America (such as ALIDE, FELABAN, ABDE, ESCO) and sectorial SME associations, of national and regional events to share experiences with and disseminate knowledge products to other NDBs, LFI, energy services and technology providers and potential SME project developers.
- Design and maintenance of dedicated web interfaces for the Project and its activities to be disseminated under IDB dedicated web pages to promote knowledge sharing among LFI and NDBs about green financing, i.e. "Klave Finanzas Verdes" and the community of practices for Financial Institutions on green finance.
- Training and Outreach. Organization of training and outreach to SMEs, LFI and ESTPs to be promoted through AFD's training and promotion systems and facilities and with the support of dedicated technical

⁵¹ This calculation takes into account that Paraguay's economy consists of 224,242 economic units employing 799,153 people and that SMEs represent 96.9% of total businesses in Paraguay, generating 61.6% of the total number of jobs for the economically active population.

experts.

- All these knowledge and learning activities will include best practices in women-owned and -led SMEs accessing financial services for EE.

178. At the same time, as part of the project (Component 1.2) there will be awareness raising, capacity building and dialogue with key audiences, in particular: a) Key industrial sector firms and its representative institutions (Unión Industrial Paraguaya and other relevant industrial associations); b) SME and their representative institutions; c) Local Financial institutions; d) Insurance companies; e) Equipment providers (local and imported); and f) Government regulators.

E.2.3. Contribution to the creation of an enabling environment

179. The Project will help develop an EE cluster in Paraguay, which includes a number of specific developments such as methodologies for identifying and assessing EE projects; legal documentation and structuring; monitoring and verification of energy savings and GHG emission reductions at the project level; issues related to access to finance, including warrantees and insufficiency of collaterals, among others. These measures, together with the demonstration effect achieved through the actual implementation, and the associated capacity building and awareness raising among key audiences in the selected EE market segment, will contribute to strengthen an enabling environment for further expansion and scaling-up of this market.

180. A key element of the new business model is an insurance product covering projected energy savings for specifically defined and verifiable EE measures that are agreed upon under a standard contract between firms and technology solution providers. It seeks to overcome barriers that businesses and technology solution providers encounter when seeking to finance EE measures from expected future energy savings. This assurance both the end-user/investor and the bank that energy savings will be sufficient to pay back the financing, while also building the capacity and credibility of technology solution and energy service providers. The enabling environment created through the GCF funds will allow for a market independent of AFD's credit lines in the long-term.

181. The creation of standardized instruments (performance contract, validation methods, and insurance policy) will enable the market to demonstrate the viability and profitability of EE investments and in the long-term promote EE investment demand and financing supply without public support. The ESI model emphasizes the use of standardized approaches that minimize transaction costs. This is enabled by focusing on sectors and technologies where relatively standard EE solutions are available. Technologies covered to date include: air-conditioning, electric motors, industrial boilers, refrigeration, and refrigeration systems. The use of standardized approaches is expected to allow the familiarization of the market with these investments and the transformation from an unknown investment to business as usual.

182. The Project will promote, through its eligibility criteria, monitoring system, environmental safeguards and technical support, the switch from fuel wood to electricity where possible, and the more efficient use of fuel wood that is sustainable and from legal origin where electricity use is not possible, and thus will promote in the long run the formalization of wood market.

183. The enabling environment that the Project will generate will have such a transformational impact that, once the GCF contribution finalizes, LFIs would be engaged in financing this type of projects even without the second-tier credit line from AFD.

E.2.4. Contribution to regulatory framework and policies

184. The Project aligns and reinforces public policy priorities related to climate change, energy use, and productivity upgrading set by the Government of Paraguay. With its focus on allowing access to climate finance and leveraging private finance, this Project is not primarily targeting domestic policy and regulation, but rather the mobilization of private sector investment for mitigation activities through EE. The Project is at the same time fully aligned with national plans and strategies, energy policies, climate policies and measures and national contributions to international cooperative efforts submitted by Paraguay. It is important to mention that AFD in its role as a public institution within the financial system will allocate GCF resources in order to accelerate the achievement of the goals set up by the government in EE investments,

185. The project supports the Government in promoting the execution of the energy law and the relevant policies aimed at reducing the use of fuelwood. This will be done through a comprehensive analysis of the sector and by fostering a policy dialogue process between government entities and with inputs from private sector market players.

186. The ESI is aligned with the National Energy Efficiency and Climate goals, as well as the Mitigation Strategy (2014), specifically with the initiatives and programs directed at private end-beneficiaries. The proposed AFD's EE Financing Strategy is a response to the barriers mentioned in section C2, as well as the absence of regulatory

framework and policies that incentivize EE. Through close collaboration with the National Committee on Energy Efficiency (CNEE) and AFD, the project ensures that all lessons from the Project contribute to and inform the discussion in Paraguay on EE measures and standards (Annex II). The main contribution to the regulatory landscape is the standardized contractual arrangement, which promotes the EE market by addressing investor and financier uncertainties.

187. To address the current demand for electricity not covered, and to ensure support to an average annual growth of 8.9% in the electricity demand in the next 8 to 10 years, Paraguay developed an ambitious plan for the development of transmission (3,891 km) and distribution (72,346 km 46% medium tension, the remainder low tension) lines as well as additional hydro generation capacity (additional 396 MW) till 2025 (ANDE, 2016). The total of these investments is expected to be US\$6.9 billion. Assuming the current Plan would be successfully implemented, and all consumers have full and efficient access to electricity, a significant shift of current equipment (particularly for agrobusiness) to electricity-utilizing equipment will require time, knowledge and increased financial capacity to undertake the investments in new and less available technologies in the market. Through its activities the Project results in that SMEs reduce Paraguay's reliance on fuel wood and fossil fuels by promoting: (i) switch from fuel wood reliance to electricity; (ii) where transmission lines are currently not accessible, and agricultural residues are available close-by, switch to agricultural residues; and (iii) where the first two options are not available or not bankable, promote a change to more efficient equipment that utilizes less and more sustainable fuel wood. This strategy supports both the long term (shift to electricity and other more sustainable energy supply sources) and medium term (reduction of reliance in fuel wood by industry) of the government's plans to increase the country increased reliance in hydro and cleaner energy and supports the transition of industrial SMEs to shift from fuel wood to electricity. The proposed project with a total volume of USD 43 Million allows Paraguay to start the transition to electricity via the three-thronged strategy discussed above, which will allow SMEs to understand the benefits, LFIs to learn about lending for EE equipment to SMEs. Together with the market intelligence gathered through the wood market assessment (Component 1.3) and the close work with the Vice-Ministry of Energy and Mining (Component 2) the project allows to bridge and to enable Paraguay's path to a fully low-carbon economy.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

188. The Project will contribute to bolstering the adoption of sustainable development pathways in Paraguay by:

- i. Promoting the modernization of key industrial sectors and economic activities, through investment in more efficient technology and processes, thus increasing their competitive strengths;
- ii. Improving the alignment of resource allocation in production processes with national resource endowment, in particular by shifting to the extended use of electricity as an energy input in production;
- iii. Play a part in increasing awareness amongst economic actors that sustainable pathways are both technically and economically feasible, as well as profitable.
- iv. Contributing to abate drivers of deforestation and forest degradation by diminishing the demand for non-sustainable biomass;

189. EE investments to be fostered through the proposed financing, in addition to climate change benefits, will bring about a number of economic and environmental co-benefits. The Project will contribute to reduce energy consumption and maintenance costs, enhancing productivity and competitiveness for industrial and commercial SME firms in Paraguay. The Project will also benefit the business environment by building capacity within the domestic private sector (including LFIs), increasing the access to finance through innovative financial instruments. The Project will also be set up to engage LFIs to provide financing to EE projects more easily in the long-term. And strengthening the industry sector and reducing energy and maintenance costs.

190. Some expected economic, social and environmental co-benefits are described below. Some of them have been included in the economic analysis of the project:

191. **Economic co-benefits.** Expected economic co-benefits would include:

- i. Production cost reductions in the selected sector, with potential spillovers in other industries with similar technology needs;
- ii. Increased profitability for SMEs through energy savings;

- iii. Strengthening of industrial clusters that are relevant as a source of jobs. It is estimated that the Project may create more than 1,000 additional direct, indirect and induced jobs in the energy efficiency sector.⁵²;
- iv. Strengthening of economic activities relevant from an external trade perspective, as a source of foreign exchange;
- v. Enhanced competitiveness through a contribution to the modernization of the industrial sector with the adoption of more efficient processes;
- vi. Enhanced financial inclusion.

192. **Social co-benefits.** Some of the expected social co-benefits may potentially include: i) Improved health⁵³ at the local level, as less use of firewood would reduce air contaminants; ii) Safer working conditions in industrial activities, with reduced labor rate accidents, in particular in the manufacturing of bricks and roofing tiles; iii) Improved job skills for workers in the sector.

193. **Environmental co-benefits.** The Project takes into account the need to improve environmental conditions in Paraguay through enhanced efficiency in the use of natural resources, in particular non-renewable biomass and water. The project may contribute to limit the increase in deforestation and forest degradation by diminishing the demand for non-sustainable biomass consumption and the loss of biodiversity.⁵⁴

194. It is worth noting that Paraguay has two main forest types: a) The Dry Chaco Forest Complex (DCFC); and b) The Interior Atlantic Forest (IAF). In the Interior Atlantic Forest of Paraguay, deforestation peaked in the 80s with average annual rates of deforestation then around 250,000 hectares (ha) and has diminished to about 20,000 ha per year in the last decade, due to the introduction of stronger regulatory restrictions but also due to depletion of the resource. This extended deforestation process resulted in a highly fragmented and degraded landscape in the eastern region. Deforestation in the DCFC has increased substantially and rapidly in the last decade due to rapid land use change: from 60,000 ha in 2006 to 242,301 ha in 2013.

195. As a consequence of the high deforestation rates, the DCFC is undergoing a dramatic process of habitat fragmentation. This extreme fragmentation has direct effects not only on the species of flora and fauna, but also on the physical characteristics of the environment, altering luminosity, humidity, temperature and evapotranspiration, which in turn change the ecosystems services stocks and flows. Fragile ecosystems, which are under risks of degradation, the clearance of natural vegetation cover and hydrological modification, such as the loss of soil fertility and increased salinity, have led to local desertification processes. The project may limit the increase in deforestation, where reduction of, or switch from, fuel wood consuming technologies are financed. Further, the Project will promote, through its eligibility criteria, monitoring system, environmental safeguards and technical support, that , where electricity use is not possible, the more efficient use of fuel wood that is sustainable and from legal origin, and thus will promote in the long run the formalization of wood market. .55

1. **Gender-sensitive development impact.** The Project presents a priori more opportunities than challenges as regards gender equality. One of the key targets in terms of the number of beneficiaries are SMEs in Paraguay where women have a relevant representation in the labor force or in management. This is especially true in the ceramics industry, which will be part of the sectors served by the project. As the project aims at improving the SMEs results

⁵² We estimate this based on an assumption of 20 direct, indirect and induced jobs in the energy efficiency sector per USD 1 Million of energy efficiency investment in the US economy (see EESI 2014 Fact Sheet: [Jobs in Renewable Energy and Energy Efficiency](#)). We use this number in absence of better data for Paraguay.

⁵³ For example, improved health at the local level lacks the necessary data, as there is no information on health impacts of brickmaking in small communities in Paraguay, as well as information on working conditions and accident data for the targeted sector. Unquantified reduction of pre-combustion and post combustion effects as well as occupational hazards from industrial wood burning are not available for Paraguay. There is information for Rohr et al 2015 Potential Occupational Exposures and Health Risks Associated with Biomass-Based Power Generation International Journal of Environmental Research and Public Health as well as Madsen et al 2004 Microbial dustiness and particle release of different biofuels Annals of Occupational Hygiene that could serve as reference, but without proper information of local population and conditions, we cannot estimate this at present moment.

⁵⁴ While the loss of biodiversity has been discussed extensively qualitatively in the literature the application of quantitative methods to assess biodiversity loss require extensive data for results to be credible. See USAID 2010 Report on Biodiversity and Tropical Forests in Paraguay and Yanosky 2013 Paraguay 's Challenge of Conserving Natural Habitats and Biodiversity with Global Markets Demanding for Products in *Conservation Biology: Voices from the Tropics* and for quantitative methods Allnutt et al 2008 [A method for quantifying biodiversity loss and its application to a 50-year record of deforestation across Madagascar](#) in *Conservation letters*.

⁵⁵ The project's objective is to promote reduction of GHG from energy efficiency in Paraguayan SMEs through the provision of medium- and long-term finance solely to energy efficiency technologies and by addressing non-financial investment barriers for these projects. The project is technology and sector-open and is not bound exclusively to technologies which reduce deforestation. Thus, the final portfolio of sub-projects financed might have anywhere between 0 and 100% of participation of fuelwood-utilizing equipment. Hence the project does not claim it reduces deforestation, as it can at *most limit the increase deforestation*, where reduction of, or switch from, fuel wood consuming technologies are financed.

and productivity through a decrease of their energy bills, it would be expected to increase revenue for women in the ceramics industry. Please see Annex X (Gender Analysis and Action Plan) for more details on the gender approach of the project.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

Does not apply.

E.4.2. Financial, economic, social and institutional needs

2. **Strategic context:** Paraguay has a small, open economy historically devoted to producing and exporting agricultural products and electrical power.⁵⁶ Over the last decade, Paraguay has substantially improved its economic performance. After almost two decades of economic stagnation and instability, between 2005 and 2014, Paraguay's GDP grew at an average rate of 4.9%.⁵⁷ This economic growth, however, has been volatile, peaking at +14.2% in 2013 and dipping to -4% in 2009. Both instances were largely the result of the yearly performance of the primary sector and the exogenous factors on which it depends. Economic growth has been largely driven by a relatively undiversified export agriculture sector (soybeans, cereals and meat). The agriculture sector's economic vulnerability to external shocks, climatic events, and international price volatility of the country's agriculture commodities, has been contained through a sound macroeconomic policy framework. Electric power exports also have a significant role as a steady driver of economic growth and by contributing to create external surpluses.

3. As a result of an extended but fluctuating growth cycle, per capita GDP grew by about 33 percent in between 2005 and 2014. Strong fiscal consolidation contributed to the economic turnaround observed since 2003. Overall fiscal surpluses averaged 0.5 percent of GDP between 2003 and 2013, and public debt fell from 41 percent of GDP in 2003 to 14.1 percent in 2013. Favorable terms of trade and the strong performance of exports led to current account surpluses averaging 1.1 percent of GDP in this period. The country has also enjoyed relative price stability. Favored by a consistent and cautious monetary policy, average inflation fell from the two digits levels observed in the 1990s and early 2000s to an average of 6 percent in the past decade.

4. **Level of exposure to climate risks for beneficiary country and groups.** In terms of total exports (US\$9.655 billion), Paraguay's primary sector accounted for 50% of this total in December 2014. Foremost among these exports were soybeans (24% of total exports), beef (14.2%), and grains (6.4%). Including soybean meal, the leading agroindustry, the sector accounts for more than 62% of total exports. The leading destinations for Paraguayan exports are the Mercosur countries (40.1%), as well as the other countries of the Latin American Integration Association (12%) and the European Union (14.7%). As mentioned Paraguay is a small and open economy, highly dependent on agribusiness, and international trade. The country is thus economically vulnerable to acute fluctuations in the price of its major commodities, to swings in demand of key trading partners and weather cycles as climate events have an impact in yields and total production. Economic vulnerability to external shocks and climate events has a direct impact on macroeconomic stability and growth as well as dire effects on the level of moderate and extreme poverty and shared prosperity.

5. In fact, the recent cycle of economic growth has resulted in strong poverty reduction and in boosted shared prosperity in a country where income distribution gaps, poverty and inequality were chronically high. Moderate poverty declined sharply in 2003-2013, from 44 percent to 23.8 percent. Extreme poverty was also reduced from 21.1 percent in 2003 to 10.1 percent in 2013. It is worth noting that extreme poverty was more persistent and stabilized at around 18 percent between 2003 and 2010, before declining markedly during 2011-13. Inequality followed a similar pattern: the Gini coefficient was stable at around 0.52 between 2003 and 2011, and it fell substantially to 0.48 in 2011-13.

6. The annual growth rate of real per capita income for those in the bottom 40 percent of the income distribution was 5.9 percent, 2.2 percentage points higher than the national average per capita income growth rate of 3.7 percent. Advances in redressing inequality and diminishing moderate and extreme poverty, however, are dependent in sustained economic growth based largely on increasing agricultural production. These circumstances create tensions between environmental sustainability (as agricultural expansion further increase land use change and reinforces

⁵⁶ Central Bank of Paraguay (BCP): Statistical Annex to the Economic Report, 2015

⁵⁷ Central Bank of Paraguay (BCP): Statistical Annex to the Economic Report, 2015.

deforestation) and economic growth. Measures to diversify the economy, increase efficiency at scale and enhance physical productivity need to be implemented through innovation, technological progress and human resource capacity building and training. Expansion of the SME segment of the domestic market in Paraguay is also significant to that process and access to finance is crucial to make it possible.

7. The Paraguayan economy primarily relies on the exploitation of natural resources and the production of commodities, environmental changes, in particular those associated with non-sustainable use of natural resources, might increase socio-economic risks in the future. It is also expected that indigenous communities will most likely lose their natural and cultural heritage, and with that their livelihoods.

8. **Financial system and local capital market constraints.** As explained in B.2, Paraguay's financial system is relatively liquid but lacks depth, and alternative sources of finance do not exist due to a) the non-financial barriers to EE investment and b) the lack of long-term finance at adequate conditions for EE projects. Despite its substantial progress in recent years, the system has structural weaknesses that prevent it from meeting the demand for, especially long-term credit among local productive sectors. Access to international climate finance to develop instruments for the development of the EE market, and the expansion of the share of AFD in long term credit lending to the productive development is expected to mitigate part of the structural weaknesses of the system.

9. **Needs for strengthening institutions and implementation capacity.** There is a need for enhanced awareness and further strengthening coordination towards an institutional response to climate change. The prevailing paradigm of seemingly inexhaustible natural resources (land, water, forests) has pervaded the approach to policies and measures, production, market development and consumption. Gradually, a legal and regulatory framework towards ensuring sustainability has emerged and is being consolidated at government level. The tension between prevalent styles of development, which are structurally unsustainable and a new sustainability paradigm still permeate the views and interactions of different government agencies. At the planning level these tensions are being addressed, while there is still a need to move to implementation at scale. In addition, there is a need to further strengthen enforcement capabilities in particular in environment issues and ensure private sector compliance with an array of laws and regulations that have enacted in an effort to provide an adequate framework for action.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

10. The Project will be fully owned by Paraguay given the robust participatory process envisaged, the key role played by AFD in fostering commercial banks engagement and active participation, as well as the coordination between core governmental agencies involved.

11. Coherence and alignment with the country's national climate strategy and priorities in mitigation and adaptation. The Project is fully aligned with:

- **The National Development Plan 2014-2030** (*Plan Nacional de Desarrollo, NDP*). This plan makes the eradication of extreme poverty its paramount objective and contains an ambitious reform agenda to achieve it. In order to raise economic growth and reduce its volatility to ensure sustainable poverty reduction, the NDP supports economic diversification strategies, management of agriculture sector risks and policies to ensure environmental sustainability. The NDP also envisages a strong public investment effort to alleviate binding infrastructure constraints.
- **National Energy Policy.** Executive Decree 6092 was signed by the President on October 2016 officially enacting the execution of Paraguay's National Energy Policy. The policy establishes a framework for the development of energetic sector in the country and its organized by Action Plans conformed by their respective strategic lines, instruments and goals for short (2017-2023), medium (2024-2030) and long (2031-2040) term development. The policy outlines EE as one of its prioritized objectives with an Action Plan composed of ten (10) elements to encourage the growth of this sector including a plan to promote EE in industry and a program for the support in the improvement of technology, equipment and processes. It also states an Action Plan to ensure mobilization of capital for energy-related investments such as EE.
- **National Energy Efficiency Plan.** The project is aligned with the planned actions for at the industrial levels, which seeks to introduce EE measures in the use of steam and heat in the industry. Specifically, it aligns with promoting cogeneration (technology innovation), promote technology improvements in equipment and processes (promoting measures of equipment substitution and modernization) to incorporate new technologies with higher efficiency

levels, promote technical assistance and capacity building in EE project implementation and promote the implementation of energy audits and systems of energy management.

- **The national climate and energy goals of Paraguay.** The Project is developed in close partnership from the beginning with the Ministry of Finance, Ministry of Environment, the Climate Change Direction and implementing partners, as well as coordinated with a relevant Paraguay government agency, as AFD.
 - **Third National Communication (TNC).** The TNC (2017), currently under final preparation, of the Government of Paraguay to the United Nations Framework Convention on Climate Change (UNFCCC), that in its mitigation section focuses on creating effective incentives for energy efficiency and renewable energy, technology transfer, as well as the adoption of policies for energy efficiency.
 - **The Nationally Determined Contribution (NDC).** The NDC of Paraguay (2015) establishes a unilateral goal of 10% of national GHG emissions reduction by 2030 and an additional 10% conditional of access to climate finance by 2030. The NDC also refers to the diverse objectives proposed in the NDP, including, inter alia, the effective control of deforestation, increasing consumption of renewable energy, increasing efficiency in the agricultural system, and reducing deforestation and forest degradation, amongst other actions. Initiatives under development targeting climate change mitigation and energy efficiency also include National Appropriate Mitigation Actions (NAMAs) schemes.
 - **National Climate Change Plan (NCCP), Phase1 – Mitigation Strategy (2014).** The NCCP that includes among its strategic lines of action the following:
 - Promote EE measures and provide financial incentives and facilitate access to finance to those that foster renewable energy generation
 - Strengthening institutional capacity to coordinate actions towards EE and sustainable use of energy
 - Promote and adopt sector policies towards clean energy through measures oriented to private sector investment in efficient energy equipment
 - Access to and mobilization of financial resources to improve energy systems including in the industry sector
 - Promote reforestation with energy purposes to diminish pressure on native forests in particular in the Eastern region (see D.3)
12. The Project GHG reductions contributes to the NDC 10% conditional GHG reduction by 2030, which is conditional to access to climate finance.
13. Lessons learnt from project implementation will inform the regulatory discussion with demonstration examples from practice for regulators. To ensure alignment and support for regulatory activities, the Project grant budget contemplates a further detailed assessment of the current regulatory situation and continuous lessons learned activities, coordinated with the National Committee on Energy Efficiency (CNEE) and other relevant government entities to inform the regulatory discussion.

E.5.2. Capacity of accredited entities and executing entities to deliver

14. **Accredited Entity.** The Inter-American Development IDB (IDB) is the main source of multilateral financing for Latin America and the Caribbean (LAC). Since 1961, the IDB has provided almost USD 246 Billion for projects to reduce poverty, raise standards of living, spur economic growth, protect natural resources, foster integration and trade, and reach other agreed goals. IDB's operations approvals in 2014 totaled USD 13.8 Billion and average annual approvals have increased consistently from USD 9.8 Billion in 2005–2009 to USD12.6 Billion in 2010–2014. The IDB is a global partnership of 48 member countries in which the 26 borrowing countries of LAC hold the majority of shares. The IDB holds a credit rating of AAA/aaa.

15. **Executing Entity.** AFD was created as an autonomous public institution, of indefinite duration, with legal personality, and its own patrimony, through Law 2640 of 2005, enacted by the National Congress of Paraguay. The creation of AFD was intended to mitigate the structural flaws verified in market terms in order to spur economic development and promote job creation. Through the AFD's provision of long-term finance it helped lengthen loan terms in the system. Longer terms allow firms to make larger and long-term investments, thereby promoting job creation and higher competitiveness.

16. AFD is the only second-tier bank in Paraguay. AFD is the sole executing agency for loan agreements or grants that provide financing for development programs and projects, with the financial intermediation and sovereign guarantee of the State. The AFD is the only channel for loans from the public sector to public and private first-tier intermediary local financial institutions (LFIs), credit unions supervised and regulated by Paraguay's National Credit Union Institute, and other entities established by Law 51. AFD also has the authority to transfer technical assistance funds that might be associated with these programs through trust funds created for that purpose and administered by the AFD, who will act as trustee.

17. AFD is a second-tier development bank that promotes economic development and job creation. Its objectives are fulfilled by channeling loan resources targeted to investment projects for firms and loans for the households⁵⁸ through LFI. AFD aims to extend credit, in any form, to complement the funding structure of the first-tier financial intermediaries, cooperatives and other financial entities created by law. These funds will be granted to enable the implementation of short, medium and long term development programs, with internal or external funds from loans guaranteed by the Paraguayan State, donations from third parties, endowment budget funds, own capital and funds obtained from the issuance of bonds.

18. As of December 2014, the AFD had US\$527 million in assets with a loan portfolio of US\$362 million (68% of its assets). The AFD does not take deposits. AFD operations as a second-tier development bank are funded by US\$363 million in financial obligations, primarily bonds (55%), multilateral loans (40%), and retained earnings and capitalizations. AFD currently accounts for only 2% of all the Paraguayan financial system assets. Given the role and importance of AFD as a development institution and the evolving nature of the Paraguayan financial system there is further room to increase its total assets for to foster development impact the institution.

19. Despite the extension in the tenor of credits, AFD's funding is nevertheless insufficient to meet the growing structural needs of Paraguay's productive sector, in the context of a sustained cycle of economic growth and despite annual fluctuations related to the effects of external shocks.

20. Over its nearly eleven years of operation, AFD has succeeded in: a) Becoming the main source of long-term financing in the Paraguayan financial system while at the same time offering terms that are considerably longer than the average for the system; b) Significantly expanding its lending activities; c) Demonstrating with its supply of long-term financing to the financial system that there is a demand for that type of product and that the participating LFIs have been able to allocate it effectively and responsibly.

21. Thus, AFD, as a National Development Bank (NDB), is in a unique position to engage local financial institutions (LFI) and private investors, align development financing with national priority mitigation actions, and canalize international climate funding as well as mobilizing domestic financial resources to promote scaled up investments in EE projects.

22. The AFD has an extensive range of financial instruments to facilitate the development of initiatives in various sectors; notwithstanding that, given the existing barriers to investments in EE, the pool of financial instruments needs to be supplemented by additional innovative instruments to address those specific barriers. The aim of the proposed Project is to support AFD in the structuring of innovative instruments to achieve the Project objective by addressing the financial and non-financial barriers.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

23. Multi-stakeholder engagement is essential for the appropriate design, and the subsequent effective and successful implementation of the Project. In the last four years of Project design, between November 2013 and March 2017, consultations were held with different government and private sector stakeholders, including inter alia, the Environment Ministry (Secretaría del Ambiente, SEAM) and its National Programme on Climate Change (Programa Nacional de Cambio Climático), the Ministry of Industry and Trade (Ministerio de Industria y Comercio), Ministry of Industry and Commerce, the Vice-Ministry of Mines and Energy (Viceministerio de Minas y Energía), National Electricity Authority (Administración Nacional de Electricidad, ANDE), the National Commission of Energy Efficiency, (Comit Nacional de Eficiencia Energética, CNEE), the Ministry of Finance, National Forestry Institute (Instituto Forestal Nacional), UN-REDD national program, Ministry of Agriculture and Livestock (MAG), industry chambers (Asociación Rural del Paraguay, Cámara Paraguaya de Exportadores y Comercializadores de Cereales y Oleaginosas, CAPECO; Cámara Paraguaya de Procesadores de Cereales y Oleaginosas, CAPPRO; Cámara de Comercio e Industria Paraguayo – Alemana), Paraguayan Industrial Union (Union Industrial Paraguaya), Paraguayan Bank Association (Asociación de Bancos del Paraguay), SMEs in the focus sectors (Cerámica Itaugua, Silvapar S.A.), financial institutions (local financial institutions and cooperatives, including Sustainable Finances Roundtable (Mesa de Finanzas Sostenibles), Banco Nacional de Fomento, Banco Amambay, Banco Atlas, Banco Sudameris, Visión Banco, Financiera El Comercio), environmental non-governmental organizations (Sobrevivencia Paraguay – Amigos de la Tierra), and research institutions (Centro de Producción Limpia).

24. Annex XII provides a complete list of all institutions, including local financial institutions, technology providers, firms in the industry sectors focus of the study, NGOs, international organizations.

25. Further Consultations once the project is approved will target national entities and private sector to support to disseminate information on the project and harmonize efforts at the country level to foster EE in the context of

⁵⁸ Households are outside the scope of this project.

mitigation actions, combat against deforestation and pursuant to sustainable development goals in Paraguay. Key stakeholders who will be further consulted as the project is implemented include the Itaipú Binacional, National Council of Science and Technology (Consejo Nacional de Ciencia y Tecnología), Ministry of Agriculture and Livestock (Ministerio de Agricultura y Ganadería), Ministry of Finance (Ministerio de Hacienda), Central Bank of Paraguay, National Institute of Technology, Normalization and Metrology (Instituto Nacional de Tecnología, Normalización y Metrología), Ministry of Education and Culture (Ministerio de Educación y Cultura), National University of Asunción (Universidad Nacional de Asunción) and other NGOs like Moisés Bertoni Foundation (*Fundación Moisés Bertoni*).

26. Stakeholder consultations will include three workshops at the initial implementation stage of the Project, mid-term during the implementation phase and at two months before the end of the implementation of project activities. Further, the consultation process will focus on raising the awareness and understanding of all stakeholders, about the opportunities associated with energy efficiency in Paraguay. The purpose of these workshops will be to share information and seek views from relevant stakeholders on the proposed objectives, activities and means of implementation and further to share information on the outputs of the Project as well as of its achievements, lessons learned and potential replication and scale-up opportunities.

27. STP has provided a letter of Non-Objection (see Annex I).

28. **Engagement with ESI actors.** The Project is based on the assumption that each participant in sub-projects does so due to economic and financial incentives. Through awareness raising activities, the Project is expected to make detailed information and data available to key actors, promoting their engagement with the project activities. A pipeline and project development consultant will support TSPs to fully take advantage of the Project's Mechanisms (standard Contracts, insurance, validation methodologies) and support the development of bankable sub-projects which will receive grant funding to support the validation costs.

29. The ESI stakeholder engagement flow chart, included in Annex XIV⁵⁹, describes the different phases of the Project and the various actors that will participate to the different stages.

30. Graph 5.3 below indicates the various actors that will be involved in the implementation of the project, from the development and feedback phases, to the socialization of the ESI Toolkit and the launching of the AFD ESI credit line.

Graph 5.3 ESI Market and NDB Actors

		NDB*	LFIs	Validator	Insurance	TSPs	SME Clients
Decision Makers	Management	[Green shaded area]					
Business	with LFIs						
Development	with SMEs	[Green shaded area]					
	with TSPs	[Green shaded area]					
Risk team	assessing LFI risk	[Green shaded area]					
	assessing SME credit risk	[Green shaded area]					
	assessing claims risk	[Green shaded area]					
Claims	Claims Department	[Green shaded area]					
Green	Green Team*	[Green shaded area]					
Legal	Legal Team	[Green shaded area]					

*Sovereign guarantee creditlines need to be approved by political authorities in some countries

*Where applicable

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

31. Section E.6.5 shows that relative to similar projects in Latin America, this project has a lower cost per ton of CO₂eq reduced, showing an estimated cost (in USD) per tCO₂eq of USD 10.75 for the total project financing and USD 5.75 per ton CO₂eq for total GCF funding.

⁵⁹ More details in Graph in Annex XIV Energy Service Insurance Project Flow diagram cycles and Engagement phases of Market actors.

32. The economic and financial analysis assessed the impact of the financing line as whole (during its estimated lifetime of 15 years). It was conducted on a per technology basis with and without the GCF support (see Annex III for more details).⁶⁰ The GCF loan resources have an impact on the interest rate AFD provides to intermediaries (LFIs). The concessionality is reflected in the interest rate and tenor that AFD provides to the intermediary banks (local financial institutions - LFIs). The GCF concessionality would allow reducing the intermediary fee to LFIs⁶¹ as it can be seen in the reference example of Table E.6.3.1 below.

33. The GCF would further reduce the final market interest rates offered by the LFIs to the SMEs. The estimated current market rate without the GCF for firm is 8.3%⁶² and the GCF funds would lower the interest rate to 6.3% (calculated based on the current market LFI SPREAD 2.84% and the interest rates offered by AFD to financial intermediaries with the Project (see Annex III).

34. It should be noted that final interest rates include LFI market SPREAD that would not be impacted by the GCF funds. The LFI SPREAD is influenced by the credit quality of the SME clients in Paraguay (and not by sub-projects). The value of the market SPREAD is based on the value that local banks in Paraguay charge at the moment.

Table E.6.3.1. Project Financing Line Flow from GCF to SMEs

Deal Flow	Market SPREAD	Interest rate in USD	Risk reduction mechanism
GCF	n.a.	0.75%	NA
IDB	n.a.	n.a.	Sovereign guarantee
AFD	3.79%	3.79% (normally 571%)	Bank credit track record
LFI	2.84%	6.63% (versus market rate of 8.63%)	Collateral
SME	n.a.	n.a.	Energy Savings insurance
Provider		(Project payment)	

Source: Annex III, "Reference" worksheet. Numbers are for demonstrative purposes only, and will change to reflect current market conditions at the time of the programme structuring.

35. As will be illustrated in section F.1., while the GCF Fund lowers the interest rate and increases the viability of each EE project, the actual change is due to the financial strategy, structured with the technical cooperation grant, which incorporates risk-sharing instruments (illustrated in Section B.1.) so that viable EE projects are actually financed. The lowering of the interest rates and availability of finance at longer term provides the LFIs with an incentive to channel the financing resources and gain expertise with EE investments and thus assess more realistically the currently high perceived risk for these projects. In turn SMEs access financing with sufficient maturities to cover the payback period of the EE technologies and have incentive to access credit because of the better interest rates.

36. In the long-run, the Project is expected to mobilize private sector investments that have a multiplier effect through better understanding and product offerings by LFIs of EE investment financing as well as a conversion of equipment sellers into technology and energy service providers. The lowering of the interest rate is expected to have a long-term effect on lending practices by financial institutions through the demonstration of the profitability of the

⁶⁰ In order to be conservative the cost-benefit analysis of the study has focused on segments where the market assessment undertaken identified the largest potential of demand for credit for energy efficiency improvements. As the program is open to any energy efficiency improvements, additional technologies, from those included in the cost-benefit analysis will be financeable, which means that the potential of demand for credit can actually be even higher. For instance, a recent study (Briano et al 2017) quantifies the potential for investments in efficiency improvements in electronic velocity variators for motors and ovens in Paraguay of about USD 3 billion (USD 399 million for motor speed variators and 2.6 billion for ovens). If the program focuses on supporting about 6% of the potential exclusively in motor speed variators this would add additional demand for credit of about USD 24 Million suggesting sufficient fuel-switch independent demand.

⁶¹ Range between 5.705% and 6.455%, including additional assumed costs of 0.75% with the Project. See Annex 3 for details.

⁶² Average interest rate spread and AFD interest rate for 3-5 year maturities, plus a spread of 2.84% from the LFI to firms. Details are included in Annex 3 including a sensitivity analysis of changing energy prices and interest rates.

business model. Based on experience with successful EE projects under the proposed financial strategy, LFIs are expected to adapt their financial risk models to realistically price EE projects and to adapt interest rates accordingly. This will allow the GCF intervention to have a long-term effect and induce market transformation.

37. The proposed Project aims at developing the financial market for EE investment in Paraguay in collaboration with the AFD. It is thus, a public-sector operation that requires a Sovereign Guarantee. The GCF's financial exit strategy for this public-sector operation is dependent on the loan maturity, which is proposed to be 20 years, as indicated in the approved GCF Board documents on the terms and conditions for public sector operations.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

38. The Project is expected to increase levels of investments by SMEs in EE projects, through on-lending by AFD to eligible first tier LFIs to provide sub-loans at adequate terms to eligible SMEs interested in undertaking EE investment projects. It needs to be noted that all loans provided to SMEs, are essentially resulting in private sector investments, which would not occur without the GCF resources due to the previously mentioned barriers to EE investments.

39. It is expected that, in the short term, the credit line from AFD would leverage at least an additional 26% in investments from SMEs' own resources (Table E.6.2.1). In the paradigm-shift scenario, once LFIs and investors become aware of the real risks and returns associated with EE investments, each dollar in financing provided by AFD could leverage 1.6 dollars in private sector investments through LFIs co-financing and SMEs own resources. It should be noted that as this Project would be intended to fund a financing line from AFD for a period of at least 15 years. This means that 1 USD of GCF funds allocated to the Project should be able to be reused under the financing line once a sub-project would have repaid its credit, and hence support additional sub-projects (i.e. between 2 to 3 projects during the financing line life time).

40. The goal in the long-term is that the LFIs finance EE investments as a business-as-usual investment and provide their credit-worthy clients with the offer of financing EE type investments and replacements of energy inefficient equipment, once they are fully aware of the real risks of EE and the business opportunity in the proposed energy saving risk-sharing instrument. As per the market study (Table 1 in Annex II), there is a potential to expand the substitution of firewood with electricity for at least 200 firms, with an estimated investment of USD 50,000 or less, for an estimated required financing of USD 10 million. As the table below shows, the proposed instrument mobilizes in the short-term an additional USD 10 Million in private sector investments, of which USD 5 million is financed with loans from LFIs. In the medium-term, the proposed instrument is expected to mobilize USD 70 million in private sector investments.

Table E.6.2.1. Mobilization Factors for AFD's EE Investment Project in the short and medium term

Term and Funding Source		Loans (millions of USD)	Loan + Grant (millions of USD)
Short term			
GCF Funds	a	20	23
AFD (mobilized)	b	20	20
SME Equity Investment (mobilized)	c	14.05	14.05
Total Investment	d = a+b+c	54.056	54.05
Mobilization Factor	e = d/a	2.7	2.5
Mid-term			
GCF Funds	a	20	23
AFD (mobilized)	b	20	20
SME Equity Investment (mobilized)	c	25	25
Additional LFI credit line (mobilized)	d	5	5
Total Investment	e = a+b+c+d	70	72
Mobilization Factor	f = e/a	3.5	3.3

E.6.3. Financial viability

41. Overall, the project shows its financial viability, across all technologies under various sensitivity scenarios. Under the Project conditions specified the expected indicators are as follows:

- Estimated cost per t CO₂ eq (total investment cost/expected lifetime emission reductions): USD 13.13 per t CO₂eq
- Co-financing ratio (total amount of the GCF's funding as percentage of project total): 37%
- Financial rate of return⁶³:

Table E.6.3.1. Indicative Project Financing Line Flow from GCF to SMEs

Investment (USD)	Oven EE	Boilers	Drying EE	Co-Generation	Total	Grant
Retrofit existing equipment (Wood as fuel)	720,000	420,000	-	-	54,310,000	3,000,000
Change to efficient equipment (Wood as fuel)	13,320,000	5,040,000	-	-		
Change to Electricity equipment*	9,360,000	4,200,000	9,250,000	-		
Replacement of fuel	-	-	-	12,000,000		
Total	23,400,000	9,660,000	9,250,000	12,000,000		

Financing (USD)	Oven EE	Boilers	Drying EE	Co-Generation	Total	Grant
GCF	8,617,050	3,557,295	3,406,313	4,419,000	54,310,000	3,000,000
AFD	8,617,050	3,557,295	3,406,313	4,419,000		
Equity	6,165,900	2,545,410	2,437,375	3,162,000		
Total	23,400,000	9,660,000	9,250,000	12,000,000		

Firms	Oven EE	Boilers	Drying EE	Co-Generation	Total
Retrofit existing equipment (Wood as fuel)	24	40	-	-	365
Change to efficient equipment (Wood as fuel)	72	120	-	-	
Change to Electricity equipment*	24	40	37	-	
Replacement of fuel	-	-	-	8	
Average Investment	195,000	48,300	250,000	1,500,000	

42. Despite the estimated high rates of return of the investments under analysis, it is important to note that the additionality of the GCF intervention becomes evident when considering the scarcity of EE-adequate long-term financing from other sources in Paraguay. Indeed, the estimated rate of return figures are based on the condition that financing *is* available and thus that these projects are actually financed. In reality, the scarcity of long-term financial resources in Paraguay due to the current structure of the financial system (see B.2) inhibits the realization of these projects. As mentioned above, GCF resources will address both the lack of long-term finance at adequate conditions and the structuring of bankable projects so to enable EE projects to be realized.

E.6.4. Application of best practices

43. The ESI model combines the best practices learned from EE initiatives and projects in LAC and beyond. As

⁶³ *It is expected that financial viability for equipment utilizing electricity will be reached during the later half of the execution period. Currently the electricity price is higher than firewood price. This balance will be influenced by increases in the industrial price for electricity in the future. This is based on data of fuel wood price increases between 2008-2013, the identified supply gap in [Rios et al 2016](#), increasing transportation costs and distances to areas in Western Paraguay relative to the industrial areas in the Eastern Paraguay, the recent large increase in industrial electricity prices and related industrial policy.

shown by the in-depth analysis of the Global Innovation Lab for Climate Finance (Annex XI), the ESI methodology was structured to provide an integrated package that addresses all barriers and shares the risks among the parties best able to manage those risks. Each element proposed and illustrated in Sections B.1 and B.3 is included to address a specific barrier and thus incentivize actors to actively promote EE investments.

44. The lessons incorporated from other programs are in particular:
- i. Support the structuring of both the demand- and the supply-side of investment financing;
 - ii. Address the barriers and perceived risks of all of the actors involved;
 - iii. Adapt to the local circumstances, with no silver bullet or textbook solution available;
 - iv. Blend loans, technical assistance and risk mitigation instruments to support the financial intermediation, as none of these instruments on its own is able to ensure that the supply of financing for EE projects will meet its demand;
 - v. Tailor investment products and incorporate EE to private sector needs
 - vi. Build on local knowledge and on the existing financial distribution network; and
 - vii. Invest in reputation and trust building, particularly when the deployment of new technologies is sought.
45. The ESI model is currently being piloted in Colombia and Mexico, and coordinated by IDB. GCF has recently approved a project in El Salvador that applies the same concepts in that country. The proposed Project benefits from the ongoing activities in Colombia and Mexico, and the future experience from El Salvador, as lessons can be incorporated in preparation, development and implementation of the Project in Paraguay. This will ensure that the executing entity, AFD, has access and adopts best practices in conducting the proposed Project.

E.6.5. Key efficiency and effectiveness indicators

Estimated cost per t CO₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)

(a) Total project financing (incl. grant element excl equity)	US\$ 43,000,000
(b) Requested GCF amount (incl. grant element)	US\$ 23,000,000
(c) Expected lifetime emission reductions overtime ⁶⁴	4,004,899 tCO ₂ eq
(d) Estimated cost per tCO₂eq (d = a / c)	US\$ 10.75 / tCO₂eq
(e) Estimated GCF cost per tCO₂eq removed (e = b / c)	US\$ 5.75/ tCO₂eq

46. The total investment costs (a) are composed of the loan resources (USD 20 Million provided by GCF and 20 million by AFD), a GCF technical cooperation grant of USD 3 Million and investor equity of USD 14.05 Million.

47. The methodology to calculate GHG emissions is illustrated in section E.1.2. (Key impact potential indicator).

48. The indicator values for AFD compare to other projects in the region as follows:
In the GCF supported EE project for BANDESAL in El Salvador⁶⁵, the calculation was:

(a) Total project financing	US\$ 51.7 Million
(b) Requested GCF amount	US\$ 21.7 Million
(c) Expected lifetime emission reductions overtime	562,037 tCO ₂ eq
(d) Estimated cost per tCO₂eq (d = a / c)	US\$ 91.99/tCO₂eq
(e) Estimated GCF cost per tCO₂eq removed (e = b / c)	US\$ 38.61/tCO₂eq

with

(a) = USD 51.7 Million, including USD 10 Million from private sources.

(b) = GCF resources of a total of USD 21.7 Million including a USD 1.7 Million grant.

In the IDB-CTF supported EE project for FIRA in Mexico⁶⁶, the calculation would be:

(a) Total project financing	US\$ 27 Million
(b) Requested GCF amount	US\$ 22 Million
(c) Expected lifetime emission reductions overtime	729,000 tCO ₂ eq
(d) Estimated cost per tCO₂eq (d = a / c)	US\$ 37.34/ tCO₂eq
(e) Estimated GCF cost per tCO₂eq removed (e = b / c)	US\$ 30.82/ tCO₂eq

with

(a) = USD 27 Million, including some USD 5 Million from private sources

(b) = CTF and the IDB resources of a total of USD 22 Million including a USD 2 Million grant.

GCF
core
indicators

⁶⁴ Estimated lifetime is 15 years.

⁶⁵ See GCF project in [El Salvador](#) (BANDESAL).

⁶⁶ See Support to [FIRA for the Implementation of an Energy Efficiency Financing Strategy for the Food Processing Industry](#)

	<p>Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)</p>	
	<p>49. The assumptions that drive the calculations in E.6.2 are that:</p> <ul style="list-style-type: none"> • Initial private sector investment mobilized is 26% (USD 14.05 million out of USD 54.05 million); • Public sector investment mobilized by AFD is equal to the GCF loan component <p>50. The indicators shown in Table E.6.2.1 would be the same in the cases of Bancoldex, FIRA and BANDESAL (see GCF BANDESAL Project Proposal). The mobilization factor in the case of AFD is in the range of those case in Mexico (5.4), Colombia (5.77) and El Salvador (5.9).</p>	
<p>Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)</p>	<p>Please refer to Section E.3.1.</p>	

F.1. Economic and Financial Analysis

Please provide the narrative and rationale for the detailed economic and financial analysis (including the financial model, taking into consideration the information provided in [section E.6.3](#)).

51. The EE investments will allow energy savings in the targeted sectors, reduced GHG emissions. However, such an impact is difficult to quantify. The economic analysis included only quantifiable benefits of the project: i) incremental benefits, including reduced energy consumption from EE improvements in firewood kilns; ii) savings from replacing firewood kilns with electrical ovens. The project account for environmental externalities, quantifying the economic benefit of reducing GHG emissions. The analysis does not account for other potential benefits for some of the beneficiaries, especially those small firms that are family based or women led enterprises. There might be some health and saved labor benefits due to less use of firewood.

52. An economic analysis of the Project confirms its positive, as its economic internal rate of return (EIRR) is 135%,(based on a social cost of carbon of USD/ton CO₂) as it exceeds the 10% economic opportunity cost of capital. This rate of return account for energy savings as well as environmental benefits from the project. A sensitivity analysis shows that the economic return is very stable to changes in incremental benefits. The net present value of project is USD \$220 million.

53. A cash flow projection was prepared based on the revenue projection and the proposed investments. For electricity-based projects, the price differential between firewood and electricity does currently not allow positive cash flows. A sensitivity analysis shows that with a reduced gap of the price of firewood, will provide with positive cash flows for these technology option (see Chart in assumptions sheet in Annex III).

54. Details of the economic analysis and financial analysis are presented in Annex III and Addendum for assumptions explanation as Annex II.

F.2. Technical Evaluation

55. The feasibility study and market analysis, which were completed to assess the business opportunities to finance EE in SMEs in Paraguay, identified high EE investment potential for the replacement of two technologies: firewood brick furnaces and firewood grain dryers.⁶⁷ Initially, the Project will only cover investment for these two technologies plus cogeneration in sugar producers.

56. Efficient technologies to replace the current firewood furnaces for brick production, firewood grain dryers, and cogeneration are proven, widely used and available in the local market through import. They require a replacement of technology, rather than a change in production processes, and their efficiency and savings potential calculation is simple compared to complex multi-measure activities.

57. The proposed EE interventions will have to comply with minimum specifications requirements and will be evaluated by a recognized technical validation entity in order to be included in the AFD Project and access the credit line of the Project. The following specifications will be evaluated and included in the validation procedure:

- A minimum energy saving threshold for each technology. For example, a more EE firewood brick furnace would decrease the energy consumption by at least 5% compared to the replaced system. By replacing with electric furnaces, the energy consumption decreases by at least 30%.
- The EE equipment that will replace the old equipment should be new and from a recognized manufacturer, that is able to provide a warranty.
- The new EE equipment has to provide at least the same service and capacity relative to the replaced system.
- The EE calculations and baseline estimations have to be in accordance with a predefined methodology based on ISO 50001 standards.

58. The replaced equipment has to be disposed of and disabled to avoid its further use (see Annex VI for details).

⁶⁷ Please see Section 3 in Annex II Market Assessment (pages 18-27 and pages 73-74) for a detailed overview of technologies, their characteristics and assessment for suitability for the proposed project.

F.3. Environmental, Social Assessment, including Gender Considerations

59. IDB Policies and management programs related to Environmental and Social Assessment, as well as gender policies are fully consistent with GCF requirements. IDB has gone through an in-depth assessment by the GCF Secretariat and the Independent Accreditation Panel and a full accreditation with no conditions has been awarded.

60. As per IDB safeguards, the Project is classified as a financial intermediary and as such is not categorized according to its potential environment and social (E&S) impacts and risks [Directive B.13 of the Environment and Safeguards Compliance Policy (OP-703)]. Based on the E&S due diligence conclusions and the intended use of proceeds, this operation is classified as low-risk level financial intermediation (FI-3). Projects to be financed under the program will only be Category C projects and will exclude projects that (i) involve involuntary resettlement of people, (ii) have a potentially adverse impact on communities and/or indigenous people, or (iii) involve conversion or degradation of critical natural habitats or cultural sites (see Exclusion List on Appendix 1 of the ESMF in Annex VI). It is also important to note that projects eligible for financing under this program are not greenfield projects: they are EE and RE projects to be implemented in existing industrial or agricultural facilities.

61. The program will be managed through the implementation of an Environmental & Social management Framework (ESMF) please refer to Annex VI.⁶⁸, to be fully integrated in the program Operating Regulations (OR). Overall, it is expected that the guaranteed portfolio present low risk.

62. Environmental impact assessment: eligible projects will include energy efficiency investments projects undertaken by SMEs, including: (i) the exchange of old equipment with new efficient equipment that reduces use of firewood, biomass and other fossil fuels; (ii) the exchange of old equipment with new efficient equipment that replaces use of firewood, biomass and other fossil fuels by electricity from hydropower; and (iii) the retrofit of equipment with new efficient equipment that reduces use of firewood, biomass and other fossil fuel. All will result in energy savings and hence will have a positive impact on global climate change by reducing GHG emissions. Due to this nature of the investments to be financed and their main beneficiary firms, mostly SMEs and in the service sector as reflected in AFD's existing credit portfolio, significant negative environmental and social impacts are not foreseen and the Project has been categorized as low risk according to IDB Environmental and Social Safeguards. Sub-projects to be financed will be C category. No A or B projects will be financed under this program.

63. The main potential adverse impact on the environment would be if replaced units (i) are not withdrawn from circulation (risk of GHG emissions leakage) and (ii) are not properly disposed (risk of contamination for equipment involving hazardous waste). To mitigate this risk, an Equipment Decommissioning and Disposal Protocol⁶⁹ will be part of the Project's operational regulations. Specific requirements to be included in the Operational Regulations of the Loan (OR) and the loan agreement are described in the annexed Environmental and Social Management Framework. The Protocol will ensure that the replaced old equipment will be properly decommissioned and disposed of. Replaced equipment will have to be handled in a technically appropriate manner to ensure that its final disposal is undertaken in accordance with all relevant national regulations and with the assistance of a national licensed or certified waste management service provider. If for any reason a Project beneficiary fails to decommission and dispose of any substituted equipment according to the Project's Decommissioning and Disposal Protocol, it will be forced to repay the loan immediately and may be subject to regulatory sanctions as established in relevant laws and regulations of the country. Compliance with the Protocol will be monitored by the external validator.

64. For the small-scale co-generation sub-projects the E&S risks identified for eligible projects will be managed through compliance with the local regulations (mainly for health and safety risks on the work place and air emissions). A specific classification tool will be developed and applied by AFD to all co-generation projects in order to ensure that only C category projects are financed through the program.

65. It is important to note that AFD has a strong institutional capacity in the management of E&S risks, with fully implemented Environmental and Social Management System (ESMS) for both first and second tier activities. The AFD, has been successfully executing various programs in compliance with the IDB safeguards. The IDB has been reviewing the AFD institutional capacity in the management of E&S risks and considered it of a good level. For this program, the

⁶⁸ The Environmental and Social Assessment will be finalised in the process of IDB project approval following a favourable GCF Board decision on the project. The key conditions, project size limits and thus the risk categorization will not change in the process.

⁶⁹ The final disposition of the old equipment depends on the technology and includes in all cases the disassembling and transportation of the material. For two technologies (firewood furnaces, firewood dryers) there is no associated cost, as the scrap value (i.e. iron) of the equipment will cover the cost of disassembling and transportation and will be conducted by recycling companies (i.e. iron brokers). For firewood furnaces and firewood grain drying equipment the disassembling and disposition of the old technology will be conducted by the technology provider installing the new equipment. The disposition costs are up to 5% of total project costs for these latter systems (refrigeration and air conditioning). These costs include the disposal of CFC or HCFC.

IDB safeguards will apply, through the development of an Environmental and Social Management Report (ESMR) that will be an integral part of the program OR (manual). The ESMR will be based on (i) the application of an exclusion list (see Annex VI), (ii) the application of a set of eligibility criteria for each type of projects, (iii) the application of AFD's existing ESMS, (iv) compulsory site-visits for projects above US\$1m, (v) the verified compliance with the Equipment Decommissioning and Disposal Protocol. The ESMR will ensure compliance with the IDB safeguards.

66. Social impact assessment including gender: given the type of projects contemplated in this Project no negative social impact is foreseen, but – on the contrary – positive indirect social impact is expected from the productivity increase the EE investment will generate. On the gender side, even if not a focus of the Project, an indirect positive co-benefit is expected. Both the marketing strategy and the capacity building plan will include a gender perspective that will enable women-owned and –led SMEs benefit from loans offered by the project, while ensuring its commitment to the use of EE.⁷⁰ A general challenge is the lack of gender statistics in business in Paraguay and there is no baseline available for the Project. The Project will support efforts to collect data through its execution and including gender in its monitoring and evaluation processes. The Results Monitoring and Reporting framework and the Results Matrix include gender indicators as well as gender disaggregated indicators with gender targets. Those results will be disseminated, using the platforms developed by the IDB on both gender and EE. For a more detailed assessment of the context of gender in Paraguay, please refer to Annex X.

F.4. Financial Management and Procurement

67. As indicated in section C.7 above, when acting as Executing Entity, the IDB will be responsible for the overall management, implementation and supervision of the Project, in line with its own internal policies and procedures. When not acting as Executing Entity, the IDB, as Accredited Entity and in line with the Accreditation Master Agreement (AMA) signed between the IDB and the GCF, will (a) administer and manage the use of GCF Proceeds according to its policies and procedures; (b) incorporate provisions in the Subsidiary Agreements requiring the Executing Entity to ensure the management, implementation and supervision of each Funded Activity in line with the Accredited Entity's own internal policies and procedures; and (c) be responsible for the monitoring, evaluation and reporting responsibilities as set forth in the AMA.

68. As part of the Project and following IDB policy, IDB determines the on-lending, financial management and oversight activities and contractual responsibilities in the framework of the loan contract with AFD. Furthermore, for the execution of the grant component IDB will contract individual consultants, consulting firms and non-consulting services in accordance with the IDB's procurement policies and procedures.⁷¹

69. The approval of the Operational Regulations (OR) of the Project by the Board of Directors of AFD, following the non-objection of the Bank, will be a prerequisite for the first disbursement of the GCF's reimbursable resources. Such regulations: i) will have to be consistent with the policies and operational standards of AFD, the IDB, and the laws and financial practices of the country; (ii) will pick up the main features of the project, including the eligibility criteria for beneficiaries, types of EE investments and LFIs, conditions under which the LFIs are to provide sub-loans and ensure that financing is provided in adequate terms and conditions (medium and long term at or below market rates) to SMEs sub-projects, as well as the environmental and social safeguards that will apply for each of the technologies financed under it; (iii) set up specific fiduciary conditions and reporting of the dedicated credit line to be established, including that any loan recuperations and re-payments are to be re-used by the line finance similar EE projects; (iv) will provide that failure to comply with its provisions will prevent access to financing; and (v) will established that any change to the OR will require the non-objection of the IDB.

70. The project provides funding for AFD's second-tier credit operations. Therefore, the project's environmental and social risks and their impacts will occur at the level of sub-loans and therefore they are non-predictable ex-ante. In accordance with Directive B.13 of the IDB's Environmental and Safeguards Compliance Policy (OP 703), the operation does not require classification. However, for the purposes of the execution of the project, AFD will have a list of sectors (exclusion list), previously agreed upon with the IDB and incorporated into the OR, which will not be able to gain access to finance, as well as a protocol that will have to be followed to ensure the adequate decommission and disposition of

⁷⁰ It is worth noting that of the three industrial sectors analysed, according to personal communications with the Ministry of Commerce and Trade, it is expected that only brickmaking will have female presence in SME ownership and/or management. Sugar industry and grain drying are, for the most part, mostly managed by men. As the project is technology-open and thereby all sectors of the Paraguayan economy can be served, the project will analyse the participation of women SMEs in the baseline study.

⁷¹ All procurement will be conducted according to IDB policy. The following procedures shall apply: a) Individual Consultants – Human Resources procedures (AM-650), b) Consulting Firms –the Policies for the Selection and Contracting of Consultants financed by the IDB (GN-2350-9) using e-Sourcing; c) Non-consulting Services –Corporate Procurement Policy and procedures (GN-2303-20). Please also see Annex XI.

old equipment substituted with the support of the Project to avoid GHG leakages. The risk management system for environmental and social risks will be detailed in the Report for Environmental and Social Management of the project, an integral part of its OR.

71. A sovereign guarantee covering the financial obligations of the borrower under the loan contract makes the guarantor (Republic of Paraguay) jointly, severally and unconditionally responsible for all the monetary obligations directly related to the loan, being repayment of the principal, payment interest and the fees contracted by AFD.

72. The disbursements, reporting (including external audit reports), monitoring, and evaluation of the Project will be done in accordance to IDB Policies and Procedures, among others the IDB's Financial Management Guidelines (OP-273-6), and reflected in the Term Sheet and FAA. Given the characteristics of the operation, the IDB would make disbursements to AFD according to its methods of disbursement that include: Advances of Funds, Reimbursement of Expenses and Direct Payments to third parties on behalf and at the request of AFD.

73. Also during the project disbursement period and its extensions, the project's financial statements will be audited annually by an independent audit firm acceptable to the Bank to be hired and paid by AFD, with terms of reference previously approved by the Bank. The auditing firm might be the same one that already audits AFD's financial statement, if acceptable to the Bank, with a view of having an integral control approach on both the executing agency and the management of the project. Additionally, AFD will assume the commitment to submit non-audited financial reports on the project during the Project Financial Reporting Period. Audited financial statements will not be required during the repayment of the loan.

74. To prepare its financial statements, AFD applies generally accepted accounting standards and regulations. The accounting standards used shall be internationally recognized accounting standards, and the accounting processes and systems should follow best practices of international standards. The use of appropriate accounting by executing agencies as well as their fiduciary systems are assessed before the approval of the loan.

75. To the satisfaction of the IDB, the AFD must present reports relating to the implementation of the project, within the sixty (60) days following the end of each semester or other period as the Bank and the EA may agree, they shall include as a minimum: (i) the status of the implementation of the activities of the program the compliance with the criteria of eligibility for credit and program level problems and/or execution risks identified and the measures proposed to remedy or mitigate those problems or risks; (ii) financial risk and potential non-performing loans and risk management measures undertaken in accordance, (iii) the extent that are being met environmental and social safeguards of the program; and (iv) the achievement of the indicators of product and expected results, as they materialize. These reports will provide the inputs for the Annual Performance Reports (APRs) the IDB will have to deliver for the GCF according to the AMA.

76. AFD undertakes to maintain, in terms that will be set in the Operations Regulations, an information system from which held the collection of project information, so that the IDB can implement, with its resources, an assessment of impact ex post of the same, which will assess the extent that the objectives of the project were achieved.

77. AFD and the IDB will carry out a mid-term evaluation of the project about 36 months after first disbursement or once 50% of the loan proceeds have been committed, whichever occurs first. This evaluation will assess the progress in achieving the expected results in the project's results matrix to identify any corrective action that may be required. AFD will also provide the IDB with the necessary information to make a completion report of the project 90 days after the end of the execution period or from the date of the last disbursement. Regular monitoring meetings will also be scheduled. The Monitoring and Evaluation Plan of the project, an integral part of any IDB project, will include a strategy to carry out an impact evaluation as of the last year of the project's execution period. This evaluation will be covered with part of the GCF non-reimbursable resources which complement this proposed GCF loan.

G.1. Risk Assessment Summary

78. The main type of risks that the project face is technical and operational (Risk Factors 1-5 and 7), and to a lesser extent social and environmental (Risk Factor 6). Table G.1.1 summarizes the risk factor, the level of impact and the probability of occurrence. A detailed description of these risk factors and mitigation measures are detailed in section G.2.

Table G.1.1. Project Risk Factors, level of impact and probability of occurrence

Risk Factor	Level of Impact	Probability of occurrence
1. Persistence of high risk perceptions of EE projects by SMEs and LFIs	High	Medium
2. Failure to create financing market for EE investments	High	Low to Medium
3. Failure to achieve expected energy savings	Medium	Low to Medium
4. Failure of adoption of proposed instruments by SMEs and LFIs	Medium	Medium
5. Fuel wood prices remain competitive with electricity pricing	Medium	Medium
6. Delays in project execution by AFD	Medium	Low
7. Environmental risks from EE Investments	Low	Low
8. Environmental risks from co-generation investments	Low	Low
9. Reduced interest and commitment by Government / AFD	Medium	Low

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1. Persistence of high risk perceptions of EE projects by SMEs and LFIs.

Description	Risk category	Level of impact	Probability of risk occurring
Persistence of high risk perceptions of EE projects by SMEs and LFIs is a critical challenge to EE investments and its occurrence has been analyzed both for developing and developed countries.	Technical and operational	High (>20% of project value)	Medium

Mitigation Measure(s)

79. The proposed Project methodology plans to address this risk through different mechanisms:
- i. **Capacity building and awareness enhancement.** To increase the capacity of potential investment firms and LFIs to assess actual credit risks associated with the financing of EE technologies under the Project's mechanisms, thus further reducing perceived risks of loan underperformance;
 - ii. **Technical due diligence.** Technical due diligence by a third party independent validator to assess project feasibility and energy saving;
 - iii. **Shared insurance mechanisms.** In addition, economic conditions in the short to medium term, in particular those resulting from incremental prices of non-sustainable biomass, uncertain supply and increasing transport costs will induce increasing interest in EE efficiency investments.

Selected Risk Factor 2. Failure to create financing market for EE investments

Description	Risk category	Level of impact	Probability of risk occurring
There is a risk that the project does not create a financing market for EE investments and the interest of	Technical and operational	High (>20% of project value)	Medium

financial institutions remains dependent on the provision of credit lines supported by concessional financing.			
Mitigation Measure(s)			
<p>80. The proposed Project methodology plans to address this risk through different mechanisms which include capacity building and demonstration projects.</p> <ul style="list-style-type: none"> - Initial support to kick-off the market will be provided through the Project. Technical support for early-financed projects, once the financing strategy has been deployed by AFD, will support demonstration of the viability of the concept. - LFI gain experience with EE investments using loan resources and risk-sharing mechanisms which let them experience the actual risks of EE investments. The key barrier to EE investment is not the interest rate, as most EE projects are profitable without concessional support. Together these activities mitigate the residual risk to low. 			
Selected Risk Factor 3. Failure to achieve expected energy savings			
Description	Risk category	Level of impact	Probability of risk occurring
There is a potential risk in that the EE investment projects to be developed under this Project will not achieve the expected energy savings and/or that these energy savings will not occur in the expected time frame.	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
<p>81. This risk is being addressed through different means. Risk will be transferred to project developers and, if the expected energy savings are not achieved due to equipment failure, the warranties/surety bonds furnished by the technology providers should provide risk protection for end users, investors and/or lenders.</p>			
Selected Risk Factor 4. Failure of adoption of proposed instruments by SMEs and LFIs			
Description	Risk category	Level of impact	Probability of risk occurring
There are risks related to the up-take/lower than expected momentum of the proposed instruments by Paraguay's energy end-users (SMEs) and financial institutions.	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
<p>82. In the framework of the market analysis of the demand and supply for EE investment and financing, extensive stakeholder engagement and consultations were undertaken with key market actors to confirm interest in EE and the conditions for investment. Furthermore, in the framework of the proposed Project each mechanism will be discussed and socialized with the relevant actors so as to receive and integrate feedback during the structuring and implementation of the financial strategy. Based on existing experience in Mexico and Colombia, these different interactive phases serve to increase the interest of market actors. In addition, the intervention is designed to minimize transaction costs to firms, technology solution providers and LFIs of entering and participating in the program. This is achieved by standardizing and simplifying documentation and procedures.</p> <p>83. The failure to take up investments, especially where related to electricity-based equipment is highly sensitive to the relation between firewood and electricity prices. To bridge the time gap till firewood becomes more expensive in the medium-term the Project contemplates intermediary energy efficiency measures to incentivize the financing market with LFIs and raise capacity among SMEs and technology service providers. Furthermore, the Project will support the Energy Ministry to enhance the execution of national policies and legislation to reduce</p>			

the use of fuel wood and in this manner, promote further energy efficient technologies and sustainable use of biomass. The Project will also be monitoring prices of fire-wood to assess if major changes could result in potential reduction of demand. (see also description in B1, corresponding footnote identifying this risk and the analysis in Annex III).

Selected Risk Factor 5. Fuel wood prices remain competitive with electricity pricing

Description	Risk category	Level of impact	Probability of risk occurring
There are risks related to the price developments of fuel wood and electricity	Technical and operational	Medium (5.1-20% of project value)	Medium

Mitigation Measure(s)

84. While demand and pricing for fuel wood is likely to increase, the interaction between the enforcement of the Zero Deforestation Law and the information provision about fuel wood price developments is important for private sector actors to take into account in their long-term investment decisions.

85. As a risk mitigation strategy, the project contemplates i) price and market monitoring mechanisms, ii) inclusive roundtable discussions with local stakeholders from national authorities, ANDE, private sector actors and the relevant NGO community working on fuel wood markets, iii) awareness and socialization campaign to disseminate results to inform business investment decisions in favor of a potential fuel switch are realized. This is particularly relevant given the informality of the market, imperfect knowledge about drivers of price changes and the fact that the prices differ between regions especially with the distance between fuel wood demand and supply centers (Mautner Markthof et al, 2008)⁷². Mitigating this uncertainty through price information provided through component 1.3.1 will furthermore help support industrial fuel wood users in their long-term investment decisions.

86. Promote, through new activities incorporated in the technical cooperation, more information and transparency about prices to investors so that business decisions in favor of a potential fuel switch are realized. This is particularly relevant given the informality of the market, imperfect knowledge about drivers of price changes and the fact that the prices differ between regions especially with the distance between fuel wood demand and supply centers (Mautner Markthof et al, 2008). Mitigating this uncertainty through price information provided through component 1.3.1 will furthermore help support industrial fuel wood users in their long-term investment decisions.

87. Support, with new technical cooperation component 2, the government to promote their policies, standards and good practices that can engage further technology providers and the private sector in investing in energy efficient equipment, as well as informing the government and review the legal, regulatory, and institutional enabling frameworks for EE investments. Following the additional recommendations received from the GCF secretariat this component has been further improved as

⁷² Fuel prices vary among different regions within Paraguay at with a factor of 3 or beyond, where supply is insufficient to meet demand, illustrating that access and transportation costs play an important role limiting profitable distances for most industrial consumers to below 100 kilometers. Paragraph 5.33 in Mauntner Markhof et al. (2008) "In this country [Brazil] wood and charcoal is needed for grain drying and in the metallurgical industries. Occasions were detected in which fuel wood buyers and intermediaries paid three or more times the normal price for fuel wood in the areas close to border with Paraguay, especially Capitán Bado and Pedro Juan Caballero." Translated from the Spanish original "[...]. En este país [Brasil] se requieren de leña y ca para dos fines principales: el secado de granos y las industrias metalúrgicas. Se han detectado casos en donde compradores o intermediarios pagan hasta tres o más veces del precio normal por cada metro estéreo de leña en las zonas de frontera seca con Paraguay, en especial Capitán Bado y Pedro Juan Caballero." A "meter estereo" is 0.59 m³. See Triana (2001). The higher price paid by Brazilian counterparts can be a reflection of higher purchasing power, no access to fuel wood due to already deforested or regulated areas. The finding strongly suggests that prices increase significantly at the border to areas where there supply cannot meet demand and that this scenario is increasingly probable in Paraguay. Taken together these findings strongly indicate a relationship between price, accessibility of fuel wood and transportation distance which has so far not been reflected in the fuel wood price increase scenarios of 20% or more. Rather these findings suggest that in regions where supply does not meet demand prices are substantially higher than depicted in the economic and financial analysis in Annex III. With increased demand and distances to the demand centers, the number of the aforementioned regions increase which will eventually lead, even in absence of enforced regulation, to significant fuel wood price growth.

Selected Risk Factor 6. Delays in project execution by AFD			
Description	Risk category	Level of impact	Probability of risk occurring
Delays resulting from limited experience of the implementing partner (AFD) in managing a complex Project focusing on EE investments	Technical and operational	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
88. Even if investment in EE measures constitutes a new area of business with additional complexities, AFD has extended experience in managing sustainability issues as part of their financial operations. Risk can be mitigated through: 1) the package of technical assistance, in particular continuous support provided for the overall coordination and integration of the Project into the operations of AFD, and 2) continued engagement between the IDB and the executing entity to ensure ownership at the management as well as technical level.			
Selected Risk Factor 7. Environmental risks from EE Investments			
Description	Risk category	Level of impact	Probability of risk occurring
If not properly decommissioned and disposed, the replaced equipment could lead to GHG leakages (re-utilization) and/or soil contamination.	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
89. AFD, with support from IDB, will design and implement a Decommissioning and Disposal Protocol, based on the existing local regulations and compliant with IDB safeguards. The Project stipulates that old replaced equipment should be properly decommissioned and disposed of to avoid GHG emissions leakages and any potential contamination. Replaced equipment will have to be handled in a technically appropriate manner to ensure that its final disposal is undertaken in accordance with all relevant national regulations and with the assistance of national licensed or certified waste management service provider.			
Selected Risk Factor 8. Environmental risks from cogeneration Investments			
Description	Risk category	Level of impact	Probability of risk occurring
If not properly assessed the program could finance Category B. projects that are deemed non-eligible.	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
90. AFD, with support from IDB, will design and implement a classification tool for cogeneration projects in order to ensure that only C category projects will be financed through the program. The classification tool will need to be approved by IDB prior to first disbursement. AFD will apply the tool itself. The AFD E&S specialists will perform on-site visits for all projects above USD1million. IDB will supervise its application as part of its normal E&S supervision tasks.			
Other Potential Risks in the Horizon			
91. Institutional commitment in Paraguay. Other potential risk that may arise during the life of the project is that the interest and commitment of the Paraguayan government or AFD could be reduced as a result of changing policy priorities and/or economic conditions. The level of impact of this risk is medium and its probability of occurrence is low. This risk is to be mitigated through the continuous and constructive engagement with government authorities as well as by the commitments resulting from international agreements.			

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's [Performance Measurement Framework](#) under the [Results Management Framework](#).

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level⁷³

Paradigm shift objectives

<i>Shift to low-emission sustainable development pathways</i>	The Project contributes to shifting Paraguay to low-carbon industrial development by increasing the efficiency of fuel wood use and, once financially viable, the change to electricity utilizing technologies for SMEs currently predominantly reliant on inefficient fuelwood use, supporting them to finance bankable projects and providing the enabling conditions and a credible demonstration track record for SMEs, LFIs and TSPs to use a commercial approach to invest in energy efficiency. The project measures have high potential for replication both within Paraguay and in other countries with similar socio-economic characteristics in LAC and beyond.				
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Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	

Fund-level impacts

<i>M1.0 Reduced emissions through increased low-emission energy access and power generation</i>	Tonnes of carbon dioxide equivalent (t CO ₂ eq) reduced as a result of Fund funded projects/programmes	Aggregate summation of sector-specific t CO ₂ eq reduction indicators. Intended to be estimated	0	Y5 600,000 Y10 1.9 Million	3,275,251	Industries: Informed by MDB/IFI GHG accounting harmonization work on energy efficiency. ⁷⁴
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⁷³ Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf

⁷⁴ Gender disaggregation is to be researched for each sector and included where possible.

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/programme outcomes	Outcomes that contribute to Fund-level impacts					
M7.0 Lower energy intensity of buildings, cities, industries and appliances	7.1 Energy intensity/improved efficiency of industries as a result of Fund support. Energy savings (GWh) (Paris performance indicator) GWh/Project lifetime	Based on AFD electronic registry system	0	Y5 377 GWh Y10 1088 GWh	2,134 GW ⁷⁵	Energy savings are realized for SMEs as expected. Government continues to invest in electricity transmission network and relative prices of firewood and electricity increasingly favors electricity.
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	5.1 Number of policies, institutions, coordination mechanisms and regulatory frameworks that improve incentives for low-emission planning and development and their effective implementation	Reports from working group dialogues and draft proposals discussed	Regulation under discussion	-	Strengthened institutional and regulatory environment that promotes EE investments.	Discussion of legal, regulatory and institutional best-practice proposals with national authorities for their consideration and decision

⁷⁵ Assuming that 360 EE projects using one technology each would benefit from the program (based on market study Annex 2). See Section E.3. for the calculation methodology and Annex 3 for the calculation.

Project/programme outputs	Outputs that contribute to outcomes					
1. Improved access to financial and non-financial instruments and operational mechanisms to deploy them for financing EE investments by SMEs	Number of integrated ESI financing strategies developed ⁷⁶	AFD project reports based on registry to be developed by sub-activity 1.1.7	0 (based on Market Study)	1	1	Main stockholders (SMEs, LFI, technology providers, verifiers) make use of financial and non-financial instruments. Skill level on EE investments of local professionals of main stockholders is increased and maintained to support market growth.
2. Development of enabling institutional, policy and regulatory environments for EE investments	Total EE investments in Millions of USD	AFD project reports based on registry to be developed by sub-activity 1.1.7	0 (or negligible based on Market Study)	Year 3 15	54.05	LFIs are interested in opening up credit lines for SMEs. SMEs are interested in taking up loans for EE investments. Government continues to invest in electricity transmission network. Relative prices of firewood and electricity increasingly favors electricity.
3. Increased access of SMEs to investment finance for EE projects	# of firms	AFD project reports based on registry to be developed	0 (negligible based on Market Study)	Year 3 132	365	Idem.

⁷⁶ The integrated strategy combines long-term finance at adequate conditions, with the ESI package consisting of the standard contract, validation mechanisms, and the insurance. Establishing the strategy requires the socialisation and cooperation of all relevant market actors to develop a sustainable commercial strategy.

		by sub-activity 1.1.7	Market Study)			
	Percentage share of loans for investments channeled to SMEs managed by women ((# of loans to women / (# of loans to women + # of loans to men))-1= multiplied by 100.	AFD project reports based on registry to be developed by sub-activity 1.1.7	TBD% ⁷⁷	at least 10%	at least 30%	There are enough SMEs that are women held or managed that are interested in taking up loans on EE investments.
	Average maturity of channeled loans (years)	AFD project reports based on registry to be developed by sub-activity 1.1.7	4-9 ⁷⁸	Y2 4.3 Y4 5.2	6-9	LFIs are interested in opening up credit lines for SMEs at better financing terms. SMEs are interested in taking up loans for EE investments.
Sub-Activities	Description	Inputs		Description		
1.1.1. Development of a standard performance contract for risk sharing between SMEs and ESTPs	Contract with retention provision and the possibility of an insurance/surety product aligns incentives of ESTP with interests of investors and financiers. This activity will support the development of a ready-to-use strategy that blends financial and non-financial instruments to promote investment by SMEs and consultation meetings with stakeholder for coordination of development of standard performance contract.	Legal and technical consultants Consultation meetings		Standard performance contract developed, discussed, stakeholder feedback incorporated, available and disseminated with ESTPs, SMEs, LFIs and local insurers.		

⁷⁷ Currently, there is no statistical significant information to establish a baseline of credit in the industrial sectors focus of this study. That is, at the moment, there is not enough information to establish a baseline. At the same time, and explained in the financial context of Paraguay, there are few credit lines in those sectors, which exacerbates the situation of data reliability to establish a baseline on this gender indicators. Please see more details in Annex X on business ownership and challenges in registering women led businesses led women.

⁷⁸ The only information on existing credit lines is for the grain industry, where there is credit for improved production (i.e. machinery, inputs, etc.). In that segment, the range in years is between 4-9 years. The goal would be to increase it to range of 6-9 years.

1.1.2. Development of insurance policy covering energy savings	<p>Insurance / security product partially mitigates non-performance risks perceived by investors and their financiers.</p> <p>This activity will support the Development of insurance policy covering energy savings by a legal consultant and the coordination meetings with key stakeholders for insurance/surety product development.</p>	<p>Legal consultant</p> <p>Coordination meetings</p>	<p>Insurance policies developed, discussed, stakeholder feedback incorporated, available and disseminated with ESTPs, SMEs, LFI and local insurers.</p>
1.1.3. Develop methodologies accounting for technology / project level energy savings	<p>Third party experts on EE validate ESTPs and their project proposal, ensuring that they are strong from a technical perspective.</p> <p>This activity will support the development of MRV system, including methodologies accounting for technology / project level energy savings, validation procedures, protocols, formats, reporting and monitoring procedures and coordination with key stakeholders for MRV system development</p>	<p>Technical consultants</p>	<p>Methodologies and templates developed and readily available for project developers (ESTP and SMEs) to apply to the Project and validators to verify project and monitoring of energy savings quality.</p>
1.1.4. Development of a Business Plan for the Project promotion and execution	<p>A business plan to strengthen the institutional capacity of AFD and other relevant market players is developed, including the establishment of a dedicated group with its budget, work plan and internal guidelines to support and implement the ESI financing strategy.</p>	<p>Technical consultants</p>	<p>Business plan with budget, human resources, timeline and milestones identified and approved internally in AFD for the Project execution and promotion.</p>
1.1.5. Hiring and operationalization of two (2) validators	<p>Strengthen the knowledge of validators to support and implement the ESI financing strategy.</p>	<p>2 technical firms or consultants</p>	<p>Validators and verifiers are hired so that they can readily verify quality of proposed sub-projects for credit from the Project and verify energy savings monitored</p>
1.1.6. Establishment at AFD of a business unit dedicated for EE financing and project	<p>Strengthen the institutional capacity of AFD and other relevant market players. Establishment of a PMU.</p>	<p>Technical consultants</p>	<p>A dedicated business unit is created in AFD to execute the program, including</p>

and pipeline development			necessary budget and human resources.
1.1.7. Establishment of electronic registry system for monitoring and evaluation of projects and program's results	The monitoring and evaluation system of AFD is strengthened to track the implementation progress of the project, it's leverage of EE investments and the energy savings and GHG emission reductions.	Technical consultants	The monitoring and evaluating system of AFD, should be based on an electronic registry system capable of collecting / indexing information stemming from supported EE projects intermediated by first tier LFIs. ⁷⁹ AFD monitoring and evaluation system will track: i) private investments in promoted technologies stemming from the financing strategy developed; ii) their energy savings; and iii) their respective GHG emission reductions.
1.2.1. Training of AFD staff (at least 20% women) on Project mechanisms and methodologies.	Strengthen the institutional capacity of AFD and other relevant market players. Train and inform LFIs, ESTPs and validators on project mechanisms and methodologies, as well as disseminate the knowledge generated at the local and regional level	Technical consultants	AFD staff trained and informed on Project mechanisms and methodologies to improve its promotion and execution.
1.2.2. Training activities (workshops, seminars, etc.) to inform and train five (5) LFIs and its staff (2 per LFI) on financing EE projects	Strengthen the institutional capacity of AFD and other relevant market players.	Technical consultants	LFIs in Paraguay informed and trained so that they provide financing to firms for EE projects.
1.2.3. Training of two (2) local technical validators (total of 6 staff) (at least 20% women) about Project methodology.	Strengthen the institutional capacity of technical validators to support and implement the ESI financing strategy.	Technical consultants	There will be at least two Paraguayan validators trained so that they can support the Project quality control scheme.

⁷⁹ Such registry should also have clear format, templates and methodologies for collecting, maintaining and analysing data. The system should rely also on publicly available data systems and other relevant information needed to evaluate impacts, in particular the national emissions factor, the national energy generation plan and matrix, as well as promoted technology standards. The IDB will be tracking the development and establishment of the monitoring and evaluation system and compliance with best practices in this area and the Project's requirements in order to collect and maintain data relevant to the financing strategy being promoted.

<p>1.2.4. Training thirty (30) technology solution providers (at least 20% women) about Program⁸⁰ mechanisms</p>	<p>Strengthen the knowledge of technology solution providers to support and implement the ESI financing strategy.</p>	<p>Technical consultants</p>	<p>ESTPs in Paraguay informed and trained so that they can promote and identify projects to participate in the program.</p>
<p>1.2.5. Workshops and seminars for targeted 360 SMEs to inform about Program mechanisms</p>	<p>Despite reduced investment risks and higher availability of financing, inertia may still limit the uptake of EE investment. However, demand is fostered through targeted outreach to key business stakeholders.</p>	<p>. Technical consultants and meetings</p>	<p>Dissemination of program financial and non-financial mechanisms to promote EE investments.</p>
<p>1.2.6. Development of six (6) products/publications, knowledge sharing events, country market reports published, and webinars</p>	<p>Knowledge sharing through publications and events increases the dissemination of lessons learnt and of the benefits resulting from the proposed project, paving the way for the replication and scaling up of investment in other sectors of the country and at the regional level.</p>	<p>Technical consultants</p>	<p>Publications and events with national and regional expert interest and participation</p>
<p>1.3.1 Assessment of fuel wood market structure. Develop methodology for assessing fuel wood market structure and price drivers to inform market actors</p>	<p>The monitoring of fuel wood market is strengthened to track the fuel wood market developments and informing market actors.</p> <p>Develop methodology for assessing fuel wood market structure and price drivers to inform market actors:</p> <ul style="list-style-type: none"> - Development of a methodology for monitoring of fuel wood market developments building on existing national and regional practices, and methods applied in the literature, as well as by inviting input by international experts; - Develop a phase-in plan with human and technological capacity needs collaborating with and strengthening the National Committee on Energy Efficiency (CNEE) 	<p>Technical consultants</p>	<p>Publications and data</p>

⁸⁰ The training and outreach events for EE energy services and technology providers will be made through existing AFD's promotion systems and capacity. See section H2 for gender-sensitive data collection and baseline development.

<p>1.3.2 Inclusive Dialogue roundtable discussions. Organize inclusive Dialogue roundtable discussions and develop report on challenges and opportunities for efficient industrial energy consumption</p>	<ul style="list-style-type: none"> - Organize in coordination with CNEE a working group for inclusive roundtable discussions with local stakeholders from national authorities, private sector, and the NGO community with a focus on fuel wood and electricity markets for industrial consumers and regulatory best practices to promote a more efficient and sustainable use of biomass as an energy source. - Transparently report on challenges and opportunities for efficient industrial energy consumption taking into account stakeholder perspectives and interests as well as methodologies and practices being developed through the Energy Savings Insurance approach and application of international practice (such as ISO standards). 	<p>Technical consultants and meetings</p>	<p>Publications and dissemination with national and regional expert interest and participation</p>
<p>1.3.3 Capacity Building and Awareness Campaign</p>	<ul style="list-style-type: none"> - Develop a targeted awareness and socialization campaign to disseminate project results to inform investment decisions utilizing appropriate communication channels, including the promotion of use of certified sustainable biomass. 	<p>Technical consultants and meetings</p>	<p>Publications and dissemination</p>
<p>2.1.1 Institutional strengthening to promote EE. (1) Consultancy to review and/or update legal, regulatory, policy and institutional frameworks relating to EE with a focus on but not limited to the use of biomass as energy source .</p>	<p>This sub-component will finance technical assistance to support the following activities:</p> <ul style="list-style-type: none"> (i) Review and/or update legal, regulatory, policy and institutional frameworks relating to EE with a focus on but not limited to the use of biomass as energy source; and (ii) Develop related EE programs and initiatives. 	<p>Technical consultants and meetings</p>	<p>Publications and data</p>
<p>2.1.2 Efficiency and sustainability of biomass as energy source Targeted studies to assess further relevant technological</p>	<p>Strengthen the institutional capacity of the Government and relevant market players to facilitate the replacement of use of fuel wood by sustainable alternative sources.</p>	<p>Technical consultants</p>	<p>Publications and data</p>

<p>improvements and practices to transition to more efficient and sustainable uses of biomass as an energy source across sectors building on the lessons learnt from the project.t And, the collection and management of data relating to the use of biomass as an energy source across sectors/subsectors</p>	<p>It will finance technical assistance to support: (i) The collection and management of data relating to the use of biomass as an energy source across sectors/subsectors, and (ii) Targeted studies to assess further relevant technological improvements and practices to transition to more efficient and sustainable uses of biomass as an energy source across sectors building on the lessons learnt from the project.</p> <p>These activities will allow furthermore to Assess best practices and alternatives in terms of effectiveness, sustainability, financial impacts on public budgets.</p>		
<p>2.1.3 Capacity building and dissemination. Workshops and seminars to relevant stakeholders on EE practices with a focus on but not limited to biomass and relevant dissemination activities</p>	<p>This component will finance capacity building to relevant stakeholders on EE practices with a focus on but not limited to biomass and relevant dissemination activities. Activities to be supported include:</p> <p>(i) dissemination of activities in workshops and regional events organized by the IDB and/or governments in participating countries.</p> <p>(ii) Adequate dissemination channels, as well as webinars, online media and on-the-job training on EE. This component will also support workshops to promote knowledge-sharing of experience, including the public and private sector.</p>	<p>Technical consultants and meetings</p>	<p>Publications and dissemination</p>
<p>3.1. Increase second tier medium and long term credit line for EE projects provided to SMEs in key industrial sectors (Loan Component)</p>	<p>Provision of a medium and long-term credit line to first-tier LFIs so that they can on-lend those resources to SMEs interested in financing EE eligible investment projects. The credit line will be co-</p>	<p>Credit line</p>	<p>Support to at least 365 SMEs to have access to credit from the Project's financing to invest in EE projects⁸¹</p>

⁸¹ It is possible that an SME is investing multiple times with the same credit line, which would lower this number, but maintain the overall number of loan around 365 (at an average loan size) of USD 109k.

	financed by the GCF's reimbursable resources and AFD resources.		Based on the market assessment in Annex 2. See section H2 for gender-sensitive data collection and baseline development
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H.2. Arrangements for Monitoring, Reporting and Evaluation

92. As described in sections B.1. and C.3. the Project is expected to develop a set of standards and methodologies for the key EE technologies promoted under the Project. These standards and methodologies will serve to measure and monitor the actual EE savings at project level and calculate emissions reductions using emission factors. Given that the assessment of energy savings is the basis for the fulfillment of contractual agreements and insurance coverage promoted by the Project, it is assumed that project developers (ESTPs) and investor SMEs have incentives to track and monitor savings. The Project will ensure that the data provided by the project developers is accurate through the validation of project proposals and verification of energy savings (as described in sections B.1. and C.3).

93. The Project, through the Electronic Registry System of AFD to be developed⁸², will provide for interfaces for the ESTPs and investing firm to report on energy savings annually. This information should be maintained and compiled in the AFD registry and *reported semi-annually* in an aggregated manner. It will also be the basis for the overall evaluation of the Project impact.

94. During the execution phase, reports will be submitted by AFD within 60 days following the end of each semester or other period as the AFD and the IDB may agree. These reports will provide information about the overall progress in the execution of the Project. In addition, the financial statements of the program shall be audited annually by an internationally recognized auditing firm following relevant financial reporting standards. The independent auditing firm will also verify compliance with the Project's eligibility criteria, as well as with the appropriate application of the methodology agreed with the IDB to distribute GCF's concessionality among beneficiary firms. IDB will also require that corrective measures to be specified in the OR in case of noncompliance with the Project requirements will be undertaken by AFD.

95. The Project overall outcome / impact assessment (overall improvements in energy intensity towards the end of the Project) will be evaluated by an independent evaluator with the following methodology.

Methodology used to measure energy savings:

96. The measurement of energy savings of a project requires determining three different energy use scenarios: baseline, estimated and actual energy use as illustrated in Table H2.1. below.

Table H.2.1. Energy Use Scenarios

Scenario	Energy Use	Data Source
Baseline. Expected future energy use of current equipment	Energy use of existing equipment that has not been replaced	Historic data and measuring of performance of the existing equipment
Alternative energy use. Expected future energy use of new EE equipment	Potential energy use of an EE equipment that is NOT in operation	Based on manufacturer specifications
Actual energy use. Measured energy use of new EE equipment in operation	Actual energy use of the new and installed EE equipment in operation	Measuring the performance of new EE equipment

⁸² Sub-activity 1.1.7 in Section B.1. and description in Section C.3.

$$(1) \quad EnPi = \frac{\text{Energy consumption}}{\text{Output (Delivered work)}}$$

97. For example: An engine in a factory that works for one day consumes 314 KWh and has an output of 15 HP would have an Energy Performance Indicator (EnPI) = 22.1 KWh/HP. The EnPI is then used to build the Baseline, the Estimated and the Actual energy use models over a given time period. For example, to build the baseline of an electric motor it would be necessary to estimate the number of operating hours per year⁸³. If the equipment is used for 10 hrs. per day, 5 days a week all year, and if the outcome is 15 HP per day then the Baseline can be modelled as follows:

$$10 \text{ hrs} * 5 \text{ days/week} * 52 \text{ weeks/ year} = 2,600 \text{ hrs/year.}$$

$$\text{Baseline} = 22.1 \text{ KW/HP} * 15 \text{ Hp} * 2,600 \text{ hrs/year}$$

$$\text{Baseline} = 861,900 \text{ KWh /year}$$

98. The Estimated energy use would be calculated from the EnPI provided by the manufacturer. An example for the electric motor could be EnPI (estimated) = 15 KWh/HP.

$$\text{Estimated energy consumption} = 15 \text{ KW/HP} * 15 \text{ Hp} * 2,600 \text{ hrs/year.}$$

$$\text{Estimated energy consumption} = 585,000$$

Which means that the Expected energy savings would be:

$$\text{Estimated Energy Savings} = 861,900 \text{ KWh} - 585,000 \text{ KWh}$$

$$\text{Estimated Energy Savings} = 276,900 \text{ KWh;}$$

To define the Energy Savings in percentage:

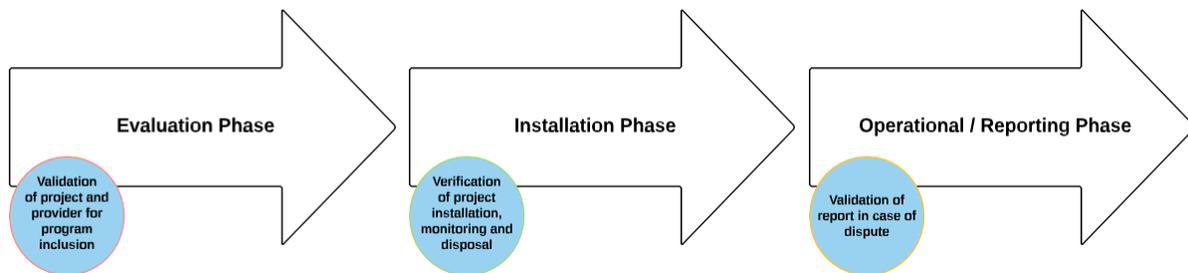
$$\text{Estimated energy savings (\%)} = \frac{\text{Baseline} - \text{Estimated}}{\text{Baseline}}$$

$$\text{Estimated Energy Savings} = 32.12\%$$

To calculate the Actual energy savings, it is necessary to register the energy use and the output in HP of the new equipment. Normally, the technology provider would install a permanent metering system that facilitates the measurement and estimation of the (actual) EnPI.

Validation methodology

99. The programme contemplates putting in place standardized measurement, reporting and verification (MRV) procedures. The objective of these procedures is to ensure quality, reliability, accuracy, consistency, and transparency of the results achieved through EE measures. The verification procedures are carried out by a specialized third-party validation entity. The MRV procedures are implemented during different phases of an individual energy savings project:



⁸³ This Information can be provided by the firm using the equipment.

- Evaluation phase: the Project is validated before the credit evaluation and approval process of a project. The validator has to evaluate the capacity of the EE project to deliver the promised energy savings. Furthermore, the validator validates the capacity (i.e. technical experience) of the Technology Provider to develop and implement the project. The validation is based on comparing the consumption of the existing equipment with the proposed new EE equipment.
 - Implementation and operation: The validator verifies the correct installation of the equipment, of the metering systems, and the appropriate disposal of the old equipment.
 - Project reporting: The validator verifies the results of the Project in case of a dispute between Client (investing firm) and the ESTP regarding the reported results (performance of the project).
100. To simplify and standardize the validation processes and procedures, the Project will develop standardized formats for the use by ESTPs and interested firms. The formats will be designed to concentrate the relevant information to conduct the activities mentioned above.
101. AFD's second tier banking system and the specific electronic registry to be developed for the Project⁸⁴ will allow for the tracking of detailed project information of each beneficiary firm, including investments in EE leveraged by the credit line from AFD as well as other criteria, such as the management by project developers of eventual environmental and social risks. This information will serve for IDB supervision of the Project execution by AFD and ensuring that eligibility requirements of the Project are complied with before funds are disbursed. It is expected that AFD reports semi-annually on aggregated output indicators based on these systems.
102. **Reporting and Evaluation.** An evaluation towards the end of the Project of the impact of credit access and scaled up investments in EE by firms will be undertaken using a quasi-experimental assessment, through statistical matching and a differences-in-differences estimator to compare the beneficiary firms with similar non-beneficiary firms.
103. The overall Project execution will be monitored through reports prepared by the executing agency and delivered to the IDB, submitted within 60 days following the end of each semester or other period as the IDB and the AFD may agree. These will reflect information about all the output and outcome indicators, and fulfillment of the sub-loan eligibility criteria.
104. The executing agency and the IDB will commission a mid-term evaluation of the Project 36 months after the first disbursement, or once 50% of the loan proceeds have been committed, whichever occurs first. This mid-term evaluation will be conducted by an independent evaluator. Progress toward the outcomes and outputs specified in the Section H will be evaluated to identify corrective actions as necessary. The executing agency will provide the information necessary for the IDB to produce an IDB project completion report (PCR) 90 days after the end of the execution period or the date of the last disbursement. Regular monitoring meetings will be scheduled. The monitoring and evaluation plan also includes a strategy for performing an impact evaluation beginning in the last year of Project implementation and includes a review of the financial management of the Project in line with IDB Bank policy.
105. The final evaluations would be undertaken up to one year from the end of the Project implementation period and will be conducted by an individual consultant/firm to support evaluation efforts, including establishment of a baseline, collection of data through surveys, their tabulation and the overall analysis (Sub-component 2.3 in Section B.1.). Please refer also to timeline of the Project in Annex VIII.

⁸⁴ Sub-activity 1.1.7 in Section B.1. and description in Section C.3.

I. Supporting Documents for Funding Proposal

- Annex I. NDA No-objection Letter
- Annex II. Market Study and Addendum Methodological note
- Annex III. Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)
- Annex IV. AFD's Letter of Commitment for co-financing
- Annex V. Project Budget and Cost Breakdown
- Annex VI. Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (If applicable) [NOT APPLICABLE]
- Appraisal Report or Due Diligence Report with recommendations (If applicable) [NOT APPLICABLE]
- Evaluation Report of the baseline project (If applicable) [NOT APPLICABLE]
- Annex VII. Map indicating the location of target firms in Paraguay.
- Annex VIII. Timetable of project implementation 2018-2023.
- Annex IX. 18-month Procurement Plan.
- Annex X. Gender Analysis and Action Plan.
- Annex XI. Energy Savings Insurance: Pilot Progress, Lessons Learned, and Replication Plan.
- Annex XII. Project Consultations and Civil Society Engagement.
- Annex XIII. EE Project Evaluation and Implementation Flow.
- Annex XIV. Operational Flow and arrangements and Engagement of Actors
- Annex XV. Terms and conditions of Co-financing

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*