Energy Savings Insurance: A Design

Prepared by:

Fiorello H. LaGuardia Foundation
Consultores en Energía - Coenergia

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Executive Summary

Mobilizing public and private finance for energy efficiency (EE) is a priority, due to EE’s potential to keep the door open to the 2 °C target through to 2020 at no net economic cost.\(^1\) IEA analysis, however, shows that although solutions and technology are readily available, more than half of the potential in the buildings and industry sectors will not be realized by 2035 (See Figure I.1, below).\(^2\)

**Figure I.1 Unrealized EE Potential without Further Targeted Interventions**

According to expert consensus, this failure stems, in large measure, from banks’ lack of familiarity with the energy efficient technologies, and their consequent exaggeration of their risks and underestimation of their benefits. Further, loans to individual energy efficiency projects are often seen as too small to support the costs banks must incur in their evaluation, processing, and monitoring, i.e., their transaction costs.\(^3\) On the end-user side, company financial decision-makers are characterized as either unaware of EE savings potential or skeptical of engineers’/vendors’ claims for the size of that potential.

The Danish Government, in cooperation with other governments and international partners, wishes to address this key barrier to the adoption of EE by small and medium-sized enterprises (SME) and has requested that consultants explore the design of an insurance mechanism to remove energy savings performance considerations from the EE financial calculus on the basis of initial piloting experience by the Inter-American Development Bank (IDB).

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\(^1\) IEA (2013), World Energy Outlook 2013 Special Report “Redrawing the Global Climate Energy Map”.
\(^3\) See, for example, IEA (2011), Joint Public-Private Approaches for Energy Efficiency Finance.

Energy Savings Insurance: A Design
The results are presented here:

- A generic business model for developing an energy savings insurance instrument to be underwritten by major reinsurance companies.
- A guide for implementation of such an instrument.
- A roadmap for a pilot program in Mexico intended to provide proof of the concept.

Consultants’ review of similar risk mitigation instruments confirms that they mobilize additional investment in energy efficiency when integrated into a programmatic approach to developing a stream of technically sound (and verifiable) and financeable projects for creditworthy end-users. In particular, the Inter-American Development Bank (IDB) program with Bancoldex, in Colombia, provided important inputs to the business model.

IDB, as a multilateral development bank, works with a national development bank as the implementing institution to structure a program to support development of targeted EE project streams for private bank financing. The national development bank provides the commercial banks with project capital and develops the insurance mechanism and flanking measures. The issuance of energy savings insurance (based on the establishment of contracting, qualification, validation, and verification procedures) assures the SME customer (as well as the bank) that the EE equipment will provide the savings required to service the financing.

Based on IDB studies in Mexico, an investment of USD 2.7 million in program set-up costs (marketing study, development of a contractual instrument, verification mechanism, and instrument, with a pilot program) could leverage up to USD 270 million of new EE investment, representing estimated electricity savings of 17,000 GWh and an estimated 8 tons of avoided CO2 emissions, in Mexico, over 10 years.

In the short term, consultants recommend that the Danish Government support a fast-track pilot program in Mexico, in cooperation with IDB, to demonstrate the mobilization potential and feasibility of the instrument. Specifically, the donor support could strategically enhance a planned pilot program for the instrument which is currently in the final planning stages by IDB and FIRA, the Agricultural Development Bank of Mexico for the food processing industry.

The program has recently been approved for funding from the Clean Technology Fund. Complementary Danish support would enable the program to serve as a “proof of concept,” by fast-tracking pilot investments and demonstrating the mechanism. Danish support would also help extracting early valuable learning on the opportunities of the business model and any needed adjustments. This, in turn, will help pave the way for further improvement, scaling up and replication in Mexico and other countries in the Latin America region.

The pilot program would last for two years, demonstrating that investment in energy efficient technologies is profitable for all concerned. Its support of energy efficiency projects with industry leaders across the range of technologies would demonstrate their value in increasing

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4 This calculation was made using a methodology similar to that employed in IFC’s Estudio de Mercado de Financiamiento de Energía Sostenible en México, October, 2012
5 This estimate does not take into account thermal energy savings
6 Formally, Fideicomisos Instituidos en Relación con la Agricultura.

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productivity and saving energy costs. Banks would perceive promotion of insurance-backed EE financing can be a service to their best customers and a low-risk way to expand lending to them.

Program experience will allow suppliers to more efficiently evaluate and market project opportunities and to integrate the reduced costs into their product pricing, as well as to secure reduced insurance rates, eliminating the need for subsidy. Eventually, banks should become familiar enough with energy efficiency to assume technology risk for selected suppliers.

If the piloting proves the approach feasible, donors should consider future support of multi-lateral development banks and relevant efforts elsewhere to mobilize private financing for energy efficiency. In this way, development of the concept and piloting could prepare the ground for replication and implementation on a larger scale and a wider geographical coverage.
Acknowledgements and Reader’s Guide

The Danish Government wishes, in cooperation with other governments and international partners, to develop and mature an action-oriented policy measure focusing on facilitation of the financing of energy efficiency with the aim to launch a scalable initiative at the UN Secretary General’s Climate Summit in New York on 23 September 2014. The initiative will also be examined as a possible high-impact instrument of the Global Climate Finance Innovation Lab.

In pursuit of these objectives, DANIDA contracted with the Fiorello H. LaGuardia Foundation under Insurance/Risk Mitigation Instrument for Energy Savings contract (File No.: 2014-7185).

The contract calls for:

- Background analysis, including overview of EE financing barriers, mitigation potential through energy savings insurances in industry and buildings, costs, risks, and existing examples of the instrument.

- A business model for fast-track development and operation of energy savings insurances underwritten by internationally recognized reinsurance companies to facilitate the financing of energy efficiency.

- Development of a roadmap for a pilot program in Mexico to provide “proof of concept” of the insurance and potential steps required for the replication of the initiative in other countries.

The present document constitutes the final report under the contract and encompasses four specific deliverables: a Background Analysis/Desk Review of Existing Risk Mitigation Instruments (Section I of this report); an Outline of a Business Plan for a Risk Mitigation Instrument (Section II); an Implementation Guide for the Risk Instrument (Section III); and a Roadmap for Implementation of the Risk Instrument in Mexico. Sections I and II have had the benefit of a review by the Danish Ministry of Energy, the Inter-American Development Bank, and selected participants in the Global Innovation Laboratory for Climate Finance. We are grateful for the many thoughtful comments. Any remaining errors are ours, and ours alone.

This document is the product of a review of the available documentation of a select set of financial instruments and programs designed to increase levels of EE financing. The literature review was supplemented by interviews with more than thirty-five individuals (See Annex I) in the United States, Colombia, and in Mexico, with EE finance instrument and program designers and participants, actual and potential.

While sincerely grateful for the collaboration of all of our interviewees, the authors wish to express particular gratitude to the Inter-American Development Bank (Jose Juan Gomes, Maria Netto and Margarita Cabrera) for sharing their knowledge and for a level of collaboration that consultants have seldom encountered anywhere. In addition to arranging and participating in telephone interviews with representatives of all of the key institutional participants in the Bancoldex EE Finance Program in Colombia, they addressed consultant’s requests for program documents and information on potential Mexican program partners with warmth, style, and wit.
This report was prepared by Patrick J. D’Addario, President of the Fiorello H. LaGuardia Foundation, in his capacity as the project's Team Leader, by Manuel de Diego Olmeda, President of Coenergia, S.A., in his capacity as the project's Local Expert and by Adalberto Parilla Limon, in his capacity as project Financial Expert.
Introduction

The Government of Denmark (GoD) has sponsored this study to assess an energy savings risk mitigation instrument as a mechanism for scaling up the financing of energy efficiency by the private sector, particularly to small and medium-sized enterprises, as part of the international effort to keep the door open to the 2 °C target through to 2020, at no net economic cost. In addition to a review of existing, similar instruments, GoD specified that the study should produce the outline of a generic business plan and guide for implementation of the instrument, as well as a roadmap for a pilot program to demonstrate the feasibility of the business plan in Mexico.

Program Review

Consultants’ program review strongly suggests that to be effective, an energy savings risk mitigation instrument needs to be integrated into a stream of technically sound projects for creditworthy end-users. One of the products reviewed, Energi Energy Savings Warranty (ESW) for ESCOs is issued to energy service companies (ESCO), who guarantee energy savings to end-users from EE measures. Should the savings not be produced, the Energi pays the ESCO’s customers for the energy savings shortfall. Even though ESW was developed as a stand-alone instrument (not attached to a financing stream), Hannover RE, Energi’s majority owner, now intends to link the policy to established financing programs.

Energi’s technical staff performs a two-step technology due diligence. Before a master policy is issued, companies are qualified on the basis of their technical competence and project experience. Before being added to the policy, the design and performance contract for each project are reviewed. The European Bank for Reconstruction and Development (EBRD), in its industrial energy efficiency audit program, has also developed internal technical staff to evaluate EE potential for its lending operations. The project flow is essentially all EBRD loans, since all loan applications are reviewed for EE potential. That same staff, however, serves as an external technical resource for the more than 80 banks to which EBRD provides clean energy credit lines through its Sustainable Energy Financing Facility (SEFF). The SEFF approach is similar to the IDB’s approach, as their national development bank partners in Colombia and Mexico will on-lend to commercial banks, utilizing external technical expertise (the Verifier – See Fig. I.1).

Business Plan for an Energy Risk Mitigation Instrument

In particular, the Inter-American Development Bank (IDB) program with Bancoldex in Colombia provided important inputs to the business plan outline and execution guide (presented in Sections II and III) for the instrument. Figure I.2, below, presents the crucial market participants at the moment that the development of the insurance program begins. A Facilitator, most likely a multi-lateral development bank, uses Donor or own funds to support an Implementer, most likely a local development bank, to define and drive an EE financing program. The Implementer uses these funds to specify and assess an EE market; to convene and coordinate key players, notably private banks; to put in place the financial (investment capital, guarantees, and

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7 IEA (2013), World Energy Outlook 2013 Special Report “Redrawing the Global Climate Energy Map”.

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insurance) and technical (contracting, qualification, validation, and verification methodologies and documents) elements required to implement the program.

**Figure I.2 Key Players at the Outset of Business Plan Implementation**

![Diagram showing key players and their interactions](image)

**Barriers to EE financing addressed by energy savings risk mitigation instrument**

Many elements of the Instrument Business Plan are designed to address banks’ requirements, particularly their core interest in mitigating risk. These include national (and multilateral) development banks’ provision of funds (at attractive interest rates and appropriate tenors) to commercial banks for on-lending to energy end-users, as well as financial guarantees to mitigate the risk of the EE loans. The savings risk mitigation instrument and the mechanisms and procedures that support it - a performance contract under which the supplier guarantees energy savings to the end user; an independent mechanism for qualifying suppliers, validating project design and savings, commissioning projects, and arbitrating disputes, also provide comfort to the banks that they are not bearing technical risk.

Moreover, these processes should eventually lead to EE savings becoming the principal guarantee for EE loans. In the short term, however, the energy end-user, particularly the SME end-user, is the primary beneficiary of the EE savings insurance. It signifies that he can trust the equipment supplier and that his promise of energy savings is credible. Most importantly, he will, in any case, have the cash needed to repay the EE financing. This latter aspect suggests that insurance may also facilitate self-financed investments in EE.
The Pilot Program

In the short term, consultants recommend that the Danish Government support a fast-track pilot program in Mexico, in cooperation with IDB, to demonstrate the mobilization potential and feasibility of the instrument. Specifically, the donor support could strategically enhance a pilot program for the instrument which is currently in the final planning stages by IDB and FIRA,8 the Agricultural Development Bank of Mexico, for the food processing industry. The program has recently been approved for funding from the Clean Technology Fund.

Complementary Danish support would enable the program to serve as a “proof of concept” by fast-tracking pilot investments and demonstrating the mechanism. Danish support would also help extracting early valuable learning on the opportunities of the business model and any needs for adjustments. This, in turn, will help pave the way for further improvement, scaling up, and replication in Mexico and other countries in the Latin America region.

Specifically, targeted Danish support for the pilot program could provide added value by:

- Subsidizing project development and transaction costs for a first batch of early EE investors, including by co-funding the design of EE investment projects, independent validation of projects, and verification of savings. This will help develop an early pipeline of demonstration projects and attract commercial banks and insurers.

- Outreach, awareness and capacity building toward local financial institutions, potential EE investors in the agriculture sector, energy service providers, and insurance/surety companies.

- Broadening the scope of efficiency technologies and subsectors to be included in the program (e.g., fisheries refrigeration, milk processing), thereby scaling up its potential impact.

- Support smaller Energy Service Providers in entering the scheme, e.g. by partially covering insurance premiums.

- Analyze and consolidate early learning from the piloting of the instrument, including as regards the instrument’s success in mobilizing private investor interest; relevant adjustments to design elements; the associated mitigation effect; and communication of lessons learned for use in initiatives to replicate and scale up the mechanism in other sectors, countries and regions.

A 2013 marketing study for the IDB/FIRÁ9 program and a 2012 IFC study10 converge around a figure of $1.1 billion of EE projects in financeable companies in agroindustry in Mexico. Estimating that 20% of the potential will have been realized in undocumented projects and that 30% of the remaining projects will be done as a result of the program, the total investment catalyzed by the program would be $270 MM. The IDB has budgeted $2 MM in program set-up

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8 Formally, Fideicomisos Instituidos en Relación con la Agricultura
9 FIRÁ/BID Estudio de Mercado Diseño de una Estrategia y Mecanismos Financieros Para Financiar Proyectos de Eficiencia Energética y uso racional del Agua en el Campo en México, July, 2013
10 IFC, Estudio de Mercado de Financiamiento de Energía Sostenible en México, October, 2012
costs. Were the government of Denmark to support the pilot program, the total preparation cost would be $2.5 million. Allowing $200,000 for additional marketing studies likely to be needed to address the entire agro-industrial market, $32 in EE investment will have resulted for each $1 of EE grants used to set-up the project.

The pilot program is meant to demonstrate that EE technologies are profitable for all concerned, and would be terminated after two years. The support of EE projects with industry leaders across the range of technologies will demonstrate their value in increasing productivity and savings energy costs. Banks will perceive that the promotion of these technologies (and suppliers) is a low-risk way to expand lending to their best customers. Program experience will allow suppliers to more efficiently evaluate project opportunities and integrate the reduced costs into their product pricing, as well as to secure reduced insurance rates, eliminating the need for subsidy. Eventually, one would imagine that banks would be familiar enough with EE to assume technology risk, for selected suppliers, at least.

Figure I.3, below, illustrates the diminishing role of the public sector and the growing role of the private sector in the instrument as the market matures, beginning with the proposed pilot program, through scaling-up, to full commercialization. It should be noted that at the peak of donor involvement, there would be donor support of the simultaneous roll out of the instrument in multiple countries and industries.

**Figure I.3 Projecting Public and Private Investment in EE Insurance over Time**
Section I: Review of Selected Risk Insurance Instruments and Programs

Introduction

Discussions of programs to facilitate EE finance almost invariably begin with a litany of barriers preventing many financially-viable EE projects from accessing capital. In recent years, this discussion has acquired a new urgency in light of the significant contribution required from EE to achieve international climate change goals. According to expert consensus, the failure of banks to integrate EE financing into their mainstream operations stems from their lack of familiarity with EE technologies, resulting in an exaggeration of their risks and an underestimation of their benefits. Further, EE loans are seen as too small to support the costs banks must incur in their evaluation, processing and monitoring (transaction costs).

On the end-user side, financial decision-makers in companies are characterized as either unaware of EE projects’ savings potential or skeptical of engineers’ or vendors’ claims for the size of that potential. Even when the financial parameters of the EE investment are understood, we are told that investment in business expansion takes precedence over IEE investment and is routinely dismissed as infrastructure. This “if it ain’t broke don’t fix it” attitude of many businesses is addressed by the EE finance and insurance programs that GoD has asked consultants to review to provide background for the design, business planning, and implementation guide for a risk mitigation instrument that would be launched in a pilot program in collaboration with selected partners in Mexico, utilizing the roadmap that we are currently developing.

One of the driving assumptions of this study is that an energy savings risk mitigation instrument cannot be constructed in a vacuum. If it is to have any hope of success, it will need to be integrated into a stream of financeable projects for creditworthy end-users. It is appropriate to note here that anyone aspiring to create significant additional bank finance of EE needs, first and foremost, to involve the banks, to assure that the initiative satisfies their requirements.

If the instrument is to promote green credits, it must address the basic challenge to bank finance of EE, to provide authoritative EE technical and financial analysis at the point of transaction at an acceptable cost to all parties. As we will later see, by resolving this problem, the EBRD industrial EE program has transformed EBRD into a major source of EE finance.

Banks have three basic concerns, repayment, transaction costs, and loan pipeline. In order to assure repayment they want to minimize risk. This is true even of credit risk, which is, in theory, what generates returns for banks – hence, banks’ common requirement that borrowers provide real guarantees in a multiple of the loaned amount. Certainly, banks are highly reluctant to assume any kind of performance or technical risk. Even when those risks are mitigated, for

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12 Industrial Energy Efficiency
15 EBRD lending to EE projects in 2014, to date, have reached 38% of their total lending, private conversation with J. Tanaka.
example, by an insurance instrument, banks want to be sure that the administrative, legal, and operating (known collectively as transaction costs) costs are minimal. One way to achieve this is to promote, on a programmatic basis, uniform loan structuring, processing, and security.

Finally, there needs to be enough project demand to justify the costs of the bank’s participation in a specialized loan program. Significant (qualified) loan demand alters the bank calculus, as the bank comes to understand the project risks, which themselves diminish as the bank acquires experience with a diversified pool of projects. The bank’s expenses to administer the loan program are then spread over a larger number of loans, and its costs per loan diminished. Most importantly, if the program is properly structured, the bank will see that it is in fact well-positioned to make money in a burgeoning EE market.16

Consultant’s challenge then, with regard to the development, modeling, and pilot design for an energy savings risk mitigation instrument was not only to attempt to capture the efficacy of the best existing models, but also to find an environment, likely programmatic, where banks’ concerns are addressed and where the instrument would be the capstone of an EE project development process allowing the financing of projects for new classes of end users. These include small and medium-sized businesses (SMEs) and may even include projects that are self-financed, where the risk mitigation instrument would assist the SME to select a qualified equipment supplier and have confidence in the level of energy savings that she could expect to receive.

To determine the likely characteristics of such an instrument, GoD requested reviews of the Energy Saving Warranty program of Energi, Inc., the Inter-American Development Bank program with (Banco Commercio Exterior de Colombia (Bancoldex) in Colombia), and the program under development by Mexico’s Agricultural Trusts, the National Agricultural Development Bank (FIRA).

Consultants were also asked to consider how the proposed risk mitigation instrument might be coordinated with the program being developed by the European Bank for Reconstruction and Development (EBRD) with Global Environment Fund (GEF) support to introduce its approach to accelerating industrial energy efficiency financing through bank-sponsored audits outside of Europe.

Additionally, as part of the process under which the Global Innovation Lab for Climate Finance is evaluating the Danish initiative for additional support, consultants were requested to review the Inter-American Development Bank EE Guarantee Mechanism in Brazil, the Mexican National Industrial Development Bank (NAFINSA) Energy Efficiency Program in Mexico, and the International Finance Corporation/Canada Climate Change Fund/Banorte EE Risk-sharing Facility. (See Figure I.4, Programs Reviewed)

Specifically, GoD has asked consultants to review these programs, as well as to design the risk mitigation instrument using the following criteria:

- **Technical**: Clients/ LFI need to have independent assurances to support implementation of EE projects and provide warranties.

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16 Private conversations with Robert P. Taylor, Principal at Energy Pathways, LLC, and former World Bank Energy Sector Leader for the East Asia and Pacific Region.

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• **Legal**: Contractual arrangements between clients and service providers need to be transparent and standardized.

• **Risk Mitigation**: Compensation / insurance schemes in case promised financial flows associated with EE savings do not occur.

• **Standards**: A reliable system depends on clear standards for monitoring and verifying energy savings.

• **Risk-sharing**: An integrated approach must ensure risks & obligations are placed where they can best be handled.

Figure 1.4, below, provides an overview of reviewed instruments and programs reviewed to inform this study.
**Figure I.4 Instruments/Programs Reviewed**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Country</th>
<th>Provider</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Savings Warranty</td>
<td>US/Canada, S. Africa (in development)</td>
<td>Energi/ Hannover</td>
<td>Energi Insurance Services (Peabody, MA) acts as agent for Hannover Re, a leading international reinsurance Company, and half owner of Energi, to offer is an Energy Savings Insurance product for ESCOs known as the “Energy Savings Warranty.”</td>
</tr>
<tr>
<td>Energy Savings Insurance Facility</td>
<td>Colombia</td>
<td>IDB-CTF pilot with Bancoldex in Colombia</td>
<td>The program supports Colombia’s efforts to enhance the competitiveness of the hotel and clinic/hospital sub-sectors, while reducing GHG emissions, through the piloting of an innovative financing model for EE projects. The financing model includes performance risk insurance covering the energy efficiency interventions implemented.</td>
</tr>
<tr>
<td>FiRe – Energy efficiency work stream</td>
<td>China, India and Brazil (initially)</td>
<td>EBRD and Bloomberg</td>
<td>The intervention aims to deploy up to USD 5bn in energy efficiency financing for large energy intensive industries and SMEs through the active use of energy audits and the translation of technical energy savings potential into financial action. This will be achieved by developing the energy efficiency financing capacity of local banks and by providing energy audits to large energy-intensive companies and SMEs.</td>
</tr>
<tr>
<td>Energy Efficiency Program, Part I</td>
<td>Mexico</td>
<td>NaFIN</td>
<td>The Mexico CTF-IDB Group Energy Efficiency Program (the Program) has worked with NaFIN, providing them with the technical knowledge and technical cooperation (TC) needed to develop necessary knowledge and build a track-record of EE investments. The investment capital and technical cooperation funds will be provided by the CTF, IDB, commercial banks, donors, and bilateral agencies.</td>
</tr>
<tr>
<td>EE Guarantee Mechanism (EEGM)</td>
<td>Brazil</td>
<td>IDB, with the UNDP and the GEF</td>
<td>The EEGM Partial credit guarantee is a globally innovative program that provides both performance and credit guarantees for up to 80% of EE project costs in commercial buildings (up to $800K per project). The guarantee can be used by ESCOs to obtain loans from banks (e.g. $1.6 million to the Brazilian ESCO, APS Soluções, to secure commercial bank financing for three projects); or to assure building owners of the savings guaranteed under ESCO energy saving contracts $25M is available, with $10M Global Environment Facility in first loss position – covers risks and reduces costs.</td>
</tr>
<tr>
<td>Insuring energy efficiency</td>
<td>Global</td>
<td>Munich RE / Hartford Steam Boiler</td>
<td>At the beginning of 2014, Hartford Steam Boiler (HSB) added a green equipment rider to its equipment breakdown insurance coverage. This could be an EE savings risk mitigation mechanism, if loss of EE savings is considered consequential damages.</td>
</tr>
<tr>
<td>Banorte EE risk sharing facility</td>
<td>Mexico</td>
<td>IFC supported by the Canada Climate Change Fund.</td>
<td>The now-abandoned project was a risk-sharing facility with Banco Mercantil del Norte (Banorte) to cover a total portfolio of up to USD 100 million in eligible SME energy efficiency transactions in Mexico. Eligible transactions were to include energy efficiency, renewable energy and cleaner production projects improving energy use of SME companies in Mexico.</td>
</tr>
</tbody>
</table>

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17 Consultant was unable to discuss the program with HSB personnel.

**Energy Savings Insurance: A Design**
Detailed descriptions of the Energi Energy Savings Warranty (ESW) and of the International Development Bank (IDB)/Bancoldex Program in Colombia follow here. The analysis of the remaining programs may be found in Annex 2.

**Energi Energy Savings Warranty**

The ESW is offered by Energi, Inc., a Peabody, Massachusetts Insurance Company, fifty percent owned by Hannover RE, who is reinsurer for the ESW. Offered since 2010, the product has been extended to 12-24 energy efficiency projects worth USD $40 million. It may be argued that this is the purest of the energy efficiency risk instruments currently available, in that it was designed specifically to securitize energy savings and is a private sector product, offered as a single product rather than as part of a broader project development and financing program.

Energi’s diagram of the Energy Performance Contract, below, illustrates the classic Energy Services Performance Contract (ESPC) model. It does not specify who finances the project, but the guarantee on savings comes from the Energy Services Provider (ESP) and the ESW will pay any difference between the projected and actual savings to the energy end user, or if the policy is endorsed, to the financier.

Thus, both the end user and funder of the project are assured that the contracted energy savings projections will be met. Energi charges the ESP between 2% and 5% of the financed portion of each project, depending on the ESP’s experience, the level of projected savings vs. guaranteed savings, the type of technologies or energy conservation measures (typically, lighting, HVAC, building controls), the project length, the contract size, and the dollar value of the savings guarantee. Energi currently offers the ESW in the EE markets for buildings and industry only in the US and Canada, although it is assessing international opportunities.

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**Figure I.5 The Energy Services Performance Contract**

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The main features of the Energi insurance process for qualified ESPs are:

- Contractor installs new building (or industry) equipment to reduce annual energy expenditure.
- Contractor guarantees the amount of annual savings that will result from the installation of equipment.
- Energi assumes a contractual obligation for repayment in the event guaranteed savings are not met.

Inter-American Development Bank (IDB) and Banco de Comercio Exterior de Colombia (Bancoldex) Energy Savings Insurance Facility

In contrast to the Energy Savings Warranty, which was developed for US Energy Services Companies (ESCOs) that have offered Energy Performance Service Contracts (ESPC) for more than thirty years, Colombia has a very small EE services industry and performance contracts are virtually unknown.

The IDB/Bancoldex, therefore, had to solve a number of problems, simultaneously: a) identify a market for EE equipment and services, b) encourage a new class of equipment and services providers to address that market, c) invent a certification process for the companies and means to vet their projects; d) find an analog to the ESPC on which an insurance product could be based (see Figure I.6, below), and e) develop the insurance product, itself. In short, the program sought to create a pipeline of EE projects, as discussed above.

Figure I.6 Elements of the IDB/Bancoldex Energy Saving Insurance Facility
One of the most interesting aspects of the program is its focus on turning equipment providers into energy efficiency savings vendors. By assisting the boiler, motor, HVAC, and other equipment vendors to market the EE savings of their products, the program will create opportunities for equipment replacement well in advance of the end of the useful life of the equipment. In other words, the vendors can argue to their customers that by the time that they would have replaced a boiler, for example, it will have paid for itself from energy savings, possibly many times over, and the customer will continue to save a significant percentage of current (and likely, by then, escalated), energy costs over the life of the new, efficient boiler. See the red portion of Figure I.5, above.

It should be noted that while some of the capital for the EE loans have come from the Climate Trust Fund, through IDB to Bancoldex, the loans will actually be made by private banks. Colombia is fortunate to have one bank, Bancolombia, that is on the cutting edge of EE finance, using teams of bankers and EE technical personnel to market loan products to its existing clients. The company providing insurance for the program, Seguros de Vida Suramericana (Sura), is Colombia’s largest insurer, and, in fact, belongs to the same group as Bancolombia.

For the benefit of less knowledgeable Colombian banks, market studies were utilized to initially focus the program on sectors with significant business opportunities and the potential for quick results – it is restricted to the hotel and hospital sectors, and to six EE products/technologies with significant potential in those sectors, thereby reducing program and project technical risk. In addition, a marketing plan was put in place to develop an adequate project pipeline by training EE suppliers to market their equipment on the basis that the EE savings generated will pay for them and raise awareness and stimulate the interest of key actors, for expansion of the program to other sectors.

ICONTEC, the Columbian Institute of Technical Standards and Certification, a non-profit entity that also serves as the Colombia certifier for the Clean Development Mechanism, was selected to be the Program Verifier. ICONTEC will qualify suppliers, validate that proposed project designs will measurably (with adequate M&V) produce the guaranteed energy savings, commission projects to assure that they are installed as designed; provide ongoing monitoring of savings; and arbitrate disputes between the ESPs and end users with regard to amounts of energy saved. In a nice touch, the costs of the arbitration will be paid by the loser.

The energy savings risk mitigation product will be critically important to the program because it allows technical risk to be shared between the EE equipment supplier/ESP and the insurer, leaving the bank to concentrate on credit risk, and giving the customer confidence that the project will, indeed, pay for itself. In order for the insurer to cover this risk, the program had to find an existing contract form that could be adapted to a performance guarantee.

A construction completion contract was adapted for the program. Once this was in place, a new risk, energy savings shortfall, was added to a standard construction bond. Under the rules of the program, the ESP must provide an energy savings guarantee to his customer. Once the validation process has been completed, and the contract between the ESP and end user signed, Sura issues a policy, lasting for the term of the financing, assuring payment to the customer of any shortfall in the energy savings. It is important to note that eighty percent of

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19 Air conditioning, boilers, cogeneration, HVAC, solar pool heaters, hot water pre-heating
20 ICONTEC is developing a separate evaluation methodology for each technology.
21 Adapting an existing insurance policy was not only a matter of efficiency – it avoided the potential complications of needing to seek regulatory approval from the insurance regulator.
Sura’s risk is covered by a reinsurer, Swiss RE. In addition to providing real guarantees to Sura, the ESP will have part of his payments tied to a determination that projected energy savings having been realized when each loan payment is due.

In addition to standardizing the ESP-client contract and the insurance policy, the program has created a standard format for project proposals – a financial proposal from a certified ESP goes directly to the participating private bank, which has the sole discretion to determine creditworthiness. The technology proposal goes to ICONTEC, the verifier. The financial proposal uses the value of the project’s projected savings as the basis for repayment and instructions for this calculation have been developed for the program. A separate technical application format has been developed for each of the technologies. On the basis of the technical application, ICONTEC determines whether the projected savings are real and verifiable. If both the financial and technical applications are approved, Bancoldex releases funds to the private bank for the project. The end user makes equal, semi-annual payments.

While it may seem whimsical to call the IDB/Bancoldex program an energy savings insurance program, when it is so much more, many vendors say that energy savings insurance appears to be critical for some end users, notably SMEs without the ability to discriminate among vendors and skeptical of savings claims. Without the program’s standardized processes and documents, no energy savings insurance would have been possible. The IDB Bancoldex program appears to have addressed all of the issues that must be resolved for EE project to be financed.

Once concern that exists about the IDB/Bancoldex program (other than its delayed launch) is the real guarantees required by the insurer. In the short term, this should not be a problem, as the EE equipment suppliers are well-know, with solid experience and balance sheets. When the program is successful and begins to attract new vendors, however it may run afoul of the perverse effect of guarantees on serial EE project developers. If they are successful, they quickly run out of real assets to pledge, owing to the relatively long pay back periods of EE projects. Since the guarantee will stay in place until the financing is paid back, smaller ESPs and equipment suppliers may some special concession to participate.
Section II: Outline of a Business Model

Introduction

The principle objective of the business model is the structuring of an energy savings risk mitigation instrument that will attract the participation of critical actors (commercial end-users of energy, energy service companies/EE equipment suppliers, and financial institutions) and serve, in the future, as a blueprint for the financing of large numbers of energy efficiency projects.

As is described hereafter, this section of the document analyzes each of the elements of the model, develops alternative modes of participation for potential market players and evaluations different scenarios with the objective of identifying the impact of modifying some of the variables in the model.

The business model was designed using the CANVAS methodology (Osterwalder & Pigneur, 2010) and aims to develop each of the critical elements pertinent to that methodology. It specifies implementation alternatives and presents sensitivity analyses around the key variables.

Figure II.1 provides a schematic representation of the elements encompassed in this business model. In the ensuing discussion, each element is detailed, beginning with the value proposition. In the present treatment, the elements of each segment of the business plan are enumerated. A more detailed discussion of each can be found at Annex 3 of this document.

The Value Proposition

As already mentioned, the objective of this business model is to develop an instrument to mitigate the risk of energy efficiency project in those countries where the market is not fully evolved, redistributing financial and market risks to the market participants best able to bear them.

Further, this model aims to diminish the perception of risk that potential energy efficiency consumers and many financial institutions have with regard to energy efficiency, by creating a portfolio of successful EE projects supported by a platform offering a robust and practical means of validation, verification, and performance monitoring for those engineered systems.

The final objective of the business plan is to provide a basis for the development of an energy efficiency market in countries where this type of project has not yet been established at scale. This will be accomplished by communicating to each market player not only the general principles of energy efficiency projects but also what particular aspects of energy efficiency are pertinent to his activities, thereby diminishing the prevailing perception of risk.
Categories of Risk in Energy Efficiency Projects

In general terms there are four types of risk in energy efficiency projects, impeding their wide-scale implementation:

- Technical Performance Risk.
- Equipment failure.
- Credit Risk.
- Risk of Extra-contractual Civil Liability.

Mechanisms for the Mitigation of Technical Performance Risk

The discussion of how to deal with this specific risk will deal with the following mechanisms:

- Energy savings insurance.
- Qualification of energy service and equipment providers.
- Validation of projects.
• Arbitration of energy savings insurance.
• Monitoring and Verification.
• Energy savings performance contracts (ESPC).
• Creation of a clear base line for the measurement of savings.
• Analysis of the financial performance of large number of energy efficiency loans.
• Projects limited to proven and well-defined technologies.

Principles of the Model

The model embodies the following principles:

• **Technical:** Begins with the confirmed capacity of energy services companies to identify and measure energy-saving opportunities for would-be clients.

• **Legal:** The project should be based on a contract in which the energy services provider (ESP) guarantees a certain level of savings, provided that his client operates and maintains the equipment in a clearly defined manner.

• **Standards:** Must be developed for the qualification of energy services providers and the validation of project design and energy savings using established and transparent criteria and methodologies.

• **Monitoring:** Should be based on equipment that automatically registers the behavior of the equipment producing energy savings.

• **Distribution of risk:** Identify risk factors that may explain the occurrence of an event for which a particular participant is responsible.

Principal Clients for the instrument

This business model is aimed, in the first place, at companies and institutions as consumers of energy interested in implementing energy efficiency projects at their premises. It is important to mention that, in addition to improving their cost structures, companies implementing this type of project make an environmental contribution, as they diminish their emissions of greenhouse gases

Market segmentation

As a secondary financial mechanism, the risk mitigation instrument must be designed to attend the market segments targeted by the programs or financial institutions providing finance to the energy efficiency projects. It is assumed that the programs or financial institutions will have done a thorough market assessment of potential EE clients and their energy needs as a basis for selecting target sectors
Secondary beneficiaries

Secondary beneficiaries would be the certified energy efficiency equipment and service providers (ESP, including ESCOs) whose savings projections would be validated and guaranteed, removing a significant barrier for a significant number of potential customers. It is anticipated lesser-known, certified small and medium-sized suppliers will, in particular, benefit.

Other beneficiaries

The assumption of technical risk by the insurer will allow the financial institutions to concentrate on the evaluation of their clients’ credit risk.

Promotion of the program

There are four natural channels through which the product could be promoted:

- Energy service providers who identify energy saving opportunities for their clients.
- Bank clients with a good credit history and potential energy efficiency projects.
- Government programs promoting energy efficiency.
- Trade and industrial associations representing EE equipment and service providers.

As is discussed later on in the document, at the proof of concept stage, no promotion is required as the projects will be hand-picked.

When the program reaches commercial scale, it will be necessary to design promotion and publicity campaigns in coordination with program participants.

Principal actors in the model

Figure II.2, below, presents the principal actors at program set-up.

This business model is exceptional in its requirement that each actor participate in the appropriate activities and bear the appropriate risks, so that together they are able to implement energy efficiency projects.
Donor

In this model, Donors play an important role in providing financial resources to allow the Facilitator to bring his experience and know-how to support the Implementing Institution to devise and establish an EE financing program.

Facilitator

The Facilitator plays a critical role in providing its own or donor resources to the Implementing Institution for program establishment, supporting various kinds of technical assistance and sharing experience of similar projects elsewhere. When the Facilitator is a multilateral financial institution, it may also provide capital for on-lending or guarantees on terms unavailable in the local financial market. This is particularly important to allow EE loans to be offered at attractive interest rates and with the extended tenors required by many EE projects.

Implementing Institution

The Implementing Institution is the local counterpart of the Facilitator, and needs to be the driving force behind the mechanism, identifying target markets, mobilizing resources, convening key players, and coordinating their activities, in sum, promoting a programmatic approach to EE financing program.

Development finance institutions are the obvious candidates for the Implementing Institution. They have increasingly looked to stimulate the energy efficiency market as part of national energy and climate change plans, seeking to overcome market failures and creating...
demonstration programs. Further, they solicit the participation of market players in certain types of projects and programs.

These institutions have an important role as program coordinators, conveners, and project aggregators. As a result of its formal responsibilities for developing the sector under its purview, a national development institution will be perceived as a leader and have the convening power to involve other key market participants, particularly the banks, who, as has been seen, are central to program development.

As a rule, this type of institution offers three types of program support:

- Some amount of project lending, often at preferential rates, and often, through commercial banks.
- Funds to support guarantees.
- Support for capacity building, marketing, and technical assistance in the target markets.

Energy end user

The energy end user is the most important figure in the model, since his role is to make energy efficiency happen, and with it, to generate energy and financial savings. It is assumed that he is creditworthy.

It is advisable that the energy end user participants in the program have the following characteristics, that:

- They be in sectors with a high energy demand, both for heat and electricity.
- They be in facilities with energy efficiency opportunities owing to obsolete equipment or inadequate energy systems.
- Company decision-makers in the areas of operations and finance be aware of the opportunity presented by energy efficiency.

Energy service providers and EE equipment suppliers

These are very important players in the EE market, performing two distinct functions. The first is the promotion of energy projects in various economic sectors. The other is the identification of real savings opportunities through energy engineering and the attendant development of technical and financial proposals for their implementation, maintenance, and monitoring.

Three separate classes of participants are identifiable:

- EE technology suppliers willing to guarantee their results and interested in growing their markets through savings guarantee schemes.
- Energy Service Providers implementing projects with guaranteed levels of savings to energy end users who provide financing for the project.
Energy Savings Insurance: A Design

- Energy Service Companies, or ESCOs, experienced with performance contracts and with the engineering and financial capacity to structure energy saving projects.

The ESPs and EE equipment suppliers should meet the following requirements:

- Have the engineering qualifications to design and execute energy efficiency projects.
- Have a history of successful projects making them credible companies for EE projects.
- Use measurement and verification methodologies in conformance with practical and commonly used standards.
- Have the capability to deliver preventive or corrective maintenance to their projects, displaying high standards of responsiveness to their clients.
- Have the support of their suppliers in the form of guarantees of the operation of installed equipment.
- Be willing to sell their goods and services under contracts guaranteeing savings and maintenance services.

Financial Institutions

Given that EE projects that require considerable investment, it is important to have the support of a financial institution that provides financing in return for charging interest. There are other kinds of financial institutions than banks, such as project-focused debt funds, lease companies and equity investors, whose funding is not based on charging interest, but on project returns.

There are three compelling reasons for commercial banks to lend in this sector: (1) there is a significant potential market that has been systematically ignored, that with the proper risk mitigation constitutes an enormous pool of business opportunity; (2) it provides a new line of services to extend to existing customer; (3) the projects burnish the bank’s image and commitment to sustainability.

Risk Mitigation Mechanisms

Risk mitigation mechanisms are a central focus of the model. In order to create an appropriate risk mitigation instrument, it is important to bear in mind that the more it resembles products available commercially in the national market, the easier it will be for the financial institutions to accept it and the issuer to participate in the program.

There are three principal modalities of risk mitigation instrument. Which may be potentially deployable in a risk mitigation scheme will depend on the country of focus:

- Bond or Completion Bond.
- Energy Saving Insurance.
- Energy Savings Performance Guarantee Funds.
The Verifier

The verifier is another critical element of the model. The verifier provides comfort to the investor/end user, the insurer and the financier. The insurer can only issue a policy to a company if it has credible technical support to assure, through ex ante validation, that a) the project will produce the projected energy savings, b) the project is installed as designed, and c) the monitoring and verification measures are adequate and sufficiently transparent to allow all parties to ascertain the levels of savings achieved at any point during the term of the financing.

Likewise, this entity will have the responsibility to act as a third party in any controversy or to validate that there is a claim to be paid by the insurer.

It is crucial to have standard evaluation criteria agreed upon by those involved and interested in the program, provided that this agreement can be reached timely and that the standards are applied equally to all of the projects.

A range of institutions have been identified who might assume the role of Verifier:

- The insurer itself has (or acquires) the technical capacity to validate and verify EE projects
- Organizations involved with the certification and verification activity in the energy sector
- Public and private universities
- Engineering colleges
- Companies certified as experts and adjustors
- Private companies endorsed by a certifying authority

Client relations

The relationship with the client will be maintained by the ESP or technology supplier as it relates to the sale, installation, operation, and monitoring of the project, programmed preventive maintenance, as well as required repairs and the calling of equipment guarantees. For issues pertaining to the loan, of course, the bank will be the contact.

Principal Program Activities

The business model has five macro processes, beginning with the qualification of ESPs to implement projects; the validation of project design and savings projections, the completion of the performance contract, insurance policy and loan documentation and disbursement; implementation, commissioning, operating and monitoring of the project, and, if needs be, the dispute resolution process.
Figure II.3 Program Macro Processes

(1) Analysis and qualification of the ESP - Each of the ESPs and suppliers of technology needs to be evaluated in order to be qualified to participate in the program.

(2) Analysis and registration of a project - It is important that project documents be as understandable and concise as possible consistent with the provision of the necessary financial and technical information for the verifier and financial institution to make the required technical and financial evaluations.

(3) Completion of the contract / insurance / loan - Once the credit analysis and the work of the verifier have been concluded, the performance contract underlying the insurance policy and the insurance policy, itself, will be executed, allowing the project loan to be disbursed.

(4) Monitoring of the Project - Each period, as defined in the structure of the insured project, a verification of the savings should be made. The periodic verification would be through monitoring system and exceptionally when savings shortfall has been detected.

(5) Claims for savings shortfalls - In the case that the project has not generated the guaranteed savings cash flow, an insurance claim should be made, and if proven justified, the insurance should be paid to the financing institution.

(6) Project close out - At the end of the project, the cash flows need to be reviewed in order to identify and liquidate any outstanding balances.

Critical Resources

These resources have been identified as indispensable for mitigating energy savings risks:

- Credit-worthy energy end-users.
- Investible Projects.
- Capable ESPs.
- Accredited verifiers.
- Green credits.
- Risk mitigation Instruments and funds.
- Performance Contract.
Income Flows

The fundamental characteristic of this type of project is its capacity to generate savings through the implementation of energy efficiency measures.

The financial viability of the project depends on the relationship between the required energy efficiency investment and the project’s ability to generate energy savings that translate into financial flows that are sufficient to repay the investment and a stipulated rate of return.

Cost Structure

Beginning with the savings generated and subtracting the percentage of savings which go immediately to the end user, the costs of operating this business model are:

1. **Energy service provider's** project income, divided in two parts:
   a) Payment for equipment and services and the associated profit margins realized upon installation of the EE equipment
   b) Part of the savings realized as payment for the monitoring and preventive maintenance for the project until the financing is repaid.

2. **The financing institution** earns interest on the financing proffered.

3. **The insurer** will receive a risk premium expressed as a percentage of the value of the project finance.

4. **The verifier** will be paid for certification of the ESPs, validation of projects, and verification of the savings over the life of the project.
Each of these expenses should be paid from the savings generated by the energy efficiency project. Nevertheless, with the objective of creating a demonstration effect for the participants in the model of the implicit risks in the business, funds from the national government or multilateral institutions could be used for the following ends:

1. Development of verification methodologies
2. Energy audits where potential projects justify them
3. A first loss or pari passu guarantee fund to restrain the cost of the insurance premiums
4. Installation of monitoring and verification equipment
5. Subsidized EE finance interest rates

Operational Considerations

As part of the implementation of this model it is important to be sure that the following elements are in place:

- Rules for operating the program.
- Qualification methodology for the energy service providers and equipment suppliers.
- Validation and verification methodologies for each technology to be financed.
- The agreement for program collaboration with the entity acting as verifier should be accepted by the insurer.
- Standard performance contracts should be available for the technologies selected.
- Participation in the program should be authorized by the credit and risk committees of the participating banks.

Financial Considerations

Annex 3 of this document presents various sensitivity analyses of the financing of EE projects, e.g., with and without energy savings insurance, and leads to the following conclusions:

- Properly structured EE projects are financially viable whenever the cash flow from savings is adequate to repay the investment in the project.
- The incorporation of insurance coverage does not significantly impact costs and provides certainty that the project will have the expected results for the energy end user.
- It is advisable to finance energy efficiency projects with debt. The consequent leverage improves the project’s net present value.
Section III: Implementation Guide

Introduction

As noted earlier, the *sine qua non* for an energy savings risk mitigation instrument (“the instrument”) is the existence of a pipeline of financeable projects. The establishment and maintenance of such a pipeline involves the collaboration of a variety of players undertaking a range of sequenced and coordinated activities. What follows here is an implementation guide for the business model described in Section II.

Program Participants and Activities

Figure III.1, below, shows the activities in an EE project financing pilot program featuring a risk mitigation instrument.

*Figure III.1 Activities and Players in an EE Finance Pilot Program*
The following activities would be undertaken for an individual EE project.

1. The EE equipment supplier or ESP would apply to the Verifier for qualification in the program. If the supplier or ESP meets technical (including providing qualifying technology) and project experience criteria, he will be qualified.

2. Once the supplier is qualified, the end-user would submit the EE equipment supplier or ESP technical proposal to the Verifier and submit the financial proposal to his bank. Verifier would validate project design (and monitoring plan) according to a technology-specific methodology and validate energy savings (and associated financial flows) projections according to the savings projection methodology. Once Verifier validates the financial flows, the bank can review the project financial proposal.

3. Verifier notifies insurer that the project has been validated.

4. The end-user signs the standardized performance contract with the EE equipment supplier or ESP, stipulating installation of the equipment to produce a guaranteed and insured level of energy savings, and providing separate payments to the supplier for preventive maintenance during the life of the financing.

5. On the basis of the validation and the signed performance contract, the insurer issues an energy savings insurance policy to the EE equipment provider or ESP, stipulating payment to the end-user for any shortfall in guaranteed energy savings.

6. Depending on the bank, the insurance policy may be endorsed to the bank, in which case, the bank would be paid directly by the insurance company for any shortfall in guaranteed energy savings.

7. On the basis of the bank’s credit analysis of the end-user and the savings insurance policy, the private bank agrees to finance the project.

8. The bank receives special (interest rate, tenor) funds from development bank, and purchases financial guarantees to minimize its risk.

The EE equipment supplier or ESP implements the project, with the Verifier commissioning the project, confirming that equipment is installed according to the approved design. The equipment supplier or ESP is responsible for preventive maintenance and for periodic verification of energy savings. If there is any dispute between the end-user and the EE equipment provider about the amount of energy savings, the Verifier arbitrates the dispute. The losing party pays the arbitration costs.

9. Should the shortfall be confirmed and be the result of equipment failure, design or installation error the insurance company would disburse to the end-user (or to the bank, if the policy had been endorsed).

10. The Implementing Institution would provide program statistics and reports to the Facilitator and Donors.

Pilot program set-up activities are laid out in blocks 1-3 of Figure III.2, below. Pilot program operational activities are laid out in blocks 4 and 5 and program scaling activities are presented in block 6. They are discussed in more detail in Annex 4.

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22 This, of course assumes that it is the equipment supplier or ESP’s first project under the program.
23 It is advisable that standardized forms for both of these proposals be created by the program.
24 This may entitle end-user to a reduced interest rate on his loan, owing to reduced risk of non-payment of the loan.
# Figure III.2 Blocks of Program Activities by Actor

<table>
<thead>
<tr>
<th>STAGE</th>
<th>ACTIVITY</th>
<th>ACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ESTABLISHMENT OF INTEREST IN THE PROGRAM</td>
<td>Do a market study of the potential for energy efficiency projects.</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Designate a Project Coordinator with responsibility for concluding agreements, coordinating activities and participants, and assuring that the project moves forward, according to plan.</td>
<td>Facilitator and Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Establish criteria for measuring program success.</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td>2. IDENTIFY PLAYERS AND ACTIVITIES FOR THE PILOT PROJECT</td>
<td>Develop the profile for target projects.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Identify/develop an appropriate risk mitigation instrument and provider for the target market.</td>
<td>Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Identify/develop a verification entity and procedures aligned with the instrument provider.</td>
<td>Facilitator/Implementing Institution and Insurer</td>
</tr>
<tr>
<td></td>
<td>Confirm and formalize participation of other key actors.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Identify resources.</td>
<td>Facilitator/Implementing Institution</td>
</tr>
<tr>
<td>3. DESIGN OF THE MODEL</td>
<td>Identify/Adapt/Develop a performance contract.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Specify the technologies to be supported in the pilot program</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Align the instrument with the other financial products.</td>
<td>Implementing Institution/Banks/Insurer</td>
</tr>
<tr>
<td></td>
<td><strong>Definition of Criteria and Methodologies</strong></td>
<td>Implementing Institution/Banks/Insurer/Verifier/Equipment suppliers/ESPs</td>
</tr>
<tr>
<td></td>
<td>• Qualification of ESPs and Equipment Providers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Validation of Project Designs by Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Projection of Energy Savings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Verification of Savings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Establish operational procedures for the contract-“instrument”-credit mechanism.</td>
<td>Implementing Institution/Banks/Insurer</td>
</tr>
<tr>
<td>4. PILOT PROGRAM KICK-OFF</td>
<td>Selection of five to ten projects with end-user, provider, and bank in place.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Assign participant resources.</td>
<td>Sponsor/Dev. Bank</td>
</tr>
<tr>
<td></td>
<td>Establish a system to monitor critical program indicators.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td>5. EXECUTION OF PILOT PROJECT</td>
<td>Installation and commissioning of projects</td>
<td>Suppliers/Verifier</td>
</tr>
<tr>
<td></td>
<td>Project operation and monitoring.</td>
<td>Implementing Institution/Suppliers</td>
</tr>
<tr>
<td></td>
<td>Present results of the pilot program as a basis for</td>
<td>All Program Participants; New End</td>
</tr>
</tbody>
</table>

Energy Savings Insurance: A Design
<table>
<thead>
<tr>
<th>6. PROGRAM SCALING PLAN</th>
<th>Activity</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>scaling the program to additional technologies and sectors.</td>
<td>Users and Suppliers</td>
</tr>
<tr>
<td></td>
<td>Adjust expansion on the basis of pilot program feedback.</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Expand to new technologies/participants.</td>
<td>Donor/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Execute market studies for new sectors.</td>
<td>Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Define resources necessary for new sectors.</td>
<td>Implementing Institution /Consultants</td>
</tr>
</tbody>
</table>
Section IV: Roadmap for a Mexican Pilot Program

Background

According to the Organization for Economic Cooperation and Development, although Mexico has one of the lowest levels of per capita CO2 emissions in the OECD, if the energy and carbon intensities of its economy continue to increase at the pace of the last decade (see Figure IV.1, below) GHG emissions could increase by 70% by 2050, compared to 2000.25 Aggressive promotion of energy efficiency is one important tool to decouple energy consumption from growth.

Figure IV.1 Energy and CO2 intensity of the Mexican Economy

Introduction

Section II presented the outline of a business plan setting out the principle elements for an energy efficiency finance program featuring an energy savings risk mitigation instrument. This section is a work plan for a pilot project based in Mexico.

Efforts of Other Institutions

During the execution of the project, and as a result of the interviews conducted with more than thirty-five different participants, three distinct efforts meriting consideration in the development of the instrument were identified:

25 OECD Environmental Performance Review: Mexico 2013
A Program of EE projects being promoted by FIRA, whose work program is under development with the collaboration of the IDB, for implementation in the last quarter of 2014 and the first quarter of 2015 as described in the report by BASE.

A Program of EE projects being promoted by BANCOLDEX in Colombia, which also has the IDB as a sponsor and includes an energy savings risk mitigation instrument (surety), and is expected to begin operations shortly.

A Program of EE projects being promoted by NAFIN with the collaboration of the Carbon Fund. In this program, there is no separate technical risk instrument. Technical risk is bundled with project financial risk in a NAFIN guarantee to commercial bank participants in the program.

**Blocks of Activities**

The following two tables list the activities that need to be undertaken to launch the pilot program and for its eventual expansion, organized into six program blocks, indicated the responsible individual or institution, the target date for its completion, and any pertinent comments.
Figure IV.1 Roadmap for a Mexican Pilot Program

<table>
<thead>
<tr>
<th>STAGE</th>
<th>ACTIVITY</th>
<th>ACTOR</th>
<th>TARGET DATE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTABLISHMENT OF INTEREST IN THE PROGRAM</td>
<td>Do a study to identify the market potential for energy efficiency projects in the market(s) of interest.</td>
<td>FIRA/IDB</td>
<td>Completed Nov 13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Designate a Project Coordinator with responsibility for concluding agreements, coordinating activities and participants, and assuring that the project moves forward, according to plan.</td>
<td>FIRA/IDB</td>
<td>SEP 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Establish criteria for measuring program success.</td>
<td>FIRA/IDB</td>
<td>SEP 14</td>
<td>w/GoD</td>
</tr>
<tr>
<td>IDENTIFY PLAYERS AND ACTIVITIES FOR THE PILOT PROJECT</td>
<td>Develop the profile for target projects.</td>
<td>FIRA/BID/Coordinator</td>
<td>In Progress</td>
<td>FIRA clients</td>
</tr>
<tr>
<td></td>
<td>Identify/develop an appropriate risk mitigation instrument and provider for the target market.</td>
<td>FIRA</td>
<td>OCT 14</td>
<td>Several interested guarantors and insurers</td>
</tr>
<tr>
<td></td>
<td>Identify/develop a verification entity and procedures aligned with the instrument provider.</td>
<td>Coordinator and Insurer</td>
<td>OCT 14</td>
<td>ANCE, IMNC, Insurer/Guarantor</td>
</tr>
<tr>
<td></td>
<td>Confirm and formalize participation of other key actors.</td>
<td>Coordinator</td>
<td>NOV 14</td>
<td>Verifiers</td>
</tr>
<tr>
<td></td>
<td>Identify resources.</td>
<td>Coordinator</td>
<td>OCT 14</td>
<td>FIRA/BID/GoD</td>
</tr>
<tr>
<td>DESIGN OF THE MODEL</td>
<td>Identify/Adapt/Develop a performance contract.</td>
<td>Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specify the technologies to be supported in the pilot program.</td>
<td>FIRA/BID</td>
<td>OCT 13</td>
<td>from Market Study</td>
</tr>
<tr>
<td></td>
<td>Align the instrument with the other financial products.</td>
<td>Coordinator/Banks/Insurer</td>
<td>NOV 14</td>
<td></td>
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<tr>
<td></td>
<td>Definition of Criteria and Methodologies</td>
<td>Coordinator/BID/CONUEE</td>
<td>DEC 14</td>
<td>Ideally, with Collaboration of Bancoldex Program</td>
</tr>
<tr>
<td></td>
<td>• Qualification of ESPs and Equipment Providers</td>
<td></td>
<td>OCT 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Validation of Project Designs by Technology</td>
<td></td>
<td>OCT 14</td>
<td></td>
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<td></td>
<td>• Projection of Energy Savings</td>
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<td>NOV14</td>
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<tr>
<td></td>
<td>• Verification of Savings</td>
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<td>DEC 14</td>
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<td></td>
<td>Establish operational procedures for the contract-“instrument”-credit mechanism.</td>
<td>Insurer, Banks, Coordinator</td>
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</table>
### Figure IV.1 Roadmap for a Mexican Pilot Program (cont’d)

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<tr>
<th>STAGE</th>
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<th>TARGET DATE</th>
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<td>PILOT PROGRAM KICK-OFF</td>
<td>Selection of five to ten projects with end-user, provider, and bank in place.</td>
<td>Coordinator</td>
<td>DEC 14</td>
<td>FIRA believes that it will be revisiting already-assessed projects</td>
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<td></td>
<td>Assign sponsor resources.</td>
<td>Sponsors/Coordinator</td>
<td>DEC 14</td>
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<td></td>
<td>Establish a system to monitor critical program indicators.</td>
<td>Coordinator</td>
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<tr>
<td>EXECUTION OF PILOT PROJECT</td>
<td>Installation and commissioning of projects</td>
<td>Suppliers</td>
<td>JUN 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project operation and monitoring.</td>
<td>Suppliers</td>
<td>DEC 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project reports on success criteria</td>
<td>Coordinator</td>
<td>DEC 15</td>
<td></td>
</tr>
<tr>
<td>PROGRAM SCALING PLAN</td>
<td>Full Scale Operation in the Food Processing Sector with Selected Technologies</td>
<td>All Program Participants; New End Users and Suppliers</td>
<td>JAN 16</td>
<td></td>
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<tr>
<td></td>
<td>Present results of the pilot program as a basis for scaling the program to additional technologies and sectors,</td>
<td>Coordinator</td>
<td>DEC 15</td>
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<tr>
<td></td>
<td>Adjust expansion on the basis of pilot program feedback.</td>
<td>Coordinator</td>
<td>FEB 16</td>
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<tr>
<td></td>
<td>Execute market studies for new sectors/technologies</td>
<td>Coordinator/Consultants</td>
<td>MAR 16</td>
<td></td>
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<tr>
<td></td>
<td>Establish verification methodologies for new technologies</td>
<td>Coordinator/Consultants</td>
<td>APR 16</td>
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<td>Define resources necessary for new sectors.</td>
<td>Coordinator</td>
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Mexico Program Participants and their Activities

Figure IV.1, below, shows the project finance activities of the principal players involved in, or being considered for involvement, in the BID/FIRA pilot program. For more detail on the process see discussion after Figure III.1, above.

Establishment of Interest in the Program

With respect to this block of activities, the following issues and need to be considered for the Mexican pilot program:

There is an existing collaborative project between IDB and FIRA to develop a program to support an energy risk management instrument for agro-industrial energy efficiency projects.
As part of this collaboration, BID/FIRA contracted BASE to produce a market study and a project design for an energy efficiency financing program featuring an energy savings risk mitigation instrument for the food processing industry. As such, our recommendations for the GoD pilot program align nicely with their program.

FIRA is strongly interested in a risk mitigation instrument as they have independently concluded that it is critical for scaling up EE financing in agro-industry.

A meeting among FIRA, BID and GoD should be arranged in the near future to formalize and agree on the specific the uses of possible GoD’s support for the pilot program.

Identify Players and Activities for the Pilot Project

The general project profile defined by FIRA/BID:

- Projects with monthly energy bills in excess of 5,000,000 Mexican pesos per month
- Companies from the food processing industry
- The technologies to be covered are efficient boilers, air conditioning and refrigeration systems, efficient motors, conveyor belts, compressed air and cogeneration

FIRA has not yet indicated the specific companies that had previously had energy efficiency audits performed that they propose to consider for pilot projects

With respect to insurance, consultants have had a series of discussions with insurance and reinsurance companies interested in developing and offering energy savings insurance:

- Euler – HSBC. Initial discussions with HSBC identified a Euler trade credit insurance covering cash flow variability that may be adaptable to energy savings cash flows. As of this date, consultants are seeking a meeting with Euler to verify feasibility and interest

- Allianz-Hannover RE. Consultants have promoted contacts between Allianz, Mexico and Hannover-RE Germany to discuss their joint interest in launching, in Mexico, a version of an energy savings – specific product currently on offer in the US and Germany. Conversations are ongoing.

- Consultants have had conversations with a broker about the possibility of adding energy savings losses as a consequential damage on equipment breakdown insurance currently being utilized by some suppliers of cogeneration systems.

- NAFIN has advised consultants of their willingness to consider utilization of performance insurance as a complement to credit guarantees after the launch of their new platform for EE projects in the Business Eco-Credit Program.

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26 This information has been shared with FIRA and IDB. Our contacts in each of these companies are identified in Annex 1: Interviewees.
The foregoing options may be considered as potential alternatives to a surety of the kind developed in the BID/Bancoldex Program and offered by Suramericana insurance on the basis of the suppliers’ accredited experience.

There are a number of options with regard to selection of a verifying entity. It is critical that the insurer/guarantor be part of the selection process and the design of the methodologies for projecting energy savings and for the evaluation of project designs for each technology, since he will be issuing policies on the basis of the verifier’s qualification of suppliers and validation of project designs and energy savings projections.

- Entities such as the National Association of Normalization and Certification for the Electric Sector, A.C. (ANCE) and the Mexican Institute of Normalization and Certification, A.C., (IMNC) that emit norms and are authorized certify compliance with them. Once the verification methodologies are established, such an entity would validate that suppliers, projects and measurements meet the established norms.

- Another possibility would be independent specialized teams who work for insurance companies, backed up by an arbitrator who would resolve disagreements over savings that may arise.

The banks with which consultants have discussed the program, Banamex, Banorte, and CI Bank, have indicated their interest in collaborating and commented favorably on the role that a risk mitigation instrument could play in the development of EE projects.

Consultants have discussed with FIRA the desirability of quickly identifying candidate projects for the pilot program from existing customers of the commercial banks.

Consultant proposes that GoD use the resources it intends to make available to the pilot program to reduce the costs to SME end users and SME suppliers:

- Subsidizing project development and transaction costs for a first batch of early EE investors, including by co-funding the design of EE investment projects, independent validation of projects, and verification of savings. This will help develop an early pipeline of demonstration projects and attract commercial banks and insurers.

- Outreach, awareness and capacity building toward local financial institutions, potential EE investors in the agriculture sector, energy service providers, and insurance/surety companies.

- Broadening the scope of efficiency technologies and subsectors of the program (e.g. fisheries refrigeration, milk processing), thereby scaling up its potential impact.

- Support smaller Energy Service Providers in entering the scheme, e.g. by partially covering insurance premiums.

- Analyze and consolidate early learning from the piloting of the instrument, including as regards the instrument’s success in mobilizing private investor interest; relevant adjustments to design elements; the associated mitigation effect; and communication of lessons learned for use in initiatives to replicate and scale up the mechanism in other sectors, countries and regions.
Impact of the pilot program

The energy efficiency market

In this program, FIRA and BID, as development institutions, with the support of GoD, are seeking to overcome market inefficiencies to create EE market opportunities, particularly by addressing exaggerated perceptions of risk. One of the principal challenges that this business plan confronts is to create a proof of concept that confirms that it has created the necessary conditions to incentivize banks and end users to undertake energy efficiency projects. A successful demonstration project will certainly mobilize quantities of capital sufficient to finance a significant part of the identified EE opportunities in the food processing sector in Mexico. Further, a successful pilot program will almost certainly mobilize additional capital for other sectors through the NAFIN program.

Impact on agro-industry

The Study on the Financing of Sustainable Energy in Mexico, (IFC, 2012) estimates that between $1,237 and $2,222 million of bank financing will be required for investment in energy efficiency, renewable cogeneration, and cogeneration in agro-industry over the next 14 years. This constitutes 60% of total investment needs.

This estimate is consistent with that of the “Market Study and Design of a Financial Strategy and Mechanisms to Finance Energy Efficiency Projects and the Rational Use of Water in Rural Mexico which reports that there are 7,000 small and medium-sized companies active in agroindustry, of which 70% are bankable. This gives us 4,900 bankable companies in the sector, with an EE investment potential of $1.1 billion.

Although not well documented, certainly many EE projects have been done in the sector, with public or private financing. It is assumed, here, that these projects have addressed twenty percent of the identified potential. We believe that a reasonable estimate is that the present program can address an additional 30% of the financeable market, as seen Figure IV.3, below.

**Figure IV.3 Donor Mobilization Ratio**

Donor support equivalent to 3% of the cost of energy efficiency measures in specific sectors raises the level of realized cost-effective projects from 20% to 50%. This would mean a 1:32 mobilization ratio.

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Energy Savings Insurance: A Design
Consultant’s estimate is that an investment of USD 2.7 million in program set-up costs (marketing study, development of a contractual instrument, verification mechanism, and instrument, with a pilot program) could leverage up to USD 270 million of new EE investment, representing estimated electricity savings of 17,000 GWh and an estimated 8 tons of avoided CO2 emissions, in Mexico, over 10 years. 

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27 This calculation was made using a methodology similar to that employed in IFC’s Estudio de Mercado de Financiamiento de Energía Sostenible en México, October, 2012.
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- “Estudio de Mercado y Diseño de una Estrategia y Mecanismos Financieros para Financiar Proyectos de Eficiencia Energética y Uso Racional del Agua en el campo en México”, Fideicomisos Instituidos en Relación a la Agricultura (FIRA), Banco Interamericano de Desarrollo (BID), Basel Agency for Sustainable Energy (BASE), 2013
- “Diseño de un Programa Integral para Financiar Proyectos de Eficiencia Energética y Uso Racional del Agua en el Campo en México”, Fideicomisos Instituidos en Relación a la Agricultura (FIRA), Banco Interamericano de Desarrollo (BID), Basel Agency for Sustainable Energy (BASE), 2013
Annex 1: Interviews and Contacts

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<tr>
<th>EMPRESA</th>
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<th>PUERTO</th>
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<tr>
<td>Optima Energia</td>
<td>Ing. Enrique Gomez Jünco</td>
<td>Director General</td>
<td><a href="mailto:egorne@optimaeenergia.com">egorne@optimaeenergia.com</a></td>
<td>52 81 0000 0113</td>
<td>7/25/14</td>
<td>Conferencia Telefónica</td>
</tr>
<tr>
<td>Banxolux</td>
<td>Lic. Diego Rojas</td>
<td></td>
<td><a href="mailto:diego.rojas@banxolux.com">diego.rojas@banxolux.com</a></td>
<td></td>
<td>7/28/14</td>
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</tr>
<tr>
<td>Legal IDB</td>
<td>Lic. Juan Pablo González</td>
<td></td>
<td><a href="mailto:jgonzalez@legalidb.com">jgonzalez@legalidb.com</a></td>
<td></td>
<td>7/30/14</td>
<td>Conferencia Telefónica</td>
</tr>
<tr>
<td>Ixotec</td>
<td>Lic. María Castro</td>
<td></td>
<td><a href="mailto:nika@ixotec.org">nika@ixotec.org</a></td>
<td></td>
<td>7/29/14</td>
<td>Conferencia telefónica</td>
</tr>
<tr>
<td>FIRA</td>
<td>Lic. Ignacio Oliver / Lic. Luis Roberto Llanos</td>
<td>DGA de Promoción</td>
<td><a href="mailto:impolver@firagob.mx">impolver@firagob.mx</a></td>
<td>01 800 999 3472</td>
<td>7/29/14</td>
<td>Entrevista personal</td>
</tr>
<tr>
<td>El Banco</td>
<td>Lic. Jorge Rey Gálvez</td>
<td>Director Sostenibilidad</td>
<td><a href="mailto:gey@elbanco.com">gey@elbanco.com</a></td>
<td>51 55 73 72 0769</td>
<td>7/30/14</td>
<td>Entrevista personal</td>
</tr>
<tr>
<td>ENERGUA</td>
<td>Ing. Raúl Ortega</td>
<td>Director General</td>
<td><a href="mailto:neo@energua-e.com">neo@energua-e.com</a></td>
<td>51 55 06 73 035</td>
<td>7/30/14</td>
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</tr>
<tr>
<td>IPD</td>
<td>Lic. Daniel Farchy</td>
<td>Sustainability &amp; Climate Finance Specialist</td>
<td><a href="mailto:dfarchy@fis.org">dfarchy@fis.org</a></td>
<td>51 55 90 06 03 61</td>
<td>7/30/14</td>
<td>Entrevista personal</td>
</tr>
<tr>
<td>Iberia</td>
<td>Ing. Jorge Freire</td>
<td>Director de Engineria</td>
<td><a href="mailto:jfreire@iberia.com">jfreire@iberia.com</a></td>
<td>51 55 45 09 2300</td>
<td>7/30/14</td>
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</tr>
<tr>
<td>IMCO</td>
<td>Ing. Lorenzo Arana Reyes, Bajaína</td>
<td>Director</td>
<td><a href="mailto:llam@isco.com.mx">llam@isco.com.mx</a></td>
<td>51 55 93 08 00 99</td>
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<td>Sogenera</td>
<td>Ing. Jorge Guillerier, Vera</td>
<td>Presidente</td>
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<td>Balam Fund</td>
<td>Lic. Guillermo Gutiérrez A.</td>
<td></td>
<td><a href="mailto:guallermo.gutierrez@balamfund.com">guallermo.gutierrez@balamfund.com</a></td>
<td>51 55 56 60 7851</td>
<td>7/31/14</td>
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<tr>
<td>Sistemas Eléctricos Metropolitano</td>
<td>Ing. Jorge Guillerier, Vera</td>
<td>Director General</td>
<td><a href="mailto:jorge.guillerier@redes.net.mx">jorge.guillerier@redes.net.mx</a></td>
<td>51 55 21 01 2111</td>
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<td>Asociación Mexicana de Empresas de Servicios Energéticos (AMESE)</td>
<td>Ing. Santiago Barón Palmonar</td>
<td>Presidente</td>
<td><a href="mailto:santiago.baron@gmail.com">santiago.baron@gmail.com</a></td>
<td>51 55 26 14 4966</td>
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<td>Entrevista personal</td>
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<tr>
<td>Fideicomiso para el Ahorro de Energía (FIDE)</td>
<td>M. José Antonio Urteaga Doclor</td>
<td>Subdirector de Operación</td>
<td><a href="mailto:juo@fide.com.mx">juo@fide.com.mx</a></td>
<td>51 55 11 09 0560</td>
<td>8/1/14</td>
<td>Entrevista personal</td>
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<tr>
<td>Nacional Financiera (NATFIN)</td>
<td>Lic. Adriana Reyes Ortega</td>
<td>Subdirección de Proyectos Sectoriales</td>
<td><a href="mailto:imaries@natin.gob.mx">imaries@natin.gob.mx</a></td>
<td>51 55 53 32 01 39</td>
<td>8/1/14</td>
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</tr>
<tr>
<td>PowerMaster</td>
<td>Ing. Jesús Nieto</td>
<td>Director</td>
<td><a href="mailto:jsu@powermaster.com.mx">jsu@powermaster.com.mx</a></td>
<td>51 55 59 89 5700</td>
<td>8/8/14</td>
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<td>Sura Colombia</td>
<td>Lic. Isabel Cristina Franco</td>
<td></td>
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</tr>
<tr>
<td>Banco Interamericano para el Desarrollo (BID)</td>
<td>Lic. José María Zambrano / Lic. Margarita Cabrera</td>
<td>División de Mercados de Capital &amp; Instituciones Financieras</td>
<td><a href="mailto:mzambrano@bid.org">mzambrano@bid.org</a></td>
<td>52 02 23 2395</td>
<td>8/1/14</td>
<td>Conferencia Telefónica</td>
</tr>
<tr>
<td>Manfi</td>
<td>Lic. Javier Oliver</td>
<td>Agente de Seguros y de Florianes</td>
<td><a href="mailto:angejv.rancher@manfi.com">angejv.rancher@manfi.com</a></td>
<td>52 55 01 77 88 13</td>
<td>8/3/14</td>
<td>Entrevista personal</td>
</tr>
<tr>
<td>Comisión Nacional para el Uso Eficaz de la Energía (CONUE)</td>
<td>M. Osde de Buen Rodríguez</td>
<td>Director General</td>
<td><a href="mailto:oseb@conue.gob.mx">oseb@conue.gob.mx</a></td>
<td>52 55 30 00 1000</td>
<td>8/3/14</td>
<td>Entrevista personal</td>
</tr>
<tr>
<td>SNSC</td>
<td>Lic. Blanca Leticia Pérez, Razo</td>
<td>Insurance &amp; Investments</td>
<td><a href="mailto:blanca.lopez@snsccom.mx">blanca.lopez@snsccom.mx</a></td>
<td>52 55 57 23 2310</td>
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28 Only the senior representative of each organization participating in a meeting is listed.
Annex 2: Section I, Additional Programs (Review of Instruments and Programs)

European Bank for Reconstruction and Development (EBRD) Industrial EE Program

In the past ten years, EBRD has succeeded in seamlessly integrating EE into its mainline industrial and commercial lending operations. EBRD launched its Sustainable Energy Initiative in 2006 to scale up its investments in energy efficiency and renewable energy. From launch to the end of 2013, cumulative EBRD SEI investment reached $17 billion in 756 projects, of which $14.4 billion are in energy efficiency. SEI investment accounted for 28% of total EBRD investment in 2013, up from less than 4% in 2005. Cumulative carbon emission reduction from these energy efficiency projects is estimated at 54 million tonnes per year.

EBRD has achieved these results by utilizing internal technical capacity, engineers in its Energy Efficiency and Climate Change Unit (E2C2) to assure that each loan application is reviewed, and classified, by its energy efficiency potential. With six full-time staff engineers, E2C2 provides EE advisory services to client technical and financial decision makers and arranges 70 industrial EE audits per year for interested companies at no cost to the companies. It then offers finance for good projects identified by the audits, entering them into the bank’s project database to allow tracking. Over the Programme’s life, each euro spent on outside auditors has resulted in nearly one thousand euros of IEE investment. While the EE assessment is a standard part of EBRD’s evaluation of loan applications, clients are not required to implement the IEE investments identified. Nevertheless, more than 60% do so, voluntarily, according to EBRD estimates.

EBRD reviews all incoming industrial (and commercial) loan applications for IEE potential. The EBRD banker and EE engineer then arrange a visit to the client to discuss the loan application. In preparation for the visit, the EE engineer sends the client the EBRD Energy Use questionnaire. Based on the client’s responses to the questionnaire, the EBRD engineer is able to research what energy efficiency upgrades are likely to be appropriate, given the company’s sector, history and investment plans. He advises the client of what topics he would like to discuss with the chief financial officer and facility manager on the day-long visit, which includes a facility walk-through. The EBRD team is then able to advise the company of the size of the

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30 EBRD contracts with industry specialists for the average €20-30,000 per audit costs, with funding from European government bi-lateral trust funds.
31 With the steady growth in the number of audits and competition for grant monies, the bank has begun to share audit costs with some clients.
32 The calculation is as follows for projects receiving energy efficiency technical assistance: 991 = €SEI Finance:€EE TA* Total Project Value:€EBRD finance.
estimated investment required to implement the EE measures and to characterize the expected returns on that investment. If the investment is financially attractive to the customer and the company has a strategic investment plan, the EBRD engineer offers to engage with the company’s technical staff in the revision of the plan to take energy efficiency into consideration. This includes an energy audit to verify and specify the investment, for which third party experts are contracted and funded by EBRD. The audit is undertaken in parallel with the evaluation of the loan application, so that EBRD can present the company’s decision-makers with a project specifying appropriate energy efficiency measures, including their investment costs and projected returns, to be financed in the loan. If the company has no strategic investment plan, EBRD may stipulate that the company establish an energy management system as part of its loan.34

EBRD offers to finance any cost above the original application amount of the IEE measures on the same terms as the original loan. They are able to do this because the savings from the energy efficiency measures are more than sufficient to repay the EE-related financing (i.e., the savings create free cash for the company), often in less than two years. No additional security is, therefore, required for the additional loan amount. Peter Hobson, the now-Senior Banker at EBRD, who was EBRD’s first Energy Efficiency banker, refers to the approach as “project finance in a corporate finance wrapper.” In other words, the energy savings produce a return on investment sufficient to justify the IEE project as a stand-alone investment, even though the loan is made on the basis of the borrower’s balance sheet.

Selected as one of the six most promising financial instruments for scaling up EE finance by Bloomberg New Energy Finance’s Financing Resilience (FiRE) initiative, the Global Environment Fund has provided EBRD with funds to roll out a program to provide capacity building to banks to promote EE financing and to fund bank-initiated industrial audits to develop EE projects for interested customers. While program planning is focusing initially on Brazil, India, and China, requests from FIRA or NAFIN for assistance in developing bank-led EE promotion programs centered on energy audits, would certainly be seriously entertained. In the short term, however, the focus of both programs on EE equipment rather than integrated systems would appear to make full-blown energy audits somewhat superfluous.

Mexican National Industrial Development Bank (NAFINSA)

As can be seen from NAFINSA’s flow chart of its EE Finance Program, below, the proposed program has most of the elements for a successful EE risk mitigation program, very much along the lines of the IDB/Bancoldex program, except that, for the moment, at least, there is no risk mitigation instrument. The program appears poised to replicate the successful EBRD formula of “project finance in a corporate finance wrapper,” i.e. the participating private banks may make their credit determinations from the balance sheet of the customers, but in evaluating the project will see the project savings flows and, going EBRD one better, are required to base their repayment schemes on those flows.

Reportedly, it was suggested during the development of the program that an energy savings risk mitigation instrument would be appropriate, and in consultant’s discussion with NAFIN program.

34 For a more detailed discussion of the loan process, see “Mainstreaming Energy Efficiency Finance, FAQ” (http://www.iee.org/FAQ-financing-EE).
personnel it was clear that NAFIN would like not to bear technical risk, which, in the program will be subsumed in the credit guarantees that NAFIN will give the participating private banks. Nonetheless, with the program fully designed without such an instrument, NAFIN will not include it in the initial stage of the program.

Like the Colombia program, NAFIN had benefit of an extensive market analysis to define a focus market. Although NAFIN personnel were silent on the question, it appears that the tourism/hotel industry is a likely to be the sector selected to initiate the program.

Although no certification process for the ESPs/equipment suppliers is shown in the diagram, it should be noted that the Spanish version of the flow chart used the term consultant for the entity doing the saving evaluation, project design, proposal, and implementation. On questioning, NAFIN indicated that “consultant” includes ESPs and equipment providers. The assumption that end users will seek out financing without already having involved an equipment supplier or ESP is striking. It may be that in the course of its marketing studies it identified the universe of potential users with sufficient precision that it can point consultants toward them. This is not a trivial question, inasmuch as the establishment of a significant project pipeline is a key to the banks becoming genuinely interested in financing the EE sector, as discussed in the section on the introduction. It may be that NAFIN is counting on the efforts of the National Commission on the Efficient Use of Energy (CONUEE) to certify consultants.

In this consultant’s interview with CONUEE, they advised us that they were in the early stages of putting together a committee of interested parties to begin a certification process. Since NAFIN will pay consultants for the preliminary technical verification of projects, they may be stipulating an SME expression of interest as a trigger to avoid creating studies without buy-in from interested end-users.

NAFIN is expecting the Trust Fund for Electric Energy Savings, FIDE, to act as a verifier of projects, drawing on its own experience of financing some 5,000 EE projects; the two institutions are in discussion about under what terms FIDE would agree to take on this role.

It is a bit worrisome that the participating commercial bank does not see the proposal until after both FIDE and NAFIN have approved it. The parallel evaluation of the technical and financial proposals in the planned Colombia program seems more efficient, although the preliminary credit check in the NAFIN program may eliminate many uncreditworthy applicants eliminating the need for further financial analysis.

With regard to the program review criteria:

- **Technical**: FIDE will provide authoritative third-party technical verification. The emphasis on equipment and the limited number of technologies should facilitate this process.

- **Legal**: NAFIN will presumably standardize the ESP/technology provider – client contract in order to assure that the consultant’s work on the project results in a bankable transaction.

- **Risk Mitigation**: The risk that energy savings will not be realized in the project is covered in the broad guarantee that NAFINSA will give the banks. This guarantee is both a credit and a performance guarantee, but in its current conception, the program has no way to separate coverage of the risks.
Standards for Monitoring and Verification: FIDE is seen as an authoritative arbiter of EE technical issues. Presumably the evaluation methodologies will be shared with potential applicants. In the absence of an agreement between NAFINSA and FIDE about the details of the latter’s role in the program, it is unlikely that this work has begun. It would be helpful if the international EE players supporting the program would promote performance-based M&V methodologies, like those of the Energy Valuation Organization (EVO), to permit technical flexibility and facilitate the introduction of new technologies.

Risk-sharing: an opportunity to lay off performance risk through a risk mitigation instrument has been lost, at least for the short-term. There has been discussion of imposing some financial penalty on the consultants if projected savings are not realized.

Energy Efficiency Guarantee Mechanism (EEGM)

The EEGM is collaboration among the IDB, the United Nations Development Programme (UNDP) and the Global Environment Fund, which created a $25 million revolving fund to provide guarantees on EE measures in buildings financed by Brazilian commercial banks. The Mechanism can provide both credit guarantees and EE project performance guarantees/insurance for savings.

The EEGM is a flexible mechanism that can support EE projects under all of the prevalent EE financing and contracting structures. This is necessary as Energy Savings Contracts vary. If an ESCO finances the project (Option B) the EEGM can provide a credit guarantee to the ESCO so that it can obtain financing from a local bank. If the client finances the project (Option A) the EEGM can provide a credit guarantee for the client to obtain financing. The EEGM can also provide a performance guarantee, guaranteeing the savings just as an insurance product might, to the client. This may be provided even when there is no credit/loan linked to the project (Option C). These are summarized in Figure I.7, below.

![Figure I.7 The IDB Energy Efficiency Guarantee Mechanism for Brazil](image-url)
Both guarantees can cover up to 80% of the value of the project (this can be 100% of the loan, if 20% of the project costs are from other sources) for commercial building EE projects (including, but not limited to, lighting, HVAC, solar, and insulation) for up to the Brazilian Real equivalent of $800,000 for a term of up to 7 years for covered risks (financial and technical, in the case of the comprehensive guarantee - options A and B) or technical risks only in the case of the performance guarantee – Option C. These guarantees can be combined, so a project could have a credit guarantee and a performance guarantee from the IDB. The performance guarantee is available for clients to support an ESCO’s performance predictions, when the ESCO has guaranteed a specific level of energy savings. So far, there have been no ESCO performance risk contracts issued, in part, because performance risk contracts or long-term energy savings contracts with payments based on energy savings are apparently seldom used by Brazilian ESCOs.

Despite the fact that Brazil has the largest number of ESCOs in the region and largest potential market for EE projects, generally ESCOs in Brazil, like many countries, predominantly generate their revenues from fee for service contracts where they are paid based on successful implementation of the EE project. Once the project is complete, the ESCO is paid in full if the client is financing the project, or if the ESCO is financing the project, it receives fixed payments over the long term contract that are not linked to monitoring and verification of energy savings. However, there are other barriers that may also be reducing the demand for this performance guarantee/insurance product, such as the market size, and the limitations on total project size (ca. USD 1M). Also, the program cannot guarantee industrial EE projects – only EE project in commercial or industrial buildings may be covered – not industrial process improvements.

The EEGM has been in place for around 1.5 of its 7 year life, and while the program has been aggressively marketed to all the major banks and ESCOs, awareness is a challenge. There may be increased interest in the performance guarantees in coming years. One hurdle in any EE finance, insurance or guarantee program is the administrative costs and the time it takes for the private sector to obtain the financing. An advantage of the EEGM program is that there are minimal administrative costs, the IDB itself can verify the project and issue the performance guarantee/insurance within a short period of time. The credit guarantees require detailed contracts, but these also are standardized. The EEGM does charge for the guarantees, and the price is based on market rates, with a discount of approximately 40% due to the GEF coverage.

As noted elsewhere in this report, the NAFINSA program will effectively offer participating banks a comprehensive guarantee on much the same terms as the EEGM, albeit with verification at FIDE and some kind of contractual requirement that the projects prepared by “consultants” deliver the promised savings. FIRA, on the other hand, appears disposed to integrate a savings risk mitigation instrument into its program, which would require that applicants have a performance contract from their equipment suppliers/ESPs. Given the food processing sector-specific nature of the FIRA program and its predominantly SME target market of energy end-users, the contract will be but one of a number of standardized documents. The question, of course, remains whether equipment suppliers will sign them.

One of the advantages of a programmatic approach to developing a project pipeline is the ability to stipulate a contract that allows technical risk to be isolated and separately addressed. This is particularly important when attempting to build an EE supply industry by convincing equipment suppliers to begin to think of their wares as energy efficiency products and to market them on the basis that the energy saved will pay for the purchase and operation of their more efficient devices long before the eventual failure of the existing equipment.
With regard to the program review criteria:

- **Technical:** The IDB verified the credit and technical risks, the eligibility of ESCOs and banks for the guarantee and reviews individual commercial buildings EE projects, principally lighting, solar, and insulation.

- **Legal:** For the comprehensive risk guarantee, the major stipulation is that the underlying contract must be for an energy efficiency project. For the performance risk guarantee, the ESCO must offer its client an Energy Savings Performance Contract guaranteeing savings. This contract appears to be rarely used.

- **Standards for Monitoring and Verification:** The EEGM will use the standard IPMVP methodologies to provide M&V for any performance guarantee/insurance issued. Long-term M&V is not required by the EEGM for credit guarantees as it would increase costs and reduce the savings to the clients.

- **Risk-sharing:** There appears to be no appetite in the Brazilian building sector EE market for performance risk mitigation independent of financial risk mitigation. The later, however, certainly has an important role in allowing ESCOs to expand their projects beyond what can be secured by company and personal assets.
Annex 3: Section II, in Detail (Outline of a Business Model)

Introduction

The principle objective of the business model is the structuring of an energy savings risk mitigation instrument that will attract the participation of critical actors (commercial end-users of energy, energy service companies/EE equipment suppliers, financial institutions and serve, in the future, as a blueprint for the implementation of large numbers of energy efficiency projects.

As is described hereafter, this section of the document analyzes each of the elements of the model, develops alternative modes of participation for potential market players and evaluations different scenarios with the objective of identifying the impact of modifying some of the variables in the model.

The business model was designed using the CANVAS methodology (Osterwalder & Pigneur, 2010). It aims to develop each of the critical elements pertinent to that methodology. It specifies the alternatives of implementation and presents sensitivity analysis around the key variables.

Figure II.1 provides a schematic representation of the elements encompassed in this business model. Each element is detailed, beginning with the value proposition.

**Figure 3.1 – Schematic of the business plan for the risk instrument**
The Value Proposition

As already mentioned, the objective of this business model is to develop an instrument to mitigate the risk of energy efficiency project in those countries where the market is less evolved, redistributing financial and operation risks to those market risks to the market players best able to bear them.

Likewise, this model will serve to diminish the perception of risk that potential energy efficiency consumers and many financial institutions have with regard to energy efficiency, creating a portfolio of successful projects supported by a platform offering robust engineering and practical means of verification and monitoring the performance of those engineered systems.

The final objective of the business plan is to develop an energy efficiency market in countries where this type of project has not yet encountered an adequate market. This will be accomplished by communicating to each market player not only the general principles of energy efficiency projects but also what particular aspects of energy efficiency are pertinent to his activities, thereby diminishing the prevailing perception of risk.

Categories of Risk in Energy Efficiency Projects

In general terms there are four types of risk in energy efficiency projects that impede their wide-scale implementation:

- **Technical Performance Risk** refers to the capability of energy efficiency projects to generate energy savings and the impact on those savings of various events related to the technical variables of the project. The present model proposes to mitigate this type of risk that too often has proven to be a barrier to the financing of energy efficiency projects.

- **Equipment failure risk** is defined as the evident failure of the energy efficiency equipment itself or its defective installation. Insurance which repairs or replaces defective equipment is readily available in the marketplace. It is increasingly common in energy efficiency contracts and so need not concern us here.

- **Credit Risk** is associated with the concession of financing for projects and reflects uncertainty whether the end user of energy/borrower has the economic and moral wherewithal to honor a contracted debt.

- **Risk of Extra-contractual Civil Liability**, refers to damage to persons or assets at the sites of energy efficiency projects. This is another common risk covered by readily available insurance.
Mechanisms for the Mitigation of Technical Performance Risk

We will deal with the following mechanisms in our discussion of how to deal with this specific risk:

- **Energy savings insurance** is a mechanism that gives certainty to the energy end user (as well as the LFI) that he will have the financial flows necessary to repay the financing contracted to implement the energy efficiency project. It is usually issued to the ESP with the beneficiary being the energy end user wanting to secure those flows and who may endorse the policy to a bank. The insurance is based on an expert, third-party, technical assessment.

- **Certification of energy service providers and equipment suppliers** requires the performance of limited due diligence sufficient to assess the capacity of the company being reviewed to competently execute energy efficiency projects.

- **Verification of project viability** validates that the EE measures contemplated in a techno-financial proposal are adequate to produce the projected results and that there is a measurement and verification scheme adequate to document the level of savings actually achieved.

- **Arbitration of energy savings insurance claims** requires a qualified third party to determine a project’s savings status, particularly if there is a dispute over the level of savings.

- **Monitoring and Verification** protocols are the means by which the operation of the deployed technology can be observed and allow for the timely identification of issues that may undermine the ability of the system to produce projected energy and financial savings. These are validated by an independent entity.

- **Energy savings performance contracts (ESPC)** clarify the rights and responsibilities of each party in an EE project, specifying a level of savings to be delivered. As the basis for savings risk mitigation insurance, they should be standardized to the extent possible, and at the same time reflect the particular characteristics of the technologies deployed.

- **Creation of a clear base line for the measurement of savings** which is the reference for all subsequent measurements of energy savings.

- **Analysis of the financial performance of large number of energy efficiency loans** will allow the statistical evaluation of the probability of a project falling to meet its financial obligations for technical reasons.

- **Projects limited to proven and well-defined technologies** readily available in the marketplace and with developed measurement and verification protocols.
This value proposition will treat the following themes:

- **Technical**
  - Begins with the certified capacity of a energy services companies to identify and measure energy-saving opportunities for would-be clients.
  - Is based on known and proven technologies for generating energy savings.
  - Is supported by verification of the capacity of the proponent to execute the project, as well as verification of the project to achieve its promised savings.

- **Legal**
  - The project should be based on a contract in which the energy services provider (ESP) guarantees a certain level of savings provided that his client operate and maintain the equipment in a clearly defined manner.
  - Financing is provided by institutions familiar with the characteristics of energy efficiency finance.

- **Standards**
  - Begin with the necessity to have a standard that permits the certification of energy services providers and the verification of projects using established and transparent criteria.
  - Should be endorsed by international organizations.
  - Should be simple to apply and test. To the extent possible, they should be based on performance, rather than design.

- **Monitoring**
  - Should be based on equipment that automatically registers the behavior of the equipment producing savings.
  - Is consistent with established monitoring and validation protocols.

- **Distribution of risk**
  - Identify risk factors that may explain the occurrence of an event for which a particular participant is responsible.
  - Attempt to understand reasonably foreseeable risks in order to take steps to mitigate them.
Principal Clients for the instrument

This business model is aimed, in the first place, at companies and institutions as consumers of energy interested in implementing energy efficiency projects at their premises. The principal users are expected to be small and medium-sized businesses lacking the capacity to identify quality, reliable suppliers of energy efficiency equipment and services or to independently evaluate the energy savings projections they claim.

Rarely have companies been so pressed to improve their efficiency and cut costs as they are today. An important mechanism of this objective is energy efficiency, as William Kennedy mentions, "in fact, for the majority of industrial and commercial organizations, the administration of energy is one of the most promising initiatives for the reduction of costs and for improving profitability (Kennedy, 2003).

It is important to mention that in addition to improving their cost structures, companies with this type of projects make an environmental contribution, as they diminish their emissions of greenhouse gases.

Market segmentation

As a secondary financial mechanism, the risk mitigation instrument must be designed to attend the market segments targeted by the programs or financial institutions providing finance to the energy efficiency projects. It is assumed that the programs or financial institutions will have done a thorough market assessment of potential EE clients and their energy needs before selecting target sectors.

In a subsequent stage and once the operation of the instrument has been proven for these simpler technologies, the verification and monitoring processes should be extended to multi-technology, and eventually, whole facility packages. Adequate segmentation of clients and technologies will increase the probability of success of the portfolio of projects by controlling critical factors, as well as using feedback from existing projects to benefit future projects.

Secondary beneficiaries

Secondary beneficiaries would be the certified energy efficiency equipment and service providers (including ESCOs) whose savings projections would be verified and guaranteed, removing a significant barrier for a significant number of would-be customers. It is anticipated lesser-known, certified small and medium-sized suppliers will, in particular, benefit.

Other beneficiaries

In particular, the assumption of technical risk by the insurer, will allow the financial institutions to concentrate on the evaluation of their clients’ credit risk. In fact, all of the verification schemes would have some financial evaluation component in the certification. One of the potential insurers in Mexico does a very thorough credit analysis of the client. Finally, to the extent that financial institutions can count on thorough technical vetting of providers and services, they can begin to promote energy efficiency financing to their clients as an additional service, while counting on the EE savings reserved for the client as a source of free cash reducing the risk of the bank’s entire loan portfolio with the client.
Promotion of the program

There are four natural channels through which the product could be promoted:

- Energy service providers who identify energy saving opportunities for their clients.
- Bank clients with a good credit history and potential energy efficiency projects.
- The mechanisms of government programs promoting energy efficiency.
- Trade and industrial associations representing EE equipment and service providers.

As is discussed later on in the document, at the proof of concept stage, no promotion is required as the projects will be hand-picked.

When the program reaches commercial scale, it will be necessary to design promotion and publicity campaigns in coordination with program participants.

Principal actors in the model

Figure II.2, below, presents the principal actors at program set-up.

This business model is exceptional in its requirement that each actor participates in the appropriate activities and bears the appropriate risks, so that together they are able to implement energy efficiency projects.
Donor

In this model, Donors play an important role in providing financial resources to allow the Facilitator to bring his experience and know-how to support the Implementing Institution to devise and establish an EE financing program.

Facilitator

The Facilitator plays a critical role in providing its own or donor resources to the Implementing Institution for program establishment, supporting various kinds of technical assistance and sharing experience of similar projects elsewhere. When the Facilitator is a multilateral financial institution, it may also provide capital for on-lending or guarantees on terms unavailable in the local financial market. This is particularly important to allow EE loans to be offered at attractive interest rates and with the extended tenors required by many EE projects.

Implementing Institution

The Implementing Institution is the local counterpart of the Facilitator, and needs to be the driving force behind the mechanism, identifying target markets, mobilizing resources, convening key players, and coordinating their activities, promoting a programmatic approach to EE financing program.
Development finance institutions are the obvious candidates for the Implementing Institution. They have increasingly looked to stimulate the energy efficiency market as part of national energy and climate change plans, seeking to overcome market failures and creating demonstration programs, they solicit the participation of market players in certain types of projects and programs.

These institutions have an important role as program coordinators, conveners, and project aggregators. As a result of its formal responsibilities for developing the sector under its purview, a national development institution will been perceived as a leader and have the convening power to involve other key market participants, particularly the banks, who, as we have seen, are central to program development.

As a rule, this type of institution offers three types of program support:

- Some amount of project lending, often at preferential rates, and often, through commercial banks.
- Funds to support guarantees.
- Support for capacity building, marketing, and technical assistance in the target markets.

As noted in the introduction, the successful introduction of an energy savings risk mitigation instrument depends on its successful integration into a project finance pipeline.35 For the most part, this will require that an institution take responsibility for development of that pipeline - identifying the target markets and involving other market players, identifying, mobilizing, and coordinating resources and measures, and, in general, promoting a programmatic approach to EE financing.

Often, as in the case the case of Bancoldex, NAFIN, and FIRA programs with IDB, this sponsoring institution will be a multi-lateral development bank, providing both grant resources (from the Climate Trust Fund) and loan capital to the program. The sponsor may be a national (Bancoldex, NAFIN) or sectoral (FIRA) or multi-lateral (EBRD) development institution. Other institutions could perform the function, e.g. a vehicle under a line ministry or under the central bank; an ESCO or manufacturers association. One can also imagine a situation in which such a pipeline is already established, but does not reach an important market or customer sector, such as SMEs. This might be the case for a Chinese bank focusing on supporting IEE in state-owned-enterprises, for example, where players, measures, and capital are in place, but need to be directed to serve SMEs.

Energy end user

The energy end user is the most important figure in the model since his role is make energy efficiency happen, and with it, to generate financial savings. It is assumed that he is creditworthy. Nevertheless there is likely to be a significant market for the risk mitigation instrument among that sector of small and medium enterprises who self-finance capital

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35 “Successful” in this context means to have a significant impact on the levels of financing of energy efficiency projects in the target markets. In other contexts, a risk mitigation instrument could certainly be a successful product for a private company offering it, without having such significant impacts.
improvements, but want to minimize technical risk. The ESP may then forego a formal financial evaluation (indeed, such an enterprise is unlikely to provide the required financial information) and make his own payment arrangements.

It is important that this energy user fit the basic profile of a participant in the program in terms of size, energy consumption, and his ability to identify saving opportunities. This ability is closely related to the sector he is in and the state of his equipment.

It is advisable that the energy end user participants in the program have the following characteristics, that:

- They are in sectors with a high energy demand, both for heat and electricity.
- They are in facilities with energy efficiency opportunities owing to obsolete equipment or inadequate energy systems.
- Company decision-makers in the areas of operations and finance are aware of the opportunity presented by energy efficiency
- They should have a commitment to sustainability that impels them to identify areas of opportunity in the rational use of energy

Energy service providers and EE equipment suppliers

These are very important players in the EE market, performing two distinct functions. The first is the promotion of energy projects in various economic sectors. The other is the identification of real savings opportunities through energy engineering and the subsequent development of technical and financial proposals for their implementation, maintenance, and monitoring.

Three separate classes of participants are identifiable:

- EE technology suppliers who sometimes guarantee their results and are interested in growing their markets through savings guarantee schemes. An important element of the business plan is to assist the providers of industrial equipment such as boilers, motors, and refrigeration systems to recognize that by promoting them as energy efficiency devices that pay for themselves with savings, they will significantly accelerate the replacement of existing equipment which otherwise would not occur until the end of their useful life.
- Energy Service Companies, or ESCOs, who are accustomed to working with performance contracts and generally have the engineering capacity to structure energy saving. ESCOs often provide financing to their customers, in return for a share of savings. This approach is preferred by some end-users because the liability for the EE project is not reflected in their balance sheet. This approach, however, requires strong balance sheets that few ESCOs have.
- In other markets, such as the US, energy end users provide the financing and ESCOs provide a guaranteed level of savings. Energy savings risk mitigation is particularly
useful in such cases, as neither the financier nor the end user needs to bear technical risk. This approach should allow more engineering consulting firms to become ESPs.

The ESPs and EE equipment suppliers should meet the following requirements:

- Have the engineering qualifications to design and execute energy efficiency projects.
- Have a history of successful projects making them credible companies for EE projects.
- Use measurement and verification methodologies in conformance with practical and commonly used standards.
- Have the capability to deliver preventive or corrective maintenance to their projects, displaying high standards of responsiveness to their clients.
- Have the support of their suppliers in the form of guarantees of the operation of installed equipment.
- Be willing to sell their goods and services under contracts guaranteeing savings and maintenance services.

Financial Institutions

Being projects that require considerable investment, it is important to have the support of a financial institution that provides financing in return for charging interest. There are other kinds of financial institutions than banks, such as lease companies and equity investors, whose funding is not based on charging interest, but on project returns.

For the financial institutions, it is important to have a mechanism to manage risk, and as far as possible, to guarantee the repayment of the financing. This they do through credit analysis and the use of guarantee and insurance products covering unexpected contingencies.

In the case of energy efficiency projects there is an additional component – the technical performance of the technology deployed. In undeveloped energy efficiency market there is an unfavorable perception of risk associated with EE projects that must be eliminated through recourse to an instrument that allows interested parties to make EE investments with the certainty that the savings will be sufficient for debt service.

There is strong interest on the part of commercial banks to lend in this sector, for three reasons: (1) there is a significant potential market that has been systematically ignored, that with the proper risk mitigation constitutes an enormous pool of business opportunity; (2) it provides a new line of services to extend to existing customer; (3) the projects burnish the bank’s image and commitment to sustainability.

It is important to bear in mind that banks have established portfolio management techniques that should be accommodated whenever possible. Thus, EE financing is repaid in equal installments, avoiding elevated transaction costs, notwithstanding that project savings flows often vary with the host’s output or the weather (think HVAC systems).
IDB programs in both Colombia and Brazil offer credit lines of somewhat longer maturities than those available in the local markets, appropriate to EE projects. Further, because the insurance product lowers credit risk, the interest rates on the EE loans should be somewhat lower than those in the local market.

**Risk Mitigation Mechanisms**

Risk mitigation mechanisms are a critical element in the model. In many countries, they have not been applied to energy efficiency projects, but they have an important role to play in giving certainly to sources of capital that they will be repaid as stipulated in their contracts for energy efficiency projects, as well as in promoting more realistic attitudes among end users and financiers about the risks of energy efficiency technologies and projects.

In creating the appropriate risk mitigation instrument, it is important to bear in mind that the more it resembles products available commercially in the national market, the easier it will be for the financial institutions to accept it and the issuer to participate in the program. Further, a new, or significantly altered, product may require approval by insurance or financial regulators, creating a significant source of uncertainty and, likely, delay, in the program. This, without taking into account the effort required to explain and provide training in the operation of a new instrument for the involved market participants. Insurers that are associated with participating Banks are likely to be willing to engage in a conversation about how to address EE savings risk mitigation needs.

There are three principal modalities of risk mitigation instrument. Which may be potentially deployable in a risk mitigation scheme will depend on the country of focus:

- **Bond or Completion Bond** seeks to guarantee the fulfillment of a contract and are based on real guarantees provided by the company contracted.

- **Energy Saving Insurance** is an instrument of ordinary insurance where in exchange for the payment of an insurance premium, the insurer makes financing payments when the stipulated savings are not realized the failure to make financing. This instrument does not require the insured to offer real guarantees to the insurer. Energy Savings Performance Guarantees, such as the EEGM, provide payments just as Energy Savings Insurance does, for any shortfall in the realized savings. This instrument also does not require the insured to offer real guarantees to the insurer.

- **Energy Savings Performance Guarantee Funds**, such as the EEGM, provide payments just as Energy Savings Insurance does, for any shortfall in the realized savings. This instrument also does not require the insured to offer real guarantees to the insurer. The funds may be private or public and achieve leverage by calculating the likely default rate, based on a history of default events or a set of assumptions. In Mexico, these funds usually operate as a trust (fideicomiso).
Comments on bonds

It is important, when selecting an risk mitigation instrument for a program, to bear in mind that a bond or completion guarantee that the requirement that the project developer pledge real assets as guarantees is likely to limit the ability to scale up the program, inasmuch as it excludes developers without such assets and limits the participation of most other developers.

Comments on insurance

Trade credit insurance

Trade credit insurance appears to merit close investigation as an EE savings risk mitigation mechanism. This insurance covers the accounts payable of the insured, based on anticipated cash flow from his accounts receivable. For EE savings, the insurance would appear to cover seasonal, or other, variations in energy savings. The insurer would pay the debt service on the project loan in any payment period in which the energy savings pledged for its payment fall short of projections. At the end of the year accounts are settled, with the end user repaying amounts advanced by the insurer from energy savings in excess of the finance payments.

In practice, the insurance companies monitor and verify the situation of each payer of the client. For an energy security product, the analog would be to monitor the savings generated by the project. Likewise, the insurance companies have experience using technical experts as adjustors. In the case of energy savings risk insurance; these experts would have the role of verifiers. Figure II.3 shows the operation of a hypothetical energy saving insurance product.

Figure 3.3 Trade Credit Insurance for Energy Savings
Trade credit insurance is available in most countries and if adapted for energy savings, should present no regulatory complications.

**Equipment Breakdown Insurance**

Another commonly available insurance is equipment breakdown insurance. While the primary coverage of such policies is failure of defined equipment, it often covers “consequential damages,” such as loss of business income. Already required by customers of cogeneration systems, with an extension of coverage to energy losses because of equipment failure, such a policy could function as an energy savings risk mitigation mechanism.

**Comments on Guarantee Funds**

This risk mitigation mechanism is based on the existence of a public or private contingency fund operated in the form of a trust, and as such, with detailed disbursement rules to cover shortfalls in energy savings pledged to the payment of the project’s financing. Often, the fund charges users a risk premium large enough to replace its disbursements. The fund’s operations generate a statistical record that allows a more precise determination of risk levels inherent in the types of project it covers.

Often, these funds receive counter guarantees that support their operation and give them the ability to leverage their own funds and mobilize additional investment capital.

**The Verifier**

The verifier is another critical element of the model. The verifier provides confidence the investor/end user, the insurer and the financier. The insurer can only issue a policy to a company if it has credible technical support to assure through ex ante validation that a) the project will produce the projected energy savings, b) the project is installed as designed, and c) the monitoring and verification measures are adequate and sufficiently transparent to allow all parties to ascertain the levels of savings achieved at any point during the term of the financing. Likewise, this entity will have the responsibility to act as a third party in any controversy or to validate that there is a claim to be paid by the insurer.

Standard evaluation criteria must be agreed upon by those involved and interested in the program. This agreement should be reached timely so the standards can be applied equally.

Different kinds of institutions have been identified who could assume the role of verifier, e.g.:

- The insurer itself has (or acquires) the technical capacity to verify EE project design, execution, and operation, likely when it has experience evaluating other covered projects having significant technical complexities. This, of course, provided that the other market participants, particularly the financial institutions are satisfied with this arrangement.

- Organizations involved with the certification and MVR.

- Public and private universities.

- Engineering colleges.
Companies certified as experts and adjustors.

Private companies endorsed by a certifying authority.

Likewise it is important that the standards used are internationally recognized, as in the case of the M&V protocol of the Energy Valuation Organization (EVO) which involve the certification of the person responsible for using them, and which are becoming industry standards.

The features which a verifier should have are:

- A pragmatic sense of evaluation; as simple as possible but not sacrificing completeness.
- Objectivity and independence.
- Experience with the types of projects he is verifying.
- Knowledge of the standards against which he is performing the evaluation.
- Not have a conflict of interest with regard to the verification task.

Client relations

The relationship with the client will be maintained by the ESP or technology supplier as it relates to the sale, installation, operation, and monitoring of the project, programmed preventive maintenance, as well as required repairs and and the calling of equipment guarantees.

The financial relationship, specifically management of the credit, will be between the bank and the energy end user, as long as cash flows are sufficient to service the bank debt.

Should the savings be inadequate to service the debt, the client will coordinate with the ESP who will have responsibility to present the claim to the insurer, and if necessary, coordinate the involvement of a claims adjustor.

Principal Program Activities

The business model has five macro processes, beginning with the certification of ESEs to implement projects; the validation of project design and savings projections, the completion of performance contract, insurance policy and loan documentation and disbursement; implementation, commissioning, operating and monitoring of the project, and, if needs be, the dispute resolution process.
(1) **Analysis and certification of the ESP** - Each of the ESPs and suppliers of technology needs to be evaluated in order to be qualified to participate in the program. They will need to provide information about their technical offerings and approach and their project history, especially information on projected versus realized energy savings. References from clients will need to be provided and checked. A basic credit check will also be performed.

(2) **Analysis and registration of a project** - Each time that a certified ESP or equipment supplier wishes to propose a project to the program, he must present the following information about the project:

   a. Sufficient financial information from the client to analyze his creditworthiness.

   b. Description of the project and applicable technology.

   c. Analysis of the energy variables susceptible to savings.

   d. Financial evaluation of the project and estimation of the financial savings.

The development and promulgation of methodologies for the evaluation of technical proposals for each of the technologies and for determination, monitoring, and verification of energy savings will remove uncertainty on the part of technology providers and customers.

Standardized formats for financial applications and for technical applications tailored to each EE product and reflecting those methodologies will facilitate the application process and the eventual scaling up of the program. It is important that these documents be as understandable and concise as possible consistent with the provision of the necessary financial and technical information for the verifier and financial institution to make the stipulated technical and financial evaluations.

(3) **Completion of the contract / insurance / loan** - Once the credit analysis and the work of the verifier have been concluded, the performance contract underlying the insurance policy and the insurance policy, itself, will be executed, allowing the project loan to be disbursed.

(4) **Monitoring of the Project** - Each period, as defined in the structure of the insured project, a verification of the savings should be made. The periodic verification would be through the monitoring system and exceptionally when a savings shortfall has been detected.
(5) **Claims for savings shortfalls** - In the case that the project has not generated the guaranteed savings cash flow, an insurance claim should be made, and if proven justified, the insurance should be paid to the financing institution.

(6) **Project close out** - At the end of the project, the cash flows need to be reviewed in order to identify and liquidate any outstanding balances with the insurance company stemming from unrepaid disbursements during the life of the project. Once this is done, all future benefits of the project flow to the energy end user.

**Critical Resources**

We have identified the following resources indispensable for a program to mitigate energy savings risk in EE projects:

- **Credit-worthy customers**: Financing institutions have the final say in whether a particular EE project is financed. This business plan proceeds from the assumption that there is a significant market of creditworthy energy end-users who will contract for EE projects when offered reasonable financing terms and (or) minimum technical risk; recall the self-financed EE projects, mentioned earlier.

- **Investible Projects**: Are a *sine qua non* for the implementation of this model. In the initial phase, a portfolio of successful projects must be developed for their demonstration effect. The portfolio will constitute a platform for the expansion of the program to a commercial scale and for the expansion of its technical range.

- **Capable ESEs**: It is critical that a critical mass of capable ESEs and EE equipment suppliers be developed with the characteristics set out above in order to stimulate and support the demand for EE projects. For those companies lacking the required expertise or professionalism, the certification process will provide an incentive to improve their products and services to participate in an expanding market.

- **Accredited verifiers**: Notwithstanding the important technical role of ESPs in the EE market, it is necessary to have a verifying entity supporting the risk mitigation instrument who will assure that the ESPs maintain high standards of engineering in the design, implementation, operation, and monitoring of projects.

- **Green credits**: In order to incentive the market, financial institutions must offer financing on competitive terms and assume a proactive role in the generation of business in the energy efficiency sector.

- **Risk mitigation Instruments and funds**: Especially during the stage of market formation, green credits should be supported by risk mitigation instruments in order to motivate energy end users and financial institutions to become involved in energy efficiency projects.

- **Performance Contract**: The model being presented here, and more importantly the development of the market for energy efficiency projects depends on the understanding of all parties that EE projects generate savings sufficient to pay for the acquisition and
operation of the EE equipment. The financial mechanisms proposed here depend on the ability and willingness to project and guarantee those savings in a so-called performance contract. These contracts are a standard part of the ESCO model, but may not be widely known or legally sanctioned in markets where there is no significant ESCO activity. In such a case, the developers of the risk mitigation instrument needs to find an accepted contract, e.g., a construction completion contract that can be adapted to guarantee energy savings and is acceptable to all parties in the EE financing transaction.

Income Flows

The fundamental characteristic of this type of project is its capacity to generate savings through the implementation of energy efficiency measures.

The financial viability of the project depends on the relationship between the required energy efficiency investment and the project's ability to generate energy savings that translate into financial flows that are sufficient to repay the investment and a stipulated rate of return.

![Figure 3.5 Distribution of Project Savings](Image)

As can be seen in Diagram II.5, above, the energy end user receives benefits in two stages:

- During the life of the project he receives part of the balance of savings generated after debt.
- From the end of the project until the end of the useful life of the installed equipment he receives all of the savings generated.

It is important that a share of the savings, however minimal, go to the end user from the beginning of the project. This is in order to immediately reward the company's management for
having undertaken the project and to facilitate their commitment to new projects in the medium and long-term.

During the life of the project, a net present value analysis of the investment in an EE project clearly justifies the energy end user’s investment in EE projects with dependable cash flows (supported by the risk mitigation instrument) that allow financing of the investment. After the project, the savings’ full impact on the firm’s bottom line and competitiveness becomes apparent.

Cost Structure

Beginning with the savings generated and subtracting the percentage of savings which go immediately to the end user, the costs of operating this business model are:

1. **Energy service provider’s** project income is divided in two parts:
   a. Payment for equipment and services and the associated profit margins realized upon installation of the EE equipment
   b. Part of the savings realized as payment for the monitoring of the project during until the financing is repaid.

2. **The financing institution** earns the interest on the financing proffered.

3. **The insurer** will receive a risk premium expressed as a percentage of the value of the project finance. The interest rate will depend on the experience and financial condition of the insured supplier. Energi charges 3-5% of the financed amount for its policy in the US. A Mexican broker estimated that a re-insured stand along insurance policy in Mexico would cost 1% of the financed amount per year.

4. **The verifier** will be paid for certification of the ESPs, validation of projects, and verification of the savings over the life of the project

Each of these expenses should be paid from the savings generated by the energy efficiency project. Nevertheless, with the objective of creating a demonstration effect for the participants in the model of the implicit risks in the business, funds from the national government or multilateral institutions should be used for the following ends:

- Development of verification methodologies.
- Energy audits where potential projects justify them.
- A first loss or *pari passu* guarantee fund to restrain the cost of the insurance premiums.
- Installation of monitoring and verification equipment.
- Subsidized EE finance interest rates.
Strategies for Implementation

The following elements must be in place as part of the implementation of this model:

- Rules for operating the program.
- Certification methodology for the energy service providers and equipment suppliers.
- Validation and verification methodologies for each technology to be financed.
- The agreement for program collaboration with the entity acting as verifier should be accepted by the insurer.
- Standard performance contracts should be available for the technologies selected.
- Participation in the program should be authorized by the credit and risk committees of the participating banks.
- Participation in the program should be authorized by the risk committees of the participating insurers.
Annex 4: Financial Analysis

In order to understand the impact of the risk instrument proposed, the following analysis is presented, showing the cash flow in six hypothetical scenarios:

1. Scenario: Project financed by the energy user and without risk instrument
2. Scenario: Project financed by the energy user and with risk instrument
3. Scenario: Project financed by a financial institution and without risk instrument
4. Scenario: Project financed by a financial institution and with risk instrument
5. Scenario: Project financed by a financial institution & enhanced risk instrument price
6. Scenario: Project under stress in performance and savings generation

These are the premises upon which the cash flows were constructed:

- The reference project concerns the installation of a boiler with thermal efficiency and savings potential.

- This boiler has the capacity to generate a monthly savings of $8,200 USD net of operating expenses and reflecting the benefits of efficiency and fuel savings. These savings are estimated from the report *Estudio de Mercado y Diseño de una Estrategia y Mecanismos Financieros para Financiar Proyectos de Eficiencia Energética y Uso Racional del Agua en el Campo en México* (BASE, 2013) that makes reference to a 3-year payback period in the case of boiler technology.

- The cost of the project is about 295,000 USD.

- Financing rate is expressed with reference to the cost of money in Mexico and will be 10% in all cases, except scenario 5, in which it is improved by two percentage points to 8%.

- For purposes of analysis of the total cash flow, assume that the project will provide benefits to the energy user for 10 years.

- The cost of performance risk and its verification was estimated to be 3% in all cases except scenario 5, which is improved by 2 percentage points.
Scenario 1- Project financed by the energy user without a risk instrument

This scenario assumes that the energy user knows the potential savings of the project, has technical capacity to implement it and the resources to complete the project.

In this case the project would have an IRR of 23%, a payback period of less than 4 years and an approximate NPV of $226,575.

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Scenario 2-Project financed by the energy user with a risk instrument

This scenario adds the cost of risk coverage to scenario 1.

In this case, the project is marginally impacted by less than one percentage point in the IRR, and a minimal change in the recovery period, which would justify the use of this instrument.

Scenario 3- Project financed by a financial institution without a risk instrument

In this scenario, the energy user assumes the entire financing with knowledge of the risk implications, supported by the financial structure of the company itself. As in Scenario 1, the company has the ability to execute the project and certainty of a positive outcome, but wants to get financial resources from an external source.

Generally speaking, in energy efficiency projects, it is suggested that an appropriate strategy is use debt versus equity financing. As shown below, we can see an improved NPV over the previous scenarios.

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NPV@WACC: 240,067

Scenario 4-Project financed by a financial institution with a risk instrument

Scenario 4 represents an energy efficiency project in which the user trusts the energy engineering to energy service company and is willing to share some of the project savings in exchange for a properly designed project. The company also wants to cover the risk of not having the expected cash flows and be assured of having the funds to cover the financing.

The results show that although there is an impact on the VPN is not significant with respect to the decision to implement the project. The benefit is reflected in the savings generated by the project during its life.
Scenario 5: Project financed by a financial institution with a subsidized risk instrument

This scenario is practically the same as above, but an improvement is observed in the cost of coverage and verification as well as a favorable impact on the rate of financing of two percentage points in each case.

In this case the project has a higher NPV, strengthening the structure of the project, especially in the short term.

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<td>29,500</td>
<td>29,500</td>
<td>29,500</td>
<td>29,500</td>
<td>29,500</td>
<td>29,500</td>
</tr>
<tr>
<td>Adjusted Cash flow</td>
<td>-</td>
<td>10,255</td>
<td>8,960</td>
<td>7,529</td>
<td>5,948</td>
<td>4,201</td>
<td>27,615</td>
<td>77,730</td>
<td>77,730</td>
<td>77,730</td>
</tr>
<tr>
<td>Accumulated CF</td>
<td>-</td>
<td>10,255</td>
<td>19,215</td>
<td>26,744</td>
<td>32,692</td>
<td>36,893</td>
<td>64,544</td>
<td>142,274</td>
<td>220,004</td>
<td>297,373</td>
</tr>
</tbody>
</table>

NPV@WACC 210,048

Scenario 6: Project under stress in performance and savings generation

This scenario implies that only 85% of savings are generated, with the project income of the energy services provider and the energy user reduced proportionally. In this scenario, the insurance company absorbs negative flows justifying its existence. Yet the project is financially interesting, as it presents a positive NPV.

The insurance would cover only the percentage needed to avoid a negative cash flow. In this case is 85% of savings.

### Conclusions

- Assuming a project term of 10 years, all scenarios are financially viable.
- Incorporation of insurance coverage does not significantly impact costs and provides certainty that the project will have the expected results for the energy end user.
- It is advisable to finance energy efficiency projects with debt. The consequent leverage improves the project’s net present value.
Annex 5: Implementation Activities (Implementation Guide)

Figure III.2 from Section III, the table *Blocks of Program Activities by Actor*, is reproduced below, as Figure 3.1, to provide a reference for the ensuing discussion of roles and activities in setting up a savings risk mitigation instrument financing program.

**Figure 3.1 Blocks of Program Activities by Actor**

<table>
<thead>
<tr>
<th>STAGE</th>
<th>ACTIVITY</th>
<th>ACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. ESTABLISHMENT OF INTEREST IN THE PROGRAM</strong></td>
<td>Do a market study of the potential for energy efficiency projects.</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Designate a Project Coordinator with responsibility for concluding agreements, coordinating activities and participants, and assuring that the project moves forward, according to plan.</td>
<td>Facilitator and Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Establish criteria for measuring program success.</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td><strong>2. IDENTIFY PLAYERS AND ACTIVITIES FOR THE PILOT PROJECT</strong></td>
<td>Develop the profile for target projects.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Identify/develop an appropriate risk mitigation instrument and provider for the target market.</td>
<td>Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Identify/develop a verification entity and procedures aligned with the instrument provider.</td>
<td>Facilitator/Implementing Institution and Insurer</td>
</tr>
<tr>
<td></td>
<td>Confirm and formalize participation of other key actors.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Identify resources.</td>
<td>Facilitator/Implementing Institution</td>
</tr>
<tr>
<td><strong>3. DESIGN OF THE MODEL</strong></td>
<td>Identify/Adapt/Develop a performance contract.</td>
<td>Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Specify the technologies to be supported in the pilot program</td>
<td>Donor/Facilitator/Implementing Institution</td>
</tr>
<tr>
<td></td>
<td>Align the instrument with the other financial products.</td>
<td>Implementing Institution/Banks/Insurer</td>
</tr>
</tbody>
</table>
| | Definition of Criteria and Methodologies  
  - Qualification of ESPs and Equipment Providers  
  - Validation of Project Designs by Technology  
  - Projection of Energy Savings  
  - Verification of Savings | Implementing Institution/Banks/Insurer/Verifier/Equipment suppliers/ESP |
| | Establish operational procedures for the contract-“instrument”-credit mechanism. | Implementing Institution/Banks/Insurer |
Description of Activities to be undertaken

At the outset, it is important to note the crucial role of the National Development Institution can play as a driving force and coordinator of the effort. As a result of its formal responsibilities for developing the sector under its purview, a national development institution will be seen as a leader and have the convening power to involve other key market participants, particularly the banks, who, as we have seen, are central to program development. Further, national development finance institutions usually have established relationships and channels and operational experience with the banks that can be utilized in developing and executing the program. While some modification of these channels may be required, this is much easier than starting anew. Further, their relationship with a large number of banks makes them natural project aggregators, an important characteristic for EE finance.

In addition to their existing knowledge base of their sector, national development banks have the authority to undertake market and other required studies to complement that knowledge. Finally, both multi-lateral development banks and bi-lateral development organizations have experience working with national development banks and established procedures for supporting them and can, therefore, more easily support a program in which they are involved.

Below, the principal characteristics and criteria required for planning the execution of the each of the identified activities. It is important to underscore that this description is a generic guide and that the particular conditions of the energy efficiency market and players in each target country will greatly affect the implementation approach.

Six blocks of activities have been identified. In chronological order of implementation, they are:

1. Establishment of Interest in the program.
2. Identify players and resources for the pilot program.
3. Design of the Model.
5. Execution of the Pilot Program.
6. Program scaling plan.

A5.1 ESTABLISHMENT OF INTEREST IN THE PROGRAM

The first step in the development of a Financing program for energy efficiency projects utilizing a risk mitigation instrument is to ascertain whether the necessary conditions exist to undertake such a program with a reasonable probability of success.

In this context, there are three basic activities to be undertaken:

- Learn the potential of the energy efficiency market and the principal barriers to its development.
- Identify an institution interested in assuming leadership and coordination of the program.
- Have clear criteria for measuring program success.

Note that, depending on circumstances, the sponsoring institution may need to be identified before the marketing study is done; in other cases, sponsorship may flow from a marketing study.

Do a market study on the potential for energy efficiency projects

It is important, as a starting point, to have an understanding of the energy efficiency market in the country in which one proposes to execute the pilot project, particularly if there has been little development of the EE market and it is necessary to encourage the entry of players into the market on the basis of:

- Potential of the EE market both in terms of required investment and realistically achievable savings.
- Predominant economic sectors with the greatest potential for EE savings.
- Availability of technology and energy service providers, for project evaluation, design, and implementation.
- Penetration of EE projects.
- Barriers which have prevented the EE market from maturing.
Designate a Project Coordinator with convening power and authority to enter into agreements and perform oversight

As noted earlier, a national development bank should be considered for the leadership and coordination of the project, given their authority, neutrality and convening power, characteristics that encourage other participants to collaborate under the bank’s coordination. If the institution is to effectively play this role, an individual needs to be designated and given authority to convene participants, forge agreements, and coordinate activities.

Establish criteria for measuring program success

At this point in program development, it is important to have clarity about the criteria for measuring program successes and to identify corrective measures should they be required. To the extent possible, the criteria should be agreed by all participants and reflect International best practices.

At the same time, a target date for the conclusion of the pilot project and transition to the full commercial program should be established, taking care to allow sufficient time to verify that projects have been well-executed and that the performance contract-insurance-finance system functions as well for project repayment as it does for project inception.

A5.2 IDENTIFY PLAYERS AND ACTIVITIES FOR THE PILOT PROJECT

Having a clear idea of the market potential and having identified an institution to lead the initiative, it is important to invite market participants and to secure critical resources for the development of the program.

One of the first issues that the lead institution should address with other market players is which risk mitigation instrument is most appropriate for the program, bearing in mind how the local market for mitigating risk (insurance, bonds, sureties, guarantees) has developed and the regulatory framework into which it must fit. Likewise, the profile of the EE projects that will be the program’s focus needs to be defined, based on market potential and the interest of the lead institution in certain sectors or technologies, as well as other commercial, regulatory, or political factors that may affect the decision.

Develop the profile for target projects

The determination of the characteristics of the projects of focus is an important part of the pilot project. Some of the most important characteristics are:

- An industrial sector where participants have influence and there is potential to involve energy end users with the potential for substantial improvement in their use of energy.

- Verifiable technologies that produce significant savings per unit of investment, and therefore have attractive rates of return.

- Establish minimum level of energy consumption to control project transaction costs.
• The end user should be creditworthy and have a strong enough balance sheet to satisfy bank requirements for financing.

• Restriction of the program to a specific geographical area may be desirable.

Identify/develop an appropriate risk mitigation instrument and provider for the target market

As noted earlier, in the discussion of the business plan, there are various alternative risk mitigation instruments that the program may adopt, depending on how the local market has evolved. Some important factors to be considered in making the choice are:

1. Existence of instruments in the market that could potentially cover energy savings.
2. Interest on the part of the insurers or guarantors in participating in the EE market.
3. Established norms for coverage of energy saving risk.
4. Cost differentials among the coverage options.
5. Coverage that is conditioned on the capacity of the supplier to install and maintain his equipment and does not limit participation (by end users, technology suppliers, or ESPs) through requirements that assets be pledged or counter-guarantees provided as a condition of coverage.

Identify/develop a verification entity and procedures aligned with the instrument provider.

The entity selected as Verifier should have the following characteristics:

1. It should be accepted and recognized by the insurer as authoritative in its qualification of suppliers, in its validation of project designs and energy savings projections.
2. It should be independent and unbiased in its technical evaluations.
3. It should be able to act as an unquestioned arbiter in cases in which there is a dispute of over the amount of energy actually saved between the supplier and the end user.

 Preferentially, the experts who perform the qualifications and validations should be associated with a highly credible certification institution.

Confirm the participation of key actors and formalize the program with critical actors

To assure the viability of the pilot project it is important to formalize the participation of the model's critical actors. In some cases formalization will require that participation be authorized by an entity's decision making body (board of directors, risk committee, credit committee, to name a few). This needs to be taken into account when scheduling the initialization of the pilot.
Identify resources

Program design needs to consider Donor, Facilitator, and Implementing Institution resources to support project preparation activities, including program design and organizational activities, marketing and other studies, publicity and marketing, and technical support, for example for developing project evaluation energy savings projection methodologies. Sponsorship should also be considered for a pilot program.

A5.3 DESIGN OF THE MODEL

Program design consists in the development of procedures, tools, policies and methodologies necessary for the financing of the EE projects in the target markets utilizing the target technologies, assuring a certain level of flexibility in the program, notwithstanding the standardization of supplier qualification, project validation, and savings verification methodologies.

Identify/Adapt/Develop a performance contract

Given the particularities of local legal and regulatory frameworks, it is advisable to find a legal counsel that understand the basic elements that a performance contract must have for all of the parties to be duly committed and protected. It should be noted that there may already be performance contracts in the market, as the result of ESCO activities.

An energy performance contract in which the ESCO is guaranteeing savings, rather than proposing shared savings, would need little adaptation for use in the program, provided it is acceptable to the insurer. In the absence of a performance contract in the market, a widely-used construction contract to which performance, insurance, and the other clauses mentioned below may be added should be identified.

The basic clauses are:

- Object of the contract.
- Compensation for services.
- Billing and late payment.
- Performance guarantee and financial instruments linked to it.
- Implementation of the contract.
- Ownership of the equipment (in this case, the end user).
- Equipment purchase option (when applicable).
- Equipment maintenance.
- Equipment warranties.
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- Civil responsibility insurance.
- Clauses dealing with variations in the end user's energy usage.
- General clauses (confidentiality, labor relations, et cetera).

**Agree on the target technologies for the pilot program**

Given the broad spectrum of energy efficiency approaches and technologies, energy efficiency projects range from the extremely simple (e.g., changing out incandescent light bulbs for LEDs) to the enormously complex (e.g., providing an integrated EE management solution for a steel plant). The range of approaches and equipment for projecting, monitoring and verifying energy savings is, unsurprisingly, correspondingly wide. It is for this reason that it is suggested to begin programs limiting both the number and complexity of the technologies to be supported, e.g.:

- Technologies that significantly increase the efficiency of energy use through upgrading equipment, that is, technologies that achieve their results by equipment replacement rather than integrating systems.
- A small number of technologies, probably no more than five or six.
- Technologies readily available in the local market, ideally from a number of vendors prepared with parts and service.

**Align the risk mitigation instrument with the other financial products**

Once the risk mitigation instrument (and vendor) has been identified it is important to meet with the participated banks to convince them to accept the insurance as a guarantee for purposes of their lending. The meetings can also be used as opportunities to ascertain whether there are any outstanding procedural issues that would impede their financing a credit-worthy client who had such insurance.

**Define criteria and methodologies**

The methodologies for standardizing qualification of providers, validation of projects, and verification of energy savings are a critical element in the program. They are, in fact, risk mitigators, in and of themselves, and need to be selected or designed with great care. Methodologies are needed for:

- Qualification of energy service providers (ESP) and EE equipment suppliers.
- Validating project designs for each selected technology.
- Projecting energy savings.
- Verifying energy savings.
Qualification of ESPs and equipment suppliers

ESPs and equipment providers need to be reviewed in terms of their reputation in the market, their history of previous EE projects implemented, specialization, and technical capacity. Companies falling short on any these criteria should be excluded from the program.

Technical validation of financing proposals

The steps for review of technical proposals are:

- Review of the client’s use of energy to be sure that the baseline conditions are well defined.
- Technology-specific review of the project design proposed to achieve energy savings.
- Review of the proposed monitoring and verification plan.
- Validation of the projected energy savings.
- Validation of the financial flows projected from the energy savings, which are the basis of the financial proposal to the bank.

Methodology to project energy savings

All parties need to agree on the methodology and verification protocol for energy savings, since it is the basic calculation on which the program’s credibility depends.

Verification of savings for each technology

The mechanisms for obtaining and recording information required to demonstrate results of each project financed must be defined. Normally simplified versions of building management systems with adequate data storage capacity are used. The data is then available for consolidated program verification reports.

Establish operating rules for the contract-“instrument”-credit mechanism

This aspect of the program may require exceptional effort, but is very important for the operation of the program, as a whole, that each set of activities be accomplished in the times stipulated while meeting the established standards of quality.

Each of the participating entities needs to agree to follow the transparent and scheduled procedures defined for its activities if the program is to function smoothly. Normally, the coordinating institution integrates the operational rules by seeking consensus among the other participants.
A badly executed activity creates repercussions for the subsequent activities. For example a badly drawn contract puts the program in jeopardy because it may not provide an adequate basis for the issuance of an insurance policy.

A5.4 PROJECT KICK-OFF

Once the operating procedures have been established for the activities of each participant, the process of financing EE projects can begin. In order to do so, a set of preparatory activities must be undertaken, including identification of pilot projects, verification of resource availability, definition of a management system to coordinate and monitor the various program activities in order to provide feedback for program adjustments and for program evaluation.

**Identify at least 5-10 projects (end user-bank-supplier)**

In order to execute the pilot program it will be necessary to undertake a direct promotion campaign to identify projects, which meet three basic requirements:

1. Interested businesses with the potential to generate energy savings within the program’s criteria.
2. That the company is bankable, i.e., there is a bank that is disposed to lend it funds for the project if it meets the other program requirements.
3. That there is an EE technology supplier or ESP that has designed the project and analyzed the technical and financial viability (and is willing, of course to submit these in the formats required by the program).

**Assign donors, facilitators, implementing institutions and other resources**

The resources identified during the structuring phase of the pilot project should be managed so that each participant that has a claim on them abides by the operational rules established for the pilot. The procedures for use of these funds should be understood ahead of time to avoid delays that will retard the implementation of the work plan.

**Establish a system to monitor critical program indicators**

In order to assess program progress, as well as to account for the use of Sponsor resources, it is necessary to define a reporting framework that allows tracking of the pilot according to criteria established by the sponsors and coordinator and which serve to indicate whether corrective measures may be required before the pilot can be called successful.

A5.5 IMPLEMENTATION OF THE PILOT PROJECT

This part of the plan requires a dedicated effort since it means close monitoring of the operation of each of the projects in the pilot to assure their proper performance, to correct any issues not foreseen in the program design and give feedback to the program with an yet toward commercial scaling. The management mechanisms must be depended upon to assure that
each participant is carrying out the activities to which he committed in a way that benefits the program, and to identify any weaknesses in the pilot program as early as possible. The monitoring is also important to be able to determine that the pilot has been successful and that all program activities are functioning in a manner that permits the program proceed to commercial scale.

**Installation and commissioning of projects**

During this stage the EE equipment supplier or ESP should design and source the technology, and build the project. At the end of this phase, the verifier will verify that the project was installed according to the approved design and is ready to begin to operate and produce energy savings. If possible project commissioning should be coordinated with scheduled energy outages and bank payment schedules.

**Project operation and monitoring**

It is the day-to-day operation of the project over months that produce the efficiency benefits that permit the project to generate its projected cash flows. It is also during this period that the maintenance necessary to keep all of the equipment in good condition to produce the level of savings required for the project’s financial stability.

**Report on project success criteria**

The program coordinator and other critical participants should establish a regular schedule on which to evaluate program results objectively and practically to determine when the program is ready to be scaled. We suggest that there be at least three review periods to verify that program results have not fallen off.

**Present results of the pilot program as a basis for scaling the program to additional technologies and sectors**

Once the program has succeeded in demonstrating its smooth operation over a number of reporting periods, a report should be prepared to initiate the process of scaling. The report should present the issues that need to be resolved for scaling. It should also present a critical review of the pilot program and present recommendations for adjustments to improve its performance.

**Adjust expansion plans on the basis of pilot program feedback**

As with any program, the initial stages of the commercial program will present opportunity that can be considered without delaying the program’s inception.

**A5.6 PLAN FOR SCALING**

With all of the elements of the proposed model validated, it will be possible to take the program to a second stage involving more projects and participants, accelerating the development of the EE market where the program operates. The commercial phase should consider adjustments derived from the pilot phase such as the price of financial products, incorporation of new technologies, or raising the level of complexity of deployment of the existing technologies.
New participants

As the first activity in this block, it is important to do an analysis of the new dimensions of the program, aiming to move the EE market toward maturity by including criteria and participants that will promote its growth. The analysis should determine the relevance of:

- Incorporating new technologies or increasing the complexity of the deployment of the existing technologies.
- Incorporating new industrial, commercial, and service sectors to increase EE market potential.
- Inviting the participation of more financial institutions, both banks and insurers.
- Instigating the participation of more EE equipment suppliers and ESPs.

Define a marketing plan

Given that in this stage of the program the objective is to create significant growth in the number of EE projects, new marketing and promotion approaches need to be defined. These activities depend on the situation of each country, but some options are:

- Financial institutions promoting directly; inviting their clients to participate in EE projects.
- Develop dissemination programs supported by the project’s coordinating entity, utilizing its convening power with energy end users.
- Direct promotion to equipment suppliers and ESPs.
- Campaigns of education and training of in EE for trade, industrial, and commercial associations.

Define the resources necessary for commercial scaling

Once the potential of the newly defined market, the profitability of the projects, and the risks demonstrated in the pilot program are understood, an evaluation should be made of the need for resources:

- To bundle projects for financing and insurance to leverage a larger number of projects.
- To develop benefits or incentives to incentivize the participation of these projects.
- To support promotional activities.
- To develop tools and methodologies necessary commercial scaling, if necessary.