



Inter-American
Development Bank

CTF–IDB “ECOCASA” PROGRAM

Mexico Energy Efficiency
Program, Part II

**IDB PUBLIC SECTOR
CTF PROPOSAL**

CTF-IDB "ECOCASA" PROGRAM ECOCASA Program
Mexico Energy Efficiency Program Part II

Proposal for Submission to the CTF Trust-Fund Committee

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<i>Name of Project or Program</i>	CTF-IDB “ECOCASA” PROGRAM MEXICO ENERGY EFFICIENCY PROGRAM PART II
<i>CTF amount requested</i>	<p>USD 49,514 M public sector loan for the ECOCASA Program</p> <p>USD 2,000,000 grant for SHF-executed technical cooperation on monitoring and evaluation, technical studies, knowledge management and simulation efforts.¹</p> <p>USD 100,000 budget for implementation and supervision of knowledge management and technical cooperation activities</p> <p>TOTAL: USD 51,614,000</p>
<i>Country targeted</i>	Mexico
<i>Indicate if proposal is a Project or Program</i>	<p>Throughout the document the word “Program” is used, as this operation is composed of different components, financed by several actors (IDB, CTF, KfW). For the purposes of the CTF it is a project, as it is a single MDB operation.</p> <p>Mexico’s CTF Investment Plan was presented by the Government of Mexico to the CTF for approval, and endorsed by the CTF Trust-Fund Committee (TFC) on January 27, 2009. The Mexico CTF-IDB group Energy Efficiency Program, Part I, was approved by the CTF board on May 4th, 2011. This Program promotes scaling up the supply of EE financing products and services by local financial intermediaries (LFIs) in Mexico, by providing them with the financial, knowledge and technical cooperation (TC) needed to develop necessary knowledge and build a track-record of such investments. The investment capital and technical cooperation funds are provided by the CTF, IDB, commercial banks, donors, and bilateral agencies. The EE Program outlined two complementary components: A Public Sector Component and a Commercial Banking Component. The Public Sector Component is described in this proposal.</p> <p>The Program’s goal is contribute to the efforts of Mexico to reduce GHG emission of the residential sector. This would be achieved by pursuing two specific objectives: (i) to increase the production of low-carbon housing by financing developers through SHF; and (ii) to increase the supply of mortgages for low-carbon housing, by providing resources for LFIs to fund mortgage loans.</p>

¹ ME-T1201 (Annex X) will support the implementation of the Program in the first 4 years. A Technical Cooperation Project will support the Evaluation and long-term monitoring of the Program and will be developed upon construction and delivery of the first ECOCASAS (tentatively in 2015).

ACRONYMS AND ABBREVIATIONS

CCLIP	Conditional Credit Line for Investment Projects
CFE	<i>Comisión Federal de Electricidad</i> (Federal Electricity Commission)
CO ₂ e	Carbon dioxide equivalent
CONAPO	<i>Consejo Nacional de Población</i> (National Population Council)
CONAVI	<i>Comisión Nacional de Vivienda</i> (National Housing Commission)
CONUEE	<i>Comisión Nacional para el Uso Eficiente de la Energía</i> (National Commission for the Efficient Use of Energy)
CRE	<i>Comisión Reguladora de Energía</i> (Energy Regulatory Commission)
CTF	Clean Technology Fund
DUIS	<i>Desarrollos Urbanos Integrales Sustentables</i> (Integral Sustainable Urban Developments)
ENIGH	<i>Encuesta Nacional de Ingresos y Gastos de los Hogares</i> (National Survey of Income and Expense of Households)
EUR	Euros
FONHAPO	<i>Fondo Nacional de Habitaciones Populares</i> (National Trust Fund for Popular Housing)
FOVISSSTE	<i>Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado</i> (Housing Fund, Social Security Services Institute of Public Workers)
GCI-9	Ninth General Capital Increase
GHG	Greenhouse Gas
GoM	Government of Mexico
GPEDUIS	<i>Grupo de Promoción y Evaluación de DUIS</i> (Promotion and Evaluation Group of the DUIS)
IBRD	International Bank for Reconstruction and Development
IDB	Inter-American Development Bank
INE	<i>Instituto Nacional de Ecología</i> (National Institute of Ecology)
INFONAVIT	<i>Instituto del Fondo Nacional de la Vivienda para los Trabajadores</i> (National Housing Fund for Private Sector Workers)
IFC	International Finance Corporation
LFIs	Local Financial Institutions
LPG	Liquefied petroleum gas
MDB	Multilateral Development Bank
Mt	Million Tons
NAMA	Nationally Appropriate Mitigation Action
kWh	Kilowatts Hour
PECC	<i>Programa Especial de Cambio Climático</i> (Special Climate Change Program)
PEDHSCC	<i>Programa Específico para el Desarrollo Habitacional Sustentable ante el Cambio Climático 2009-2012</i> (Specific Program for Sustainable Housing Development to combat Climate Change)
PRONASE	<i>Programa Nacional para el Aprovechamiento Sustentable de la Energía</i> (National Program for the Sustainable Use of Energy)
REFF	Renewable Energy Financing Facility
SEDESOL	<i>Secretaría de Desarrollo Social</i> (Social Development Ministry)
SEMARNAT	<i>Secretaría de Medio Ambiente y Recursos Naturales</i> (Secretariat of Environment and Natural Resources)
SENER	<i>Secretaría de Energía</i> (Energy Ministry)
SHF	<i>Sociedad Hipotecaria Federal</i> (Federal Mortgage Society)
SM	<i>salarios mínimos</i> (minimum wages)
TC	Technical Cooperation
UNFCCC	United Nations Framework Convention on Climate Change
USD	US Dollars

Proposal for Operation Development

PROJECT SUMMARY MEXICO CTF IDB ECOCASA PROGRAM (ME-L1121)

Financial Terms and Conditions			
Borrower: Sociedad Hipotecaria Federal S.N.C.			
Executing Agency: Sociedad Hipotecaria Federal S.N.C.			
Guarantor : United Mexican States			
Source	Amount (USD million)		
IDB-Clean Technology Fund Trust-Fund	49.514	Disbursement period:	2 years
		CTF Service Charge:	0.75%
		MDB upfront fee:	0.45%
		Maturity/Grace:	20/10 years
		Currency	USD
IDB (Ordinary Capital CCLIP X-1006)	50.00	Flexible Financing Facility	
		Disbursement period:	2 years
		Rate	Libor + spread
		Maturity/Grace:	25/5 years
		Currency:	USD chargeable to the Ordinary Capital
Total	99.514		
Project at a Glance			
<p>Project objective/description: The program goal is contribute to the efforts of Mexico to reduce greenhouse gas (GHG) emissions of the residential sector. This would be achieved by pursuing two specific objectives: (i) to increase the production of low-carbon housing by financing developers through SHF; and (ii) to increase the supply of mortgages for low carbon housing by providing resources for LFIs to fund mortgage loans for non-affiliated workers. The concessional resources of the Clean Technology Fund (CTF), channeled through SHF, will be targeting the construction projects. Resources from the existing CCLIP ME-X1006 will fund SHF mortgage instruments for its target. This program is part of a multi-pronged approach to help Mexico follow a low-carbon growth path over the medium to long term. The overarching strategy of the CTF for Mexico (CTF Investment Plan) includes action in the fields of renewable energy, power generation, energy efficiency in the housing sector, among others, through the provision of loans and Technical Cooperation activities. The German Development Bank (KfW) is expected to commit a further EUR 80 million to leverage CTF/IDB resources in this facility by year end. Finally, a grant from LAIF (EU Commission) with KfW and IDB for up to USD 9 million has been provisionally approved.</p> <p>Related operations: this facility is closely related to a number of TCs from the IDB-CTF Trust Fund, amounting to USD 2.265 million (see Annex VII).</p>			
<p>Special contractual conditions: prior to the first disbursement of the program, the Executing Agency will provide evidence, to the Bank's satisfaction of the entry into effect of the Program Operational Regulations (ROP) agreed with the Bank.</p>			
<p>Exceptions to Bank policies: A waiver of the policy requirement as per GN-2246-1 on minimum funds committed or disbursed under the previous CCLIP project (ME-L1103, OP-871) is being requested (see ¶1.19 and 2.8).</p>			
<p>The project is in line with the country strategy: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>			
<p>The project qualifies for: SEQ <input type="checkbox"/> PTI <input type="checkbox"/> Sector <input type="checkbox"/> Geographic <input type="checkbox"/> Headcount <input type="checkbox"/></p>			

I. DESCRIPTION AND RESULTS MONITORING

A. Introduction

- 1.1 Mexico has shown a strong commitment to combating Climate Change. Although Mexico is not mandated to limit or reduce its GHG emissions under the Kyoto Protocol, the country has firmly adopted the United Nations Framework Convention on Climate Change (UNFCCC) principle of “common but differentiated responsibilities”, and pledged to reduce its GHG emissions voluntarily. At the 14th Session of the Conference of the Parties to the UNFCCC in December 2008, Mexico announced its goal of reducing its GHG emissions to 340 Mt CO₂e (50% below 2002 levels) by 2050.²
- 1.2 In order to fulfill this commitment the reduction of GHG emissions from the residential sector is essential. The expansion of Mexican cities over the past years has significantly increased their carbon footprint.³ According to estimates by the Social Development Ministry (SEDESOL), the pace of urban expansion reached—in the last 30 years—an average of 50 hectares daily.⁴ Housing represents no less than 60% of this growth. Unchecked and/or insufficiently planned, this expansion has created inarticulate cities and brought about increased energy demand, infrastructure deficits and inefficient transport patterns.
- 1.3 The problem is being addressed with a sense of urgency because the future is even more challenging: toward 2030, as projected by the SEDESOL and UN Habitat,⁵ there will be 20 cities of more than one million inhabitants in Mexico, which entails complex challenges for urban planning policy and economic and social development. The National Population Council (CONAPO)⁶ estimates that, as a response to this fast-paced growth, by 2030 the housing stock in Mexico will have increased by 56%, as compared to 2005 levels.
- 1.4 The residential sector currently accounts for around 16% of total energy use in the country, 11% of commercial energy use (excluding firewood), 26% of total electricity use and 3% of direct GHG emissions.⁷
- 1.5 Even though the residential sector’s share of energy use is significant, its current direct contribution to the emissions balance is relatively modest and does not explain the merit of decisive action in this particular field relative to other alternatives. Nonetheless, its importance is better explained when we account for two further considerations:

² Although the concept of GHG emissions involves gases other than CO₂, these other gases are included in these goals in terms of CO₂ equivalent (CO₂e) units.

³ Estado Actual de la Vivienda en México, 2011 (p. 60). See <http://bit.ly/CHSM2011>.

⁴ SEDESOL. Desarrollos Urbanos Integrales Sustentables (bit.ly/DUIS2011)

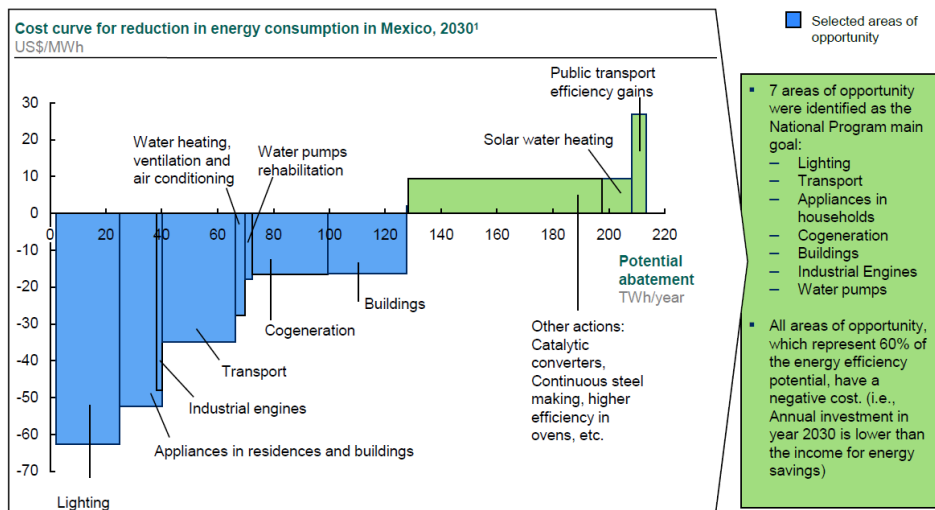
⁵ The State of Mexican Cities: (bit.ly/IEVMex)

⁶ CONAPO. Statistics on Housing (bit.ly/Ly8MNC)

⁷ National Energy Balance, 2008 (bit.ly/bne2008) Emission data based on the 2006 GHG inventory, and processed to include in the final energy use sectors their corresponding share of upstream emissions (energy sector emissions).

- a. **There are a series of indirect contributions of the residential sector to the GHG total emissions.** The residential sector is indirectly responsible for the energy use and GHG emissions in other sectors, such as construction, cement and steel industries, water and sanitation and transport. The latter have grown substantially during the last decades on account of inadequate architectural designs and building techniques, the use of energy and GHG emission-intensive building materials and technologies; inefficient water use, leading to increased energy use and GHG emissions in the water and sanitation sector, and locations with poor accessibility, leading to a high reliance on energy-intensive transport systems.
- b. **The saving potential of the residential sector is more cost-effective than other alternatives.** Although the National Institute of Ecology (INE) and the Secretariat of Environment and Natural Resources' (SEMARNAT) analysis of the different sectors in Mexico acknowledges that actions targeted at the residential sector represent only between 5 and 6% of the total CO₂ mitigation potential, these actions have been chosen as one of the seven areas of intervention underpinned in the National Program for the Sustainable Use of Energy (PRONASE, 2009), on account of their cost effectiveness. In fact, these areas represent 60% of the total GHG savings potential by 2030 which imply investment costs that are lower than the benefits accruing from the GHG savings delivered (these actions deliver profits) (Figure 1).

Figure 1: Cost curve for reduction in energy consumption in Mexico in 2030



¹ Considering the cost curve for the reduction in Green House Effect Emissions for main fuels.

Source: McKinsey GHG abatement cost curve V 2.0, CONUEE's review

1.6 Therefore, when considering both direct and indirect contributions of the residential sector to GHG emissions, plus the cost-effectiveness of its abatement potential, actions taken by the GoM in this sector are better understood.

B. Background and policy framework in Mexico.

1.7 The general mandates on energy and efficiency are laid out in the National Development Plan (2007-2012) and further developed in the National Climate

Change Strategy (2007) and in the Special Climate Change Program (PECC 2009-2012). The PECC envisages actions in the field of energy efficiency and GHG reductions in the residential sector (legislation, standards and technological elements to reduce GHG emissions in new housing developments, GHG emissions models in urban areas, construction of housing units that guarantee the efficient use of energy, altogether delivering CO₂e reductions of 1.20 MtCO₂e /year as of 2012, using eco technologies financed by green mortgages).

- 1.8 The most detailed account of the strategies and actions envisaged in terms of energy efficiency is the National Program for the Sustainable Use of Energy (PRONASE 2009). Its implications in terms of the housing policies are consistent also with the National Housing Program 2008-2012 and with the Special Program for Sustainable Housing Development to combat Climate Change (PEDHSCC) established by CONAVI. There is also an array of legislation on construction and building standards and/or appliance standards⁸.
- 1.9 A number of initiatives by Mexico's Government agencies engaged in housing⁹ have been aiming to improve the sustainability of Mexico's housing stock. The National Housing Commission (CONAVI)¹⁰ and the National Housing Fund for Private Sector Workers (INFONAVIT)¹¹ started in 2007 a joint effort to foster the construction of houses with energy-efficient and water-saving technologies. INFONAVIT is currently implementing the *Hipoteca Verde* (green mortgage) program and CONAVI leads the *Esta es tu casa* ("this is your house") subsidy program for low-income home buyers. Both programs consist of an increase in the amount (of the mortgage or the subsidy) granted only in case houses have certain technology packages. Both programs have been resounding successes¹² and progress is still ongoing: since 2011, INFONAVIT is including the *Hipoteca Verde* requirements for all the mortgages it provides (approximately 70% of the total market), and as of 2012 CONAVI has introduced sustainability and location criteria in the eligibility for the *Esta es tu casa* subsidy program. CONAVI recently launched an "Inter-Institutional Sustainable Housing Working Group" in order to coordinate the existing initiatives and find synergies in pressing topics such as monitoring and evaluation, training and capacity building and sustainable pilot projects.
- 1.10 The Federal Mortgage Society (SHF), beyond its role in the mortgage market, has become the lead agency of the Promotion and Evaluation Group of the Integral Sustainable Urban Developments (GPEDUIS). The task of the group is essentially an administrative process of quality certification. Urban development projects

⁸ Link [EERegulation](#)

⁹ Annex I.

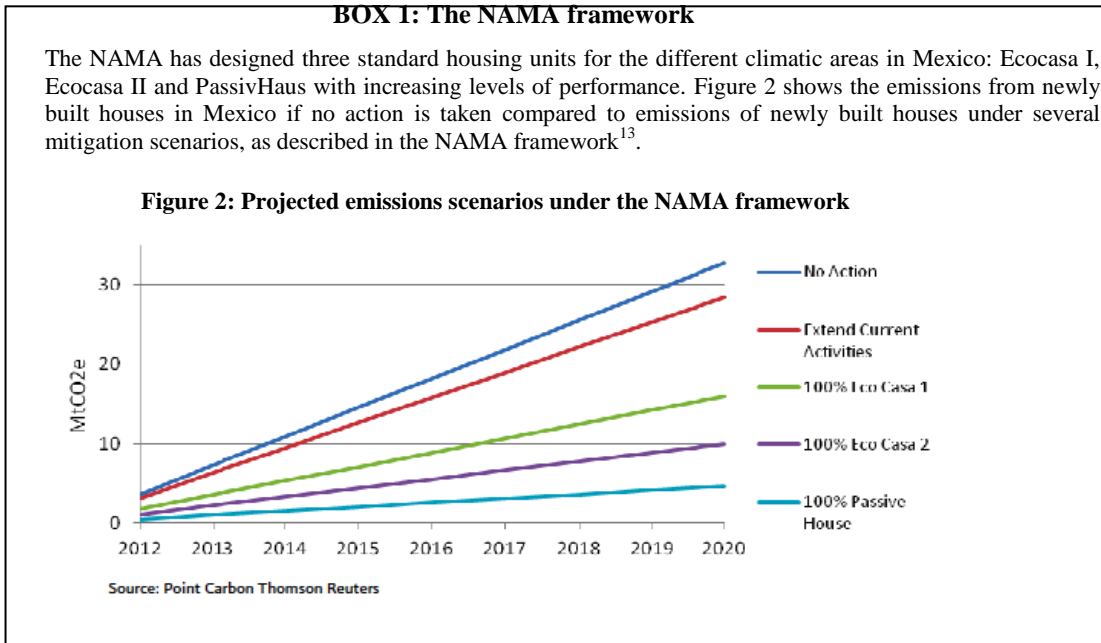
¹⁰ Public agency that sets the policies and programs within the housing sector, and provides housing subsidies, in order to develop market conditions for inclusive housing in Mexico.

¹¹ Public agency that provides mortgages and pensions for workers, by automatically deducting a percentage of the worker's paycheck as a form of payment. The system includes only employees in the formal private sector.

¹² As of 2011, CONAVI's "*Esta es tu casa*" program had provided 870,000 green subsidies, accounting for MXN 24,000 million. INFONAVIT's *Hipoteca Verde*, had provided 581,662 green mortgages (42% of which also were accompanied with subsidies), up from 105,000 provided in 2009.

designed according to a comprehensive methodology are certified by the GPEDUIS and thereby become eligible for the basket of incentives managed by each of the departments involved in the GPEDUIS.

- 1.11 The German Technical Cooperation Agency (GIZ), as well as the Governments of Britain, Canada and Spain are among the strongest partners in these efforts and are committed to developing the sector in Mexico.
- 1.12 The leadership shown by Mexico with this wide array of initiatives in the residential sector has resulted in the implementation of the world's first Nationally Appropriate Mitigation Action (NAMA) plan, which is intended to promote the use of energy-efficient appliances and building design for houses at a national level. The NAMA is based on the concept of "whole-house approach": it does not focus on specific energy efficiency and renewable energy measures in houses, but it oversees the overall performance of the house. This approach is more cost-effective, as a performance-based system enables housing developers to choose the most appropriate means to achieve the intended emission reductions, *vis-à-vis* a pre-established baseline



- 1.13 Based on best international practice, the NAMA uses a standard international *ex-ante* simulation tool for the evaluation of results for a representative sample of buildings, in order to define standard housing unit types with different levels of performance of emission reductions (for further reference, see Box 1). This simulation tool is currently being adapted for the Mexican case. In parallel, and based on this adapted version of the simulation tool, INFONAVIT is developing a rating system for sustainable housing. The mentioned system will rate thermal performance, the efficiency of household devices, water usage, and urban infrastructure. Finally, SHF will work under the NAMA umbrella in this program,

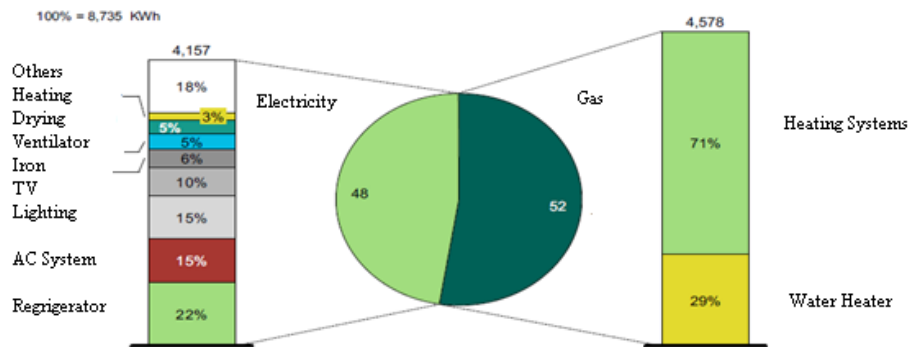
¹³ See Link <http://bit.ly/NAMAMX>

in close collaboration with CONAVI, INFONAVIT and other public and private actors. It is envisioned that the proposed program will be fully compatible with this rating system structure.

C. Problem’s description and Intervention proposed.

1.14 **Excessive emissions from the residential sector in Mexico.** Air conditioning, refrigeration, home appliances and electronics are the main growth areas of residential electricity demand in Mexico (Figure 3). Especially in the northern parts of the country, inexpensive and inefficient second-hand AC systems imported from the US are easily available. Domestic hot water and cooking drive the demand for residential liquefied petroleum gas (LPG) and natural gas, and are the main end-use factors increasing residential fuel consumption.

Figure 3: Residential consumption patterns in Mexico



Source: Federal Electricity Commission (CFE), National Survey of Income and Expense of Households (ENIGH 2006), National Commission for the Efficient Use of Energy (CONUEE) Analysis

1.15 Residential energy consumption levels are determined by a combination of factors (weather, energy prices, the owner’s income and his propensity to save or his concern with the environment). However, homes designed disregarding energy and water efficiency criteria and/or region-appropriate building materials can perform significantly below the average, as they are likely to require higher levels of consumption of energy and water. An average house, per estimations of the IDB team, consumes approximately 71kWh/m². A poorly designed house in a hot climate may use an additional 1,000 kWh per year, representing about 600 kg of CO₂ unnecessarily released into the atmosphere.¹⁴ Poor planning and building practices result in increased expenditure in transportation and energy, but also in a loss in quality of life, as dwellers spend a considerable amount of time in transportation between the job place and home or leisure opportunities and live in houses with very low levels of comfort.¹⁵

¹⁴ Specific Program for Sustainable Housing Development to combat Climate Change. CONAVI (2008). Mexico City. P10. See Link <http://bit.ly/PEDHSCC>.

¹⁵ C2C2: Hacia Ciudades Competitivas Bajas en Carbono. Center for Sustainable Transport CTS-Embarq 2011. See <http://bit.ly/CTSc2c2>

- 1.16 The current government initiatives have jump-started the production and marketing of environmentally friendly homes based on a limited set of eco technologies. The approach of the current programs, while initially effective in its simplicity, needs to be enhanced to promote a more ambitious agenda that includes architectural and construction techniques in line with best international practice, and provides more flexibility framed into the “whole house approach” through performance-based incentives. This is fully aligned with the government’s intentions of scaling up its current programs to take into account those issues, as presented in the NAMA.
- 1.17 **The proposed program seeks to scale up the deployment of low-carbon housing by providing the financing and the incentives that will lower the costs of both developing and acquiring such houses.** The program will contribute to improve the quality of the construction industry in Mexico by lifting the energy efficiency standards of newly built houses into ECOCASAs (see Box 2).¹⁶At the same time, it will provide mortgage finance that will encourage the purchase of houses already built with a set of minimum efficiency criteria. Altogether, this will induce lower energy consumption and water usage, lower GHG emissions, relative to the current trend, complementing and giving an impulse to the government policies and initiatives in this domain. Also, it should deliver a higher level of comfort for beneficiaries.

BOX 2. What is an ECOCASA?

An ECOCASA is a housing unit that results in a reduction of a given amount of GHG emissions compared to the NAMA base case. The NAMA establishes 3 different levels of emission reductions, called Ecocasa1, Ecocasa2, and Passive House.

The NAMA base case distinguishes among the 4 climate zones (hot and dry, hot and humid, temperate, semi-cold) and three types of housing (single houses, row houses and apartment blocks). No insulation is considered for the base case and the electrical appliances are average to low energy efficiency.

There is a menu approach to the measures that can deliver the targeted reductions. Measures might consist of a combination of: insulation in roof and walls, reflective paint, efficient gas boiler, efficient refrigerator, solar water heater, energy saving windows, among others.

The whole building approach is envisioned to lead to an optimum solution regarding energy efficiency, comfort of the house owner and cost effectiveness, as well as to provide flexibility in the design.

- 1.18 In addition, the development of a thriving sustainable residential market in Mexico faces several other challenges, such as:

¹⁶ Two financial instruments were considered for this purpose: Supply-side (bridge loans) or demand-side (mortgages). Given that the Program will provide only a limited amount of resources (vis-à-vis the size of the market), it was considered that the demand-side approach would be ineffective in providing incentives for the developers, and that a supply-side approach would be preferable.

- a. Energy subsidies. A key factor influencing residential energy consumption is the implicit subsidy in the administered gas and electricity tariffs.¹⁷ The government is aware of the implications of the current price structure and is committed to gradually reflecting international prices in the cost of energy (see [http://bit.ly/IMF artIV](http://bit.ly/IMF_artIV)).
 - b. Mortgage incentives provided by INFONAVIT are only available to affiliated workers. Non-affiliated workers, the population covered by the mortgages activity of SHF, cannot access the INFONAVIT program which has included “green criteria” on the mortgages provided since 2011 (see paragraph 1.9). Moreover, most of the subsidy provided by CONAVI is also channeled through INFONAVIT, the largest mortgage provider in the country.¹⁸
 - c. Low adoption rate of the official standards. Although there are several standards in place aimed at reducing the energy consumption of buildings, enforcement is a responsibility of sub national entities, which often lack capacity and institutional structure to ensure successful implementation.¹⁹
 - d. Lack of awareness of the benefits of sustainable housing among the developers, the home owners and the public administration.²⁰
 - e. Funding and subsidies for otherwise uncompetitive technologies. Unit cost of KW-hr of certain technologies is higher than the average cost in Mexico.²¹
- 1.19 Against this background, the proposed intervention is part of a broader multi-pronged approach to the problems described above, and includes:
- a. The ECOCASA Program as described in this POD, where the Bank will disburse: (i) USD49.514 million of the Clean Technology Fund (CTF) resources in concessional loans, acting as an executing agency, to finance the development of residential projects (building of ECOCASAs, see Box 2) that meet CO₂e reduction goals established by the program; and (ii) USD50 million from the Bank’s existing CCLIP ME-X1006 that will fund SHF mortgage instruments (on houses that meet CONAVI criteria) for its target population, low to middle income workers not affiliated to any social security program. Consistent with the contents of the previous operation under the conditional credit line CCLIP ME-X1006 (ME-L1103/OP-871, paragraph 1.26), to be considered by the Board on July 19th, the ordinary capital component of this project constitutes the fifth operation under the referenced CCLIP ME-X1006, leveraging the CTF resources as per CTF requirements. On account of this, the project team is requesting a waiver of the policy requirement over minimum funds committed or disbursed (75%/50%), as

¹⁷ CONAVI, Semarnat. Supported NAMA for Sustainable Housing in Mexico-Mitigation Actions and Financing Packages. Mexico City, 2011. See Link <http://bit.ly/NAMAMX>

¹⁸ This speeds up growth in the market for sustainable housing. However, low and middle-income families paradoxically become the main drivers of this development, in strong contrast to developed economies.

¹⁹ CONAVI, Semarnat. Supported NAMA for Sustainable Housing in Mexico-Mitigation Actions and Financing Packages. Mexico City, 2011. See Link <http://bit.ly/NAMAMX>

²⁰ Idem supra.

²¹ Idem supra.

established in document PR-211 (GN-2246-1, paragraph 1.16 iv). Justification is that both operations are being approved almost simultaneously and resources from the third CCLIP operation (ME-L1079) meet the minimum commitment and disbursement requirements. The KfW (with support from the German Government) is expected to provide an additional concessional loan of EUR 80 million to finance the development of housing projects with the same objectives.

- b. A technical cooperation (TC) package funded with USD2.0 million of CTF grant resources will be executed, USD1.6 million already granted and USD0.4 to be requested in the future.²² The activities of this TC will include: (i) support for developing and implementing simulation, rating, inspection, and monitoring procedures addressing the thermal performance, water usage, accessibility (location) and building material lifecycle aspects of houses; (ii) strengthening of the capacities of the housing industry and housing finance institutions, through technical studies and training opportunities; (iii) dissemination of knowledge on low-carbon housing among the public, industry, universities, and government institutions at the national and local level; and (iv) support for the development of public policies for low-carbon housing (see Annex).
 - c. Finally, some USD9 million from the LAIF (EU Commission) will complement the current proposal, as well as KfW's loan proposal. These funds, which as of submission of this document had been provisionally approved, will subsidize the construction of additional houses with the highest energy efficiency standards (Passive House Standard), as defined in the NAMA.
- 1.20 With regard to the scope of the intervention, around 27,600 homes over the implementation period (up to 7 years), the program is significant enough to spear head the next generation of low-carbon housing in Mexico. Considering demand for new housing at 0.6 million annually, the program's eventual effectiveness relies on its demonstration power and on its transformational impact, especially through the collaboration and participation of the main agencies involved in sustainable housing in Mexico (CONAVI/SHF/ INFONAVIT/ SEMARNAT)²³.

D. The role of SHF: long-lasting relationship with the IDB

- 1.21 SHF is a National Credit Corporation which operates as a second tier bank with the mandate²⁴ to develop the primary and secondary markets for mortgage financing, with a predominantly social orientation. SHF's corporate strategy aims to develop housing markets in Mexico, primarily through: (i) the promotion of greater efficiency and the strengthening of the housing market, (ii) the promotion

²² An additional USD0.265 million for preparatory and initial activities of the program has already been approved (ME-T1202) on May 2011.

²³ It is important to recall that public policy is the main driver of housing in Mexico (86% of mortgages in 2011 were granted by the public housing institutes INFONAVIT and FOVISSTE). A demand driven approach to the introduction of low-carbon housing in Mexico would be utterly ineffective.

²⁴ See excerpts from the SHF Statutes in Link http://bit.ly/SHF_OL.

of access to credit and housing solutions, (iii) the promotion of an adequate supply of housing, and (iv) the provision of liquidity to the instruments of housing finance and infrastructure finance at prices that reflect their risk.

- 1.22 In order to cater for the unattended sectors, SHF has among its 2012 goals: to support the revival of lending to developers, to continue providing financial solutions for non-affiliated workers and to continue introducing microcredit and self-production products. As part of their annual plan, the SHF also expects to provide first-loss guarantees and credit insurance to housing, with around 40% of these operations covered for unaffiliated buyers.
- 1.23 Although this intervention will be the first involving a clear objective of emission reductions in the residential sector in Mexico, the Bank has cooperated intensively with SHF over the years, contributing to the GoM's goal of a more inclusive and efficient mortgage industry. In particular, the first three operations (2067/OC-ME, 2173/OC-ME, 2262/OC-ME) under the CCLIP,²⁵ amounting to USD1.5 billion, provided an important and timely support to the sector through SHF, supporting its countercyclical role in the aftermath of the financial and economic crisis of 2008-2009.²⁶ In terms of TC actions, the Bank financed the improvements in the Public Registries and, with resources from the Spanish Fund, the evaluation and supervision of the Integral Sustainable Urban Developments (DUIS).
- 1.24 The SHF has full sovereign guarantee on the obligations undertaken until January 2014, as recorded by the second transitory article of its founding Law, but uses market mechanisms to set prices and its management is geared for a return on equity (ROE) and guided by private sector discipline. Despite the deterioration in the mortgage industry in recent years, as of March 2012, the company had a ROE of 6.37% and an index of capital (ICAP) of 14.11% (13.43% on March 2011)

E. The role of the Bank and the Strategic Alignment of the Program.

- 1.25 In the context of this particular program, the Bank plays several important roles: (a) IDB will be channeling international funds for climate change mitigation into Mexico, (b) insofar as CTF resources are combined with IDB/CCLIP resources, the Bank is also contributing to scaling up the impact sought by the international donor community (c) the Bank is transferring best practice and helping develop capacity and awareness on these issues, (d) the Bank is a leading player among a group of international donors and national agencies concerned with sustainable housing. Finally, IDB's involvement with the CTF Investment Plan in Mexico

²⁵ Please refer to documents ME-L1063, ME-L1065 and ME-L1079 for details on these previous operations.

²⁶ The resources of the three programs were used to finance: (i) 11,349 long-term mortgages for USD189 million, (ii) 2,700 bridge loans, totaling USD376 million; (iii) 21 real estate projects and 3,351 credits in the new program Rent to Own (ROC) for a total of USD96.6 million, (iv) USD46.8 million for microcredit, and (v) USD787.4 million investment in MBS and other IFRH's. Regarding the beneficiaries of the program, the allocation of resources has been focused on the target population of the SHF, hence: (i) their average income was 7 minimum wages (SM), including individuals with income from 2 SM, with a modal of between 3 and 4 SM, (ii) 91% of the borrowers of the ROC do not belong to groups of employees and / or individuals earning less than 10 SM, and (iii) 40% were women. Regarding the secondary market support, the Bank's resources contributed to the secondary market liquidity by rediscounting of MBS purchases by SHF.

goes beyond this program. It started in the very design of the investment plan and it includes cooperation in various fields, in a multi-pronged approach in collaboration with IBRD and IFC.

- 1.26 The Mexican strategy on climate change was incorporated into the IDB Country Strategy (CS) with Mexico 2010-2012 (GN-2595-1). It features in its results matrix, whose strategic objectives include supporting the implementation of the climate change adaptation and mitigation agenda at the federal and sub-national level. The proposed program contributes to the objective of reduction of GHG emissions, specifically to its indicator of “volume of annual reductions in GHG emissions through programs to fund low-carbon projects”, as identified in the Results Matrix of the CS.²⁷ It also is consistent with the lending target in support of climate change initiatives of the IDB’s GCI-9. In addition, its outcomes also are deeply linked to another CS area of intervention, namely the “increase housing sector access to financing”, as they contribute to the availability of both mortgage loans and construction financing.

F. Objective of the program and key results indicators

- 1.27 The program goal is contribute to the efforts of Mexico to reduce GHG emission of the residential sector. This would be achieved by pursuing two specific objectives: (i) to increase the production of low-carbon housing by financing developers through SHF; and (ii) to increase the supply of mortgages for low carbon housing (as defined by CONAVI) by providing resources for LFIs to fund mortgage loans for non-affiliated workers.
- 1.28 The expected outcomes in connection with the specific objectives are: (a) an effective fall in the amount of water, gas and electricity consumed in the houses built and financed as well as the corresponding reduction in the expenses on the utilities and the average amount of GHG emissions averted per home, and (b) an increase in the level of comfort attained by the beneficiaries on account of the characteristics of the new homes, in terms of temperature range inside the houses within comfort standards.
- 1.29 The primary impact of the program will be through its contribution to the overall reduction in GHG emissions from the residential sector at a national level. Two caveats: (a) on top of the GHG emissions abated by the program, the project is expected to deliver a transformational effect in the residential sector through the deployment of new building and construction standards and a performance-based policy that should demonstrate to developers, citizens and banks alike the advantages of the new housing model in terms of energy savings; and (b) over the period of reinvestment of the funds (see Section II.A below) the Bank, with the help of the TC package, will seek to introduce and to measure water saving, location and building material criteria that will further enhance the impact of the program. The Monitoring and Evaluation Plan will address the measurement of the results, with the support of the TC Package.

²⁷ In accordance with the CS, the areas to which eligible projects must relate include housing.

- 1.30 The Results Matrix outlines the indicators and the means to verify the accomplishment of the program's targets. Using conservative estimates, the program is expected to produce around 27,600 houses built and another 1,700 financed, in the first seven years. Based on the time span considered, the CTF/KfW funds are expected to deliver the construction of, at least, one additional wave of houses amounting to half the first wave (13,800 houses), totalizing 43,100 houses built and purchased. With these, the total resources invested would deliver energy savings of around 2.4 million MWh and emissions reductions of 1.6 million metric tons of CO_{2e}, accumulated over 40 years, period of time considered as a conservative lifetime for the homes. The net present value (NPV) of the program is USD83.49 million, based on the quantification of the following benefits: (i) the annual flow of metric tons of CO₂ averted (GHG emissions reduced), valued at market price, (ii) the annual reduction in energy (electricity and gas) consumption of the home owners/occupiers, valued as savings on subsidy expenditures for the government and savings on energy bills for the individuals, (iii) the annual reduction in water consumption of the home owners/occupiers, valued as savings on their water bills, and (iv) the difference in terms of wealth derived from the increased value of the real estate assets.

II. FINANCING STRUCTURE AND MAIN RISKS

A. Components, terms, characteristics and eligibility of projects

- 2.1 **Component I: Loans for developers.** SHF will use the concessional resources of the CTF to provide bridge loans to developers. The program is geared towards low-and middle-income housing (income between 5 and 12 times the minimum wage). Prices of the houses built will range from MXN 200,000 to 600,000. Since the maturity of construction loans in Mexico is normally 2-3 years, it is expected that over an implementation period of up to 7 years SHF will reinvest the proceeds of the sub loans (interest, principal, prepayments) in eligible projects.
- 2.2 In order to accelerate investment and to generate a greater initial market impact, participation in the program will be open to developers invited by SHF, who will allocate resources per project following the institution's own standard procedures. In future phases of the program, participation will be open to all developers and the TC package will help build capacity for developers who require it.
- 2.3 SHF will select an initial pipeline of projects that deliver at least 12 kg CO₂e per m² and year or 20% reduction in the expected GHG emissions associated with energy consumption of the houses relative to the baseline, whichever is lower. *Ex-ante* estimates using the INFONAVIT simulation tool will help SHF establish the eligibility of projects. The tool is expected to be ready and deployed by mid July 2012. Were such tool not available at the time of launching the program,²⁸ developers shall hire a consultant at their own expense to produce the calculations following the guidelines of NAMA and subject to the Bank and SHF approval.
- 2.4 The project team will review the eligibility of projects selected by SHF. Initially the program will only consider emission reductions related to thermal performance. Thereafter, as part of the TC package, studies will be carried out to quantify emissions reductions from water savings, better location and from the use of materials with lower life-cycle emissions. These studies will help recalibrate the eligibility targets during the implementation phase. These targets will be an integral part of the Program Operation Regulations (ROP) and might only be revised by mutual agreement between IDB and SHF.
- 2.5 The terms and rates applicable to CTF financing are contained in the CTF Financing Products and Terms (20 years maturity, 10 years grace period and a 0.75% rate of charge) [CTF Financing Products and Terms](#). The IDB fee will consist of an upfront payment equal to 0.45% of the amount of the loan, payable by the borrower to the IDB to cover costs of origination, design, preparation, implementation and disbursement, monitoring and evaluation of the program financed by the CTF.
- 2.6 The contract will establish a mechanism for determining the terms at which CTF resources are passed to the developer so as to ensure an appropriate transfer of the subsidy element to the final beneficiaries. In order to reduce financial intermediation and

²⁸ Tool is being developed and tests are currently in place, with the support of the German Development Cooperation. Although a specific schedule for the launch of the tool publicly has been established, delays in this process may occur.

transaction costs, the SHF may channel the loans to developers through a single high-rated financial intermediary or through a trust fund. SHF will provide IDB with the necessary pricing information on the pass-through of the concessional terms of CTF resources on to the end borrower.

- 2.7 Disbursements from the Bank to SHF will follow standard Bank procedures and will be in accordance with the conditions laid out in the contract. A special treatment will be established in the contract with regard to advanced CTF resources on account of the concessional element involved.
- 2.8 **Component II: Loans for LFIs.** This component, financed with resources from the CCLIP ME-X1006, will work following the practice of previous similar operations with SHF (2067/OC-ME, 2173/OC-ME, 2262/OC-ME).²⁹ As previously referred to, in the contents of the fourth operation under the referenced CCLIP (ME-L1103/OP-871, paragraph 1.26), to be considered by the Board on July 19th, this component constitutes the fifth individual operation under the CCLIP ME-X1006, leveraging the CTF resources as per CTF requirements. In view of this, a waiver of the policy requirement over minimum funds committed or disbursed is being requested, as both fourth and fifth operations are being approved almost simultaneously (see ¶1.19). SHF will facilitate to eligible LFIs the financing of mortgages for the purchasing of houses that meet the CONAVI criteria for *Hipoteca Verde* (see paragraph 1.9). LFIs will have to meet the overall requirements by SHF, who will apply its standard processes and bylaws to select them. The project team will be timely and sufficiently informed. There are no limits on the number of LFIs to be selected.
- 2.9 **Terms, rates and costs for the end borrower.** SHF will determine the financing terms to their client LFIs, by applying a spread to IDB terms (particular LFI risk spread plus SHF operating costs). Financing terms and conditions for the end borrower (sub loans) will be established at the discretion of each participant LFI. SHF will provide IDB with the pricing information on the pass through of the IDB terms on to the end borrower. Disbursements from the Bank to SHF will proceed following standard Bank procedures and in accordance with the conditions laid out in the contract.

B. Risks to the program.

- 2.10 Among the specific factors studied in the risk profile of the program the possibility of a significant departure from current policies and/or inadequate regulation having a negative impact over the results of the program is perhaps the most distinct, particularly in connection with the impending change in government. In broad terms, the project team has a positive view with regard to these risks because of the government's international commitments, the savings potential, and the importance of low-carbon housing from an environmental but also from an economic point of view. All presidential candidates have emphasized the importance of energy efficiency and climate change mitigation.

Environmental and social risks. The operation is classified under policy directive B.13, given that it is a flexible lending instrument. Low carbon housing projects are considered climate friendly due to their contribution to long-term GHG emissions reductions. However, projects can have adverse environmental and social impacts. These will vary

²⁹ Please refer to documents ME-L1063, ME-L1065 and ME-L1079 for details on these previous operations.

based on the specifics of the projects. SHF has experience in the Bank's approach and will assess the environmental and social risk and specific mitigation measures on a project by project basis, in accordance with IDB policies.

Fiduciary risks. Based on the Bank's recent institutional capacity evaluation on SHF's structure and processes and based on their experience in executing recent operations, the fiduciary analysis concludes that SHF's systems are adequate and reliable. The fiduciary management system of the federal entities is in fact solid and thoroughly regulated, in terms of both financial and acquisitions matters, with strong internal controls and with external controls by independent audit firms designated by *Secretaría de la Función Pública*, the *Auditoría Superior de la Federación (ASF)*, the *Comision Nacional de Bancos y Valores* and others. This program will use national financial systems.

III. IMPLEMENTATION AND MANAGEMENT PLAN

- 3.1 The borrower and executing agency for the program will be SHF, S.N.C., with the United Mexican States serving as guarantor. SHF will execute the program under its current organizational structure. SHF will be the executing agency of the TC package, in coordination with the Bank. The provisions governing program execution, financial intermediaries' participation, and eligibility of individual loans will be established in the ROP agreed by the Bank and SHF, in accordance with SHF and Bank standards and policies, Mexican laws, and practices in Mexico's financial industry.
- 3.2 Neither procurement actions nor consulting services are contemplated in this program. Eventually, end borrowers may use procurement processes according to market practice and acceptable to the IDB, according to Appendix IV of the Bank's Procurement Policy.
- 3.3 The CTF/IDB resources of USD99.514 million are to be fully disbursed within 2 years running from the effective date of the loan agreement. The IDB will disburse ordinary capital resources via reimbursements or advances and in the currency requested by SHF, according to standard practice and contractual requirements. As a condition prior to the first disbursement of the program, the Executing Agency will provide evidence, to the Bank's satisfaction of the entry into effect of the ROP agreed with the Bank.
- 3.4 **Monitoring Reports.** The program will be monitored through semiannual reports prepared by the executing agency and presented to the Bank within 60 days after the close of each six-month period, measuring progress against the indicators in the Results Matrix and on the fulfillment of the eligibility criteria (see Annex IV M&E Plan)
- 3.5 **Evaluation.** The borrower and the Bank will conduct a midterm evaluation within 24 months from the date of the first disbursement of financing or once 50% of the loan has been committed, whichever occurs first. The evaluation will assess progress in accomplishing program objectives and outcomes based on the Results Matrix in order to identify any corrective action required. The borrower will provide the information necessary for the Bank to conduct a Project Completion Report (PCR). Periodical monitoring meetings are also scheduled. The measurement of energy and water consumption over a period of time will allow us to check and determine the GHG emissions that will be averted during the life of the project, a calculation that is contingent on a number of assumptions but that should give us a reasonably accurate

measure of the overall impact. The savings in the spending on water, gas and electricity of the families will also be measured.

- 3.6 **Information.** SHF will compile and maintain all information, indicators and parameters, including all documentation required to prepare the PCR and any *ex- post* assessment the Bank or CTF may wish to conduct.

Housing Initiatives in Mexico

Background of the Housing Sector

The Mexican Housing Finance market is divided according to the level of income and the status of employment (private sector, public sector, formal and informal). Table 1 shows the main actors¹ in the Housing Sector in Mexico. In addition to the institutions presented in the table, commercial banks and SOFOMES can provide funding to Housing Developments in Mexico.

Table 1: Main actors in the housing market in Mexico

Organization	What They Do	Target Market
INFONAVIT	Provide mortgages and pensions for workers from a fund fed by compulsory deductions of 5% of paycheck.	Private sector employees with formal salary
FOVISSSTE	Provide mortgages and pensions for workers by automatically deducting 5% of paycheck	Public sector employees
SHF	Provide funding for construction loans, mortgages and microfinance loans through financial intermediaries to all market segments with a focus on the lower middle class and poor	For mortgages: independent workers, workers in informal sectors, and co-financing of INFONAVIT and FOVISSSTE mortgages
CONAVI	Sets the policies and programs within the housing sector to develop market conditions so that all Mexican families can have a home; provides housing subsidy to poor.	The entire housing market
FONHAPO	Serves the population in patrimony poverty and in need to improve, acquire, or build a home through the provision of subsidy.	Families under Asset Poverty with no access to any bank loan or subsidies under Infonavit, Fovissste, CONAVI or others.

The 2008 crisis had a deep impact in the SOFOMES engaged primarily in the housing sector. SHF's mandate is to support financial intermediaries, including SOFOMES and microfinance institutions, by providing funding, guarantees and Technical Cooperation to help them develop their mortgage and construction lending portfolios. Commercial banks serve traditionally middle-class population.

¹ CONAVI: Comisión Nacional de Vivienda (National Housing Commission)

FONHAPO: Fondo Nacional para las Habitaciones Populares (The National Trust Fund for Popular Housing)

FOVISSSTE: Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (Housing Fund, Social Security and Services Institute of Public Workers)

INFONAVIT=Instituto Nacional del Fondo de la Vivienda para los Trabajadores (National Housing Fund for Private Sector Workers)

SHF: Sociedad Hipotecaria Federal (Federal Mortgage Society)

SOFOME: Sociedades Financieras de Objeto Múltiple (Multi-purpose financial companies)

Sustainable Housing in Mexico

Toward 2030, as projected by the Social Development Ministry (SEDESOL) and UN Habitat², in Mexico there will be 20 cities of more than one million inhabitants, implying complex challenges for urban planning policy, economic and social development. The National Population Council (CONAPO)³ estimates that in the time period from 2005 to 2030 the housing stock in Mexico will increase by 56%. The residential sector currently accounts for around 16% of total energy use in the country, 11% of commercial energy use (excluding firewood), 26 percent of total electricity use, and 14% of greenhouse gas emissions⁴. In addition, the housing sector is indirectly responsible for the energy use (and greenhouse emissions) in other sectors, namely the construction sector, the cement and steel industries, the water and sanitation sector, and the transport sector. Direct and indirect energy use and GHG emissions have grown substantially during the last decades on account of (i) inadequate architectural designs and building techniques, leading to poor thermal performance, which in turn involves increased energy use for air conditioning and heating; (ii) the use of energy and GHG emission-intensive building materials and techniques; (iii) inefficient water use, leading to increased energy use and GHG emissions in the water and sanitation sector, and (iv) locations with poor accessibility, leading to a high reliance on energy-intensive transport systems.

The following is a description of the main support programs for low carbon initiatives and efforts in the residential sector in Mexico.

a) INFONAVIT's Green Mortgage Program (Hipoteca verde) and Rating System

The Green Mortgage (Hipoteca Verde) of INFONAVIT finances housing with a set of chosen eco-technologies that guarantee a minimum amount of savings to the mortgage buyer of MXN215 monthly (appr. USD 20). The set of minimum energy efficiency requirements is different for single family and multi-family homes, as well as on account of the climate zone, but the main energy efficient technologies involved are: florescent energy efficient lighting, solar water heater, high efficiency gas heater (hybrid of solar and gas), efficient toilets, faucets with flow control, faucet valves with water savings accessories, organic and inorganic waste containers and water and electricity meters.

The INFONAVIT, founded in 1972, is the oldest and largest mortgage institution in the country and also serves as a pension institute. It covers the mortgage market for private sector employees and in 2011 it granted 501,292 loans, for a total amount of 156,2 billion MXN (over 12 Billion USD). It is financed through a 5% deduction from workers salary and workers, companies and government are involved in its management. In practice INFONAVIT (as well as FOVISSTE, the twin institution dedicated to public sector employees) operate more as public pension and mortgage providers for the employed than as banks. In the case of the mortgage industry, these Funds are responsible for 85% of the number of annual mortgages and close to 70% of the total value of the mortgages issued. Starting in 2011, the ecotechnologies don't come in fixed packages, but are flexible and depend on the climate are of the housing unit and on the personal

² The State of Mexican Cities: bit.ly/EdiCdM.

³ Statistical information on housing in Mexico: bit.ly/IEVMex.

⁴ National Energy Balance, 2008 (http://www.sener.gob.mx/res/PE_y_DT/pub/Balance_2008.pdf) Emission data based on the 2006 GHG inventory, and processed to include in the final energy use sectors their corresponding share of upstream emissions (energy sector emissions)

preferences of the mortgage payer, who can now use a simulation tool, available online at INFONAVIT’s website, to determine the combination of technologies that he/she can acquire with the subsidy, in order to achieve the minimum required savings due to reduced energy/water use. This financial product has been so far the most powerful driver of residential environmentally friendly technologies. In 2011 alone, INFONAVIT issued 376,815 Green Mortgages, 75% of the total number of mortgages it issues are “green” (over 650 thousand homes in the period 2007-2011).

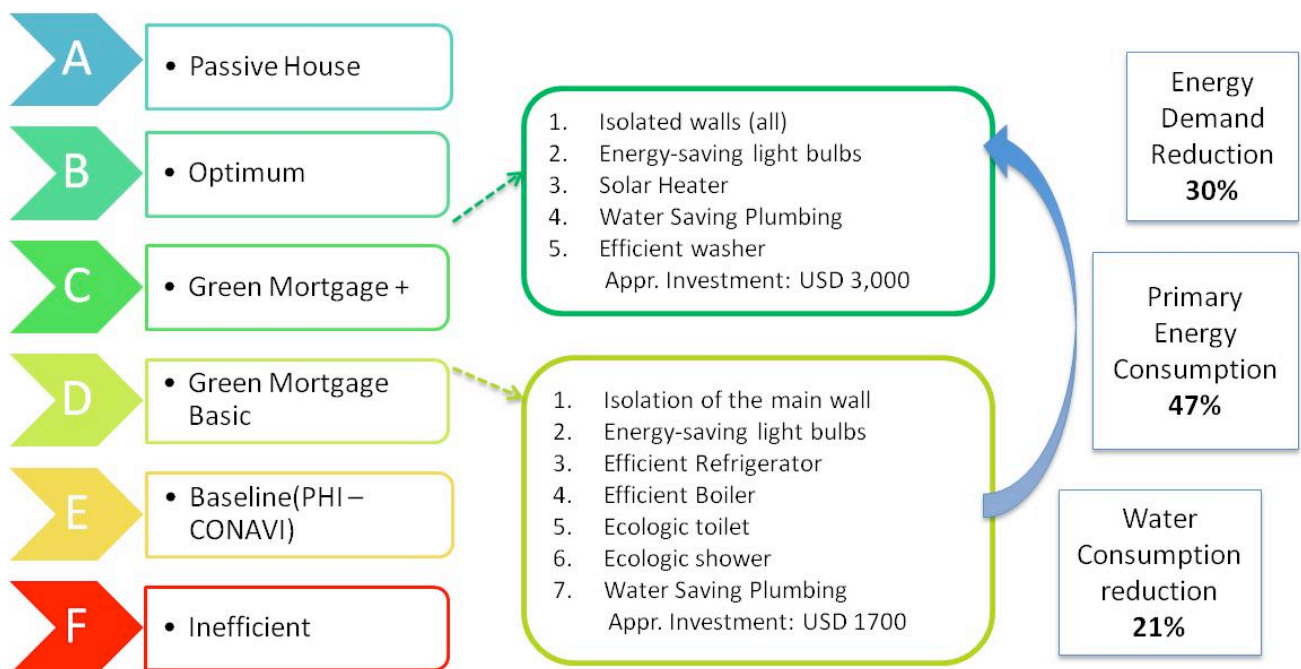
The currently under preparation “**Energy and Environment Rating System for Housing**” (SCV, for its Spanish Acronym), lead by INFONAVIT in close coordination with the relevant Housing agencies in Mexico and with support from the German technical Cooperation Agency GIZ, the German Ministry of Cooperation BMZ and the British Embassy, will provide a system to “label” housing projects according to their level of This system evaluates and ranks, according to a preset level, the energy performance and environmental impact of housing taking into account three components:

- Energy Demand
- Power Consumption
- Water consumption

For the evaluation it considers 3 parameters:

- Architecture of the housing
- Construction systems and materials
- Eco-technologies incorporated

Figure 1: Example of the levels of the SCV for an isolated temperate-cold climate (in development)



This rating system intends to (i) provide the home owners with more information energy efficiency in their homes; (ii) reduce the consumption of water and energy; (iii) encourage the use of more efficient and environmentally friendly materials and architectural designs; (iv) allow the housing institutions to share a common evaluation tool and focus the incentives in a more efficient way. The System is currently under development and will be tentatively implemented in 2013 in combination with the Housing Register (RUV, for its Spanish Acronym).

The register functions as a single window, or a one-stop shop, that enables unique registration of housing supply in which private actors integrate housing information. INFONAVIT obtains the information necessary for their operation processes, while the financial intermediaries obtain the information needed to support business decisions. Private and public agencies have a system of information that is sufficient, accurate and timely. The registry also allows standardizing and integrating the registration processes of supply, construction progresses, quality of housing, and real estate valuation in the mortgage market – including processes that involve local authorities.

b) “Ésta es tu casa” Program

The “Ésta es tu casa” (“This is your house”) Program is a subsidy program created by CONAVI to attend the housing demand of the low-income population. It also introduces energy efficient technologies by establishing a set of minimum energy efficiency criteria for the developer. The program targets workers with salaries below 5 times the minimum wage (approximately USD 700). The subsidy can be used for: (i) acquisition of new or used house; (ii) improvement of existing housing; (iii) acquire a lot with services and (iv) self-construction of the house. The “Ésta es tu Casa” program sets as requisite for the grant of the subsidy the introduction of sustainability criteria. From 2009 to 2012 the criteria were shared with INFONAVIT’s Green Mortgage Program (see A), in form of packages of eco-technologies to reduce the use of water and energy/ Hence, the federal subsidy for new dwelling acquisition demanded the dwelling to have a basic eco-technology package for a water sustainable use and energy saving (electricity and gas). This initiative allowed that, during 2010, more than 151 thousand green mortgages were financed (89,718 subsidized by the program “Ésta es tu casa”); that is, 44% more than the dwellings financed in 2009, where 105 thousand mortgages of this type were granted (67,256 subsidized by program “Ésta es tu casa”). As for carbon dioxide (CO₂) emissions, it is estimated that each dwelling generates a saving between 1 and 1.5 tons. With these documents—including the Housing Building Code—it is sought that the very municipalities include these guidelines in local regulations for building licenses in the near future.⁵

Starting in 2012 CONAVI has introduced the following criteria: (i) competitiveness; (ii) location; (iii) equipment and (iv) densification. For the very first time in Mexico, there are developments that can be denied a subsidy for non-compliance with the criteria. The subsidy is disbursed as a reduction on the mortgage. CONAVI passes the cash value of the subsidy directly to the financial intermediary that provides the mortgage, who then reduces the total principal amount. The beneficiary only holds a certificate as proof of the subsidy and the subsidy plays the role of a down payment. This subsidy has significantly contributed to the development of green housing. Nonetheless, the target segment of the population is limited to low-income housing. In

⁵ <http://idbdocs.iadb.org/wsdocs/getDocument.aspx?Docnum=36768182>

2011 the program delivered 165,704 subsidies, for an amount of 5.17 Billion MXN (417 USD Millions)

c) DUIS

Given the need to strengthen the management of urban development and improve the quality and sustainability of cities, the Mexican authorities formed the Group on the Promotion and Evaluation of **Sustainable Integral Urban Developments** (GPEDUIS , Promotion and Evaluation Group of the DUIS⁶). The SOCIEDAD HIPOTECARIA FEDERAL SHF is the Government Agency who has developed the DUIS concept and methodology and is leading the development of the process and its institucionalization within the framework of the Housing Law and the planning regulations. Its essential purpose is to integrate the strategies of the Federal Government in a policy for the generation of comprehensive urban development projects with sustainability criteria, and to consolidate and coordinate support measures to facilitate the low-income population to access housing finance. The task of the Group is essentially an administrative process of quality certification. Urban development projects designed according to a comprehensive methodology (the so called RUBA methodology, integrated by 11 determinants, 23 prerequisites and 48 indicators with fixed weights to evaluate projects) are certified by the GPEDUIS and receive the qualification as DUIS, thereby becoming eligible for the basket of incentives managed by each of the departments involved in the GPEDUIS. This acts as the positive incentive to foster responsible planning and land development.

By the end of 2011 there are 8 developments that have been certified as DUIS, amounting to 338,240 homes, with 1'355,500 beneficiaries, an estimated investment of \$74,000 million MXN on an area covering 9,260 hectares. Eleven other projects are undergoing analysis, they would imply another 202,657 sustainable housing units, with 810,228 beneficiaries and an area of 6,637 hectares developed at an approximate cost of 43,600 Million MXN.

d) Housing NAMA

Mexico has published the world's first Nationally Appropriate Mitigation Action (NAMA) in the housing sector in November 2011⁷, intended to promote the use of energy-efficient appliances and sustainable building design, and foster technology up-scaling to make new homes increasingly efficient as the program develops. The NAMA concept is based on the whole-house approach, not focusing on isolated energy efficiency and renewable energy measures in housing, but rather in performance. The NAMA has designed three levels of energy efficiency and renewable energy for standards housing units in the different climatic areas in Mexico: **Ecocasa I, Ecocasa II and PassivHaus Level.**

Worldwide experience shows that performance-based systems are more cost-effective, as they enable housing developers to choose the most appropriate means to achieve emission reductions vis-à-vis a baseline. The NAMA includes an evaluation tool, the MEEP, based on the Passiv House Planning Package (PHPP) from the Passiv Haus Institut. The program is based in large

⁶ SEMARNAT, SENER, SEDESOL, CONAVI, BANOBRAS, INFONAVIT, FOVISSTE and SHF. (www.duis.gob.mx for more info)

⁷ http://www.conavi.gob.mx/documentos/publicaciones/4_Supported_NAMA_for_Sustainable_Housing_in_Mexico.pdf

part on European and International norms and is a design tool for low-energy consumption buildings. This calculation tool has been evaluated with detailed simulations with measured and monitored results of hundreds of buildings. This tool is being adapted to the Mexican case and will be the basic tool for the proposed program. Table 1 shows the estimated GHG emissions reductions to be achieved by each of the three benchmarks in the four considered climate zones.

Table 1. Annual emissions avoided in a 40m² house by building type and climate zone, tCO₂

Single & Row House	Hot & Dry Climate	Hot & Humid Climate	Temperate Climate	Semi-Cold Climate
Eco Casa 1	2.0	2.0	0.8	0.8
Eco Casa 2	2.7	3.5	0.9	0.8
Passive House	3.0	4.0	1.0	1.0
Vertical (multi-family)				
Eco Casa 1	1.7	2.0	0.9	0.8
Eco Casa 2	2.2	2.7	1.2	1.0
Passive House	2.6	4.0	1.2	1.1

Source: Passive House Institute

The NAMA is a tool for the Mexican Government to scale up existing efforts in terms of market penetration and level of efficiency, as well as to concentrate scattered efforts towards a common goal to reduce GHG emissions and shift towards a more sustainable urban growth pattern. The proposed Program with SHF will be an integral part of the NAMA, providing direct investment in performance-based energy efficient projects in Mexico's housing sector.

Under the NAMA framework, donors and investors can target their support towards specific activities that align with their development priorities and Mexico's needs. The NAMA provides a vehicle to attract and leverage additional international funding to support sustainable development in Mexico, both directly (homes with a certain efficiency standard) and indirectly (capacity building).

e) Other efforts

There are a number of initiatives that are currently being developed in Mexico such as:

- **Housing Sustainability Index (ISV):** VESAC is a public-private association that is working towards a more sustainable pattern in housing developments. It is composed by the lead housing developers in Mexico as well as by INFONAVIT, CONAVI and SHF. The Centro Mario Molina, a well renowned R&D Institution serves as the technical core expert institution and is developing a Housing Sustainability Index from the social, economic and environmental perspective that is currently being tested in selected housing developments around the country.
- **Program of Activities (POA):** The World Bank, through its Partnership for Market readiness, is working with CONAVI to present a POA for its validation by the UNFCCC and obtain carbon credits for energy efficiency and renewable energy measures in housing. The Program of Activities will be developed with the ultimate goal of promoting

sustainable development and, in particular, a sustainable use of energy in the housing sector in Mexico. The Program, based on an initiative by CONAVI called “Programa específico para el desarrollo habitacional sustentable ante el cambio climático” (“Specific program for the sustainable development in housing in a changing climate”), aims to promote sustainable development through the implementation of technologies and design measures that translate into a more sustainable use of energy in the housing sector, therefore reducing greenhouse gas emissions. It is expected the PoA will be operationalized through policy and financing instruments intended to facilitate the adoption of green measures in the housing sector in Mexico and to alleviate the gap between available finance and the funding needed to facilitate large-scale access to green measures in new and existing housing.

- **The German Technical Cooperation Agency (GIZ) and the German Federal Ministry for the Environment (BMU)** are strong partners with Mexico in the field of sustainable energy and buildings. Their focus is on local development, technical support to the design of instruments and structuring of the regulatory framework. GIZ is strongly supporting INFONAVIT in the SCV, CONAVI with the NAMA and other related activities.
- **The Government of Canada** has been financing the piloting of so called “Net Cero” housing projects, an energy-efficient housing pilot project in Mexicali, and is actively contributing to the design of the NAMA’s MRV System. The focus of the GoC’s cooperation is on mitigation.
- **World Bank’s Partnership for market readiness:** The PMR objectives are to (i) provide grant funding and technical assistance building market readiness components; (ii) pilot and test new concepts for market-based instruments; (iii) provide a platform for technical discussions, South-South exchanges, and collective market innovation; as well as (iv) create and share lessons learned and best practice. The Partnership brings together a group of developed (11) and developing countries (15, including Mexico), as well as other key experts and stakeholders. The PMR-supported activities are country-specific and build on each country’s initiatives to meet nationally-defined priorities. The PMR-supported activities can include (i) assessment and preparations; (ii) work on technical market readiness components such as MRV (monitoring, reporting and verification) systems and a registry of carbon emissions assets; (iii) work on policy components (e.g. setting goals and preparing legal and regulatory frameworks; (iv) institutional components; and (v) piloting of market instruments, such as scaled-up crediting instruments based on NAMAs. Through its participation in the PMR, Mexico seeks to identify and assess the various options for: establishing a registry platform/tracking tool, and selecting the NAMAs deemed best suited for further elaboration for a scaled-up a crediting mechanism. In the framework of the PMR, Mexico (through CONAVI) is elaborating a NAMA in the urban sector that can be supported by a crediting mechanism. This instrument is currently being defined.

Optional Document 2

Technical Cooperation Activities of the “ECOCASA” Program

1. Background

- 1.5 The general objective of the ECOCASA Program is to contribute to the reduction of GHG emissions in the residential sector in Mexico. This will be achieved by providing financing for housing developers to build housing projects that meet GHG reduction goals established by the Program as well as mortgages that follow CONAVI’s sustainability criteria. The TC program envisages: (i) to develop and implement, building on the existing efforts, simulation, rating, inspection, and monitoring procedures addressing the thermal performance, water usage, accessibility (location) and building material lifecycle aspects of houses; (ii) to strengthen the capacities of the housing industry and housing finance institutions for the financing and construction of low-carbon housing through the provision of bridge loans to housing developers, as well as technical studies and training opportunities; (iii) to disseminate knowledge on low-carbon housing among the public, industry, universities, and government institutions at the national and local level, and (iv) to provide inputs to support the development of public policies for low-carbon housing.
- 1.6 The immediate outcome of the program will be the construction of houses with lower lifecycle GHG emissions (including both the construction and the lifetime stages). In addition to this, it is expected that the program will provide additional, long-lasting benefits to the housing sector in Mexico, as (i) the Program will be an integral part of the NAMA Program, joining targeted efforts with the relevant actors in the housing sector and contributing to the mainstreaming of sustainability criteria in the housing industry ; (ii) more municipal and state governments will be able to incorporate sustainable housing tools into their housing and urban policies; (iii) more financial intermediaries will offer financial products designed in accordance with the particularities of sustainable houses; (iv) an increasing number of home buyers will be aware of the long-term benefits sustainable houses provide, and (v) the housing industry will have a better knowledge about improved architectural and building approaches and techniques.

2. Components of the Technical Cooperation Activities

- 2.1 The ECOCASA Program includes an array of technical cooperation activities to be executed in three stages (see below). These activities can be divided in four categories:

Component 1: Improvement of the Simulation capabilities:

- 2.2 The TC will contribute to the enhancement of the simulation data and capabilities regarding the performance of sustainable buildings in Mexico. The activities will serve two main purposes: (a) to enhance the performance of the simulation model that has been developed by Infonavit (DEEVI) and (b) to provide new information to feed future additional criteria for the ECOCASA Program and other related initiatives.
- a) The activities will enhance the DEEVI system by (i) improving its thermal performance module including new climate and building material data (in particular, climate data based on forecasts that consider the effects of climate change), (ii) including

a model that represents the ownership and use of air conditioning and heating devices, and (iii) including the carbon reductions related to the lifecycle of building materials. The adaptation of the manual for Mexican users will also be financed.

b) Technical studies will be developed (i) to determine the three GHG emission factors of water in the housing sector (water supply, water heating, and bottled water supply) and to establish the potential for reducing GHG emissions by reducing water consumption in the sector; (ii) to establish the relationship between the location of Housing developments in Mexico and the indirect emissions due to transport that they produce taking into account data from Mexican cities. Case studies on the carbon footprint of housing developments in urban areas related to transport will also be conducted in the framework of the improvement of the simulation efforts.

Component 2: Design and Implementation of the Monitoring and Evaluation Tool:

- 2.3 In the framework of the NAMA, the Passive House Institute (PHI) is currently developing an adaptation to the Mexican context of their PHPP tool (Passive House Planning Package) to support the Initiative of INFONAVIT to launch an “Green Housing Rating System” (SiViVe), led by INFONAVIT in close coordination with the relevant Housing agencies in Mexico and with support from the German technical Cooperation Agency GIZ, the German Ministry of Cooperation BMZ , the British Embassy, The Government of Canada, as well as several consultancy firms. The SiViVe will provide a system to “label” housing projects according to their level of environmental performance. Both the SiViVe and the NAMA will use a software tool called DEEVI (Energy Efficient Design for Housing, in Spanish DEEVI) that will be available tentatively in July 2012.
- 2.4 The TC package will finance the design and implementation of a Monitoring and Evaluation System in close coordination with the initiatives being undertaken by CONAVI in the framework of the “**Inter-institutional Working Group for Sustainable Housing**” (an informal gathering of the stakeholders in housing policy). The TC will finance the installation of monitoring devices in selected pilots and control groups to reliably obtain the data regarding: (i) the consumption of water and electricity in approximately 2,400 houses, annually, over a period of 4 years (**Basic NAMA Monitoring**); (ii) the temperature, energy performance and other selected variables in approximately 200 houses one year after the start of the Program, to serve as a calibration and reassessment method for the program, together with a household survey (**in depth, short term Monitoring**), and (iii) a final **impact evaluation** 5 years after the first year of implementation of the Program, to evaluate the impact of the program regarding CO₂ emissions, savings in utilities and level of comfort of the beneficiaries.
- 2.5 The surveys will be designed in order to obtain gender-disaggregated data on: (i) socio-economic conditions of the household; (ii) habits of consumption of electricity and water; (iii) characterization of the housing devices (appliances, shades); (iv) usage of the house; (v) perceptions about comfort, and (vi) decision-making for house buying.

Component 3: Knowledge Management and Training

- 2.6 This component includes several activities to build the capacity within SHF and among the beneficiaries and the developers, as well as to raise awareness among the general public of the benefits of energy and resource efficient homes.
1. **Training courses** by international experts to SHF and housing developers, focusing on South –South Exchange, to foster the exchange of knowledge and the sharing of best practices in sustainable housing. A workshop on the Passive House concept will also be provided to SHF and developers in order to familiarize them with the highest standard of the NAMA Program.
 2. **Design of the inspection process for SHF Inspectors.** The strategy will define the inspection procedures to include in the monitoring of the works that SHF currently performs within its structure in order to include specific indicators, take into account the necessary timeframe of the ECO-CASA and train the inspectors in the technical aspects of the ECO-CASAS.
 3. **Assessment of the economic benefits** of low-carbon housing, and a study on the design of enabling policy, regulatory, and financial instruments
 4. **Municipality/State Level Policy Development:** Resources will be channeled to provide Housing Institutes and Municipalities with training regarding the possible change in building codes and municipal- and state level regulations to enforce sustainability principles and implement energy efficiency policies at the local level.
 5. **Communication Strategy,** which will focus on the differentiated target groups and highlight different aspects of the Program. SHF will publish **educational materials** aimed at buyers of the houses for the use and maintenance of environmental technologies, including technologies such as cross ventilation. The manual will include general information about the average energy savings associated with each of the environmental technologies according to Infonavit estimates available. The manual will be launched in the first half of 2013, coinciding with the launching event. **The Launching event** will be organized together with KfW and SHF to present the Program to the relevant housing institutions and developers not included in the Program. **Media material will be** to be prepared as part of the diffusion efforts.

Component 4: Program Management

- 2.7 The TC will finance a Technical Team to support SHF in the activities related to the Management of the Program, Coordination with IDB and SHF, technical review of products of the Technical Cooperation Activities and Supervision of Monitoring efforts. The structure of the team is yet to be defined, as it will depend on the needs of the program as it is implemented, but it will be tentatively be composed of: (i) one Senior Specialist in Energy Efficiency, Sustainable Housing and Simulation and (ii) two Junior Program Manager to lead the overall implementation of the Program in the short and medium term.

3. Structure and resources of the Technical Cooperation Activities:

- 3.1 The technical cooperation activities will be implemented in three tranches:

ME-T1202¹ (Stage 1): This TC aims to support the preparatory and initial activities of the ECOCASA Program. The resources for this technical cooperation were approved by the CTF TFC on May 2nd, 2011 (USD 265,000).

ME-T1201 (Stage 2): This TC will support the implementation of the Program in the first 4 years. The resources will be granted by the CTF, in the framework of the submission of the proposal of the ECOCASA Program (USD 1,600,000).

TC (TBD) (Stage 3): this TC will support the Evaluation and long-term monitoring of the Program and will be developed upon construction and delivery of the first ECOCASAS (tentatively in 2015) (USD 400,000).

A. Indicative Budget and timeframe:

	Stage 1*	Stage 2	Stage 3	TOTAL
Simulation	145,000	225,000	0	370,000
Monitoring	0	460,000	400,000	860,000
Knowledge Management and Training	30,000	625,000	0	655,000
Management +Travel	90,000	215,000	0	305,000
Others	0	75,000	0	75,000
TOTAL (USD)	265,000	1,600,000	400,000	2,265,000

* Resources for Stage 1 have already been approved on May 2011 (see paragraph 3.1 above).

¹ IDBDOCS#36837367

Mexico CTF-IDB “Ecocasa” Program

ME-L1121

Fit with CTF Investment Criteria

FIT WITH MEXICO’S INVESTMENT PLAN

The CTF is one of the two Climate Investment Funds (CIF), a collaborative effort among the Multilateral Development Banks (MDBs) and countries to bridge the financing and learning gap between now and a post-2012 global climate change agreement. The Clean Technology Fund (CTF) has received pledges for nearly USD 4.8 billion. Through the CTF, countries, the MDBs, and other partners agree upon country investment plans to provide scaled-up financing for public and private sector projects that contribute to the demonstration, deployment, and transfer of low-carbon technologies with significant potential for greenhouse gas (GHG) emission reductions. The CTF is governed by a Trust-Fund Committee (TFC), with representatives of the donors and the recipient countries. The World Bank is the Trustee of the funds and hosts the administrative unit. CTF financing is channeled through five MDBs, including the IDB, which was designated Implementing Entity on June 8, 2010. The MDBs participate in the governance of the funds through the MDB Committee.

Mexico’s CTF Investment Plan was presented by the Government of Mexico to the CTF for approval, and endorsed by the CTF TFC on January 27, 2009. The CTF IP is a “business plan” agreed among, and owned, by the Government of Mexico for the International Bank for Reconstruction and Development (IBRD), the Inter-American Development Bank (IDB) and the International Finance Corporation (IFC) to provide support for Mexico’s low-carbon policy objectives. The multi-year business plan outlines the strategy, sectors, and objectives to be implemented and co-financed by the three MDBs. The IP includes USD 200 million of concessional CTF resources for IDB programs aimed at scaling up renewable energy (RE) and energy efficiency (EE) investments. A first IDB program, approved in November 2009, included USD 50 million for financing private sector RE projects, as well as a number of technical cooperation (TC) activities. The second program, Mexico CTF-IDB group Energy Efficiency Program, Part I, was approved by the CTF board in May 2011. It promotes scaling up the supply of EE financing products and services by local financial intermediaries (LFIs) in Mexico, by providing them with the financial, knowledge and TC needed to develop necessary knowledge and build a track-record of such investments. The third program was approved in October 2011: the Renewable Energy Financing Facility, which combines resources from CTF, IDB and NAFIN, a national development bank, to finance RE power generation plants. The fourth program, described herein, seeks to enable SHF, a national development bank, to support its clients (LFIs) and housing developers, in building energy-efficient houses.

POTENTIAL FOR GHG EMISSIONS SAVINGS

The housing sector has a number of direct and indirect GHG emission impacts:

- First of all, the way houses are built will determine the energy consumption during the house’s lifetime. For example, building a house with better thermal insulation will reduce the amount of

energy that its inhabitants will require in heating, ventilation and air conditioning (HVAC), in order to keep the house within comfort conditions.

- The building materials and techniques used for building a house lead to GHG emissions related to both the use of energy and the industrial processes involved. Therefore, GHG emissions can be reduced by choosing materials and techniques with a low lifecycle GHG footprint.
- The use of water in houses leads to indirect GHG emissions related to the pumping, transport, heating, and treatment of water and wastewater. The use of water saving devices can therefore indirectly lead to GHG emission reductions.
- Lastly, the location of houses has an impact on the transport needs of its inhabitants during its lifetime. By improving the location of a house vis-à-vis the transport needs (e.g. a more central location), the GHG emissions related to transport can be reduced.

In its first stage, the “Ecocasa” Program seeks to reduce GHG emissions due to the first item on this list, namely, the emissions related to the use of energy by the house’s inhabitants. In order to enable SHF to consider the other three items on the list at a later stage, tools will be developed with the support of several technical cooperation activities. Following a conservative approach, when assessing the GHG emission reductions that the program is expected to produce, only the emission reductions related to the use of energy by the house’s inhabitants will be considered.

Simulation software programs are available to forecast the thermal performance of a house as a function of its layout and the thermal and air-tightness characteristics of the building materials and accessories. The Housing NAMA published by the government of Mexico (GoM) includes calculations on the GHG emissions of a baseline house and three different types of low-carbon houses: Ecocasa1, Ecocasa2, and Passive House. These calculations were made with the Passive House Planning Package (PHPP) developed by the Passive House Institute (PHI) in Germany.

The GHG emission reductions to be achieved by the Program were calculated building on the NAMA simulations. Given the concessionality of the resources to be transferred to the developers via bridge loans, it is estimated that the first houses to be built with the bridge loans provided by the program would be more efficient than the Ecocasa1 houses, and during the implementation of the Program the level of efficiency would be moving toward the Ecocasa2 level. In addition the following assumptions were made:

Variable	Value	Remarks
House lifetime	40 years	
Temperature range	The standard range (20° to 15°C) was used for both the baseline and efficient cases	
Coefficient of performance for air conditioning equipment	2.5 for both the baseline and efficient cases	This value may be conservative: In many regions of Mexico, especially in the North, many people get second-hand devices with lower CoP values (usually illegally imported from the United States). If such low-efficiency devices are used, the GHG emission reductions produced by architectural improvements would be higher

Correction for air conditioning and heating use	Energy use for HVAC was multiplied by the percentage of households that own air conditioning or heating devices (for the corresponding state/region and income level) ¹	
Appliances	The standard appliances assumed by the NAMA for the baseline are also assumed for the efficient case	
Distribution of bridge loans among regions	<ul style="list-style-type: none"> • Hot and dry: 60% • Hot and humid: 25% • Temperate: 7.5% • Temperate cold: 7.5% 	The program's main focus will be on the hot regions of the country, where the effects will be higher
Distribution among house types	<ul style="list-style-type: none"> • Adosada: 33.3% • Aislada: 33.3% • Vertical: 33.3% 	These are the three house types defined by the NAMA: <i>Adosada</i> (terraced house, or townhouse), <i>aislada</i> (detached house), and vertical
Reinvestment of resources on bridge loans	It was assumed that the concessional loan resources would be invested a total of 4 times	

To note, many of the variables on the table above (such as the percentage of households that will purchase an air conditioning or heating device) are subject to uncertainty. We have made an effort to make the best estimations, on the basis of the available information. The monitoring and evaluation component of the program will enable assessing to what extent the reality deviates from the forecast, and a feed-back will be provided to adjust the simulation procedures.

According to these assumptions, 43,000 efficient houses would be built, and the emission reductions (including CTF, IDB, and KfW loans) would be **1.63 million metric tons of CO₂e**.

COST-EFFECTIVENESS

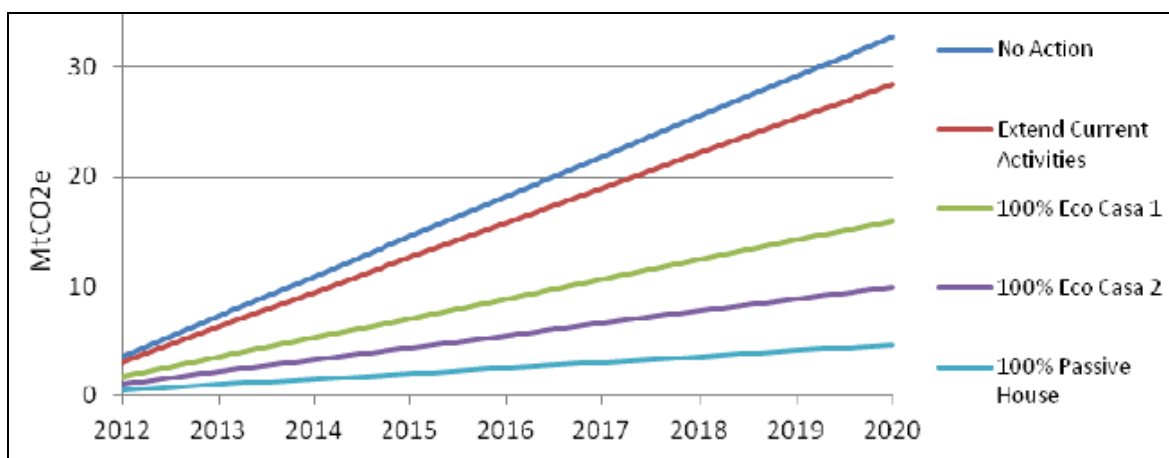
The unit abatement cost of CTF resources is USD 32 per ton of CO₂e (USD 125 per metric ton of CO₂e for the total Program resources).

DEMONSTRATION POTENTIAL AT SCALE

Scope for avoided annual GHG emissions. Taking into account demographic growth rates, it is estimated that Mexico will need to build more than 7 million new housing units by year 2020. By simply continuing the current activities in the housing sector, these houses would contribute 28.5 Mt CO₂e per year. By shifting towards the Ecocasa1 efficiency level, 12.5 Mt CO₂e of emissions would be avoided every year. And by shifting to the Ecocasa2 level, emission reductions would be 18.5 Mt CO₂e/year (see Figure 1).

¹ Survey data from the National Statistics Institute (INEGI): National Survey on Household Income and Expenditure (Encuesta Nacional de Ingresos y Gastos de los Hogares, ENIGH), <http://bit.ly/ENIGHmex>.

Figure 1: Emissions from newly built houses under the different efficiency levels set in the NAMA



Source: *Supported NAMA for Sustainable Housing in Mexico – Mitigation Actions and Financing Packages.*

Transformation Potential. The Ecocasa Program, together with other activities linked to the implementation of the Mexican Housing NAMA, is expected to contribute to the transformation of the housing market in several ways, including (i) by raising public awareness on the benefits of low-carbon housing; (ii) by disseminating knowledge about low-carbon housing among the developers and financial institutions; (iii) by improving the simulation models’ ability to accurately forecast ex-ante the energy consumption and GHG emissions of houses, and (iv) by supporting the development of an enabling policy framework, including local building codes, and the policies and programs of federal housing sector institutions.

Due to these factors, it is expected that: (i) whole-whose simulation-based rating systems will be trusted by house buyers; (ii) house buyers will be ready to pay more for low-carbon houses, recognizing their long-term benefits; (iii) local financial institutions will provide adequate mortgages, and (iv) public policies will internalize the social benefits of low-carbon housing, and provide additional incentives.

Due to the combined effect of these factors, it is expected that the market will evolve at least towards the Ecocasa1 efficiency level in the medium term. Further progress (up to the highest “passive house” standard) may be possible with additional international climate finance.

DEVELOPMENT IMPACT

The Ecocasa Program’s most important impact is a development impact: It will enable low-income households to either make savings in their energy bills, or improve their living conditions (by improving the comfort of their homes):

- In the case of households that lack air conditioning or heating devices (even in the hot regions of the country the majority of low-income households lack air conditioning), the benefits of the program will be in terms of improved comfort. Living in an uncomfortable home is one of the symptoms of energy poverty, and improving comfort is one way of combatting poverty. Since women use to spend more time than men at home, they will benefit more from the improvement in comfort.
- In the case of households that own air conditioning or heating devices, the program will lead to savings in their energy bills.

The program will also have development impacts on the national economy, namely: increased energy security, and reduced expenditure in energy subsidies.

It should be stressed that, since climate change models foresee an increase in temperatures in the hot areas of Mexico, the construction of low-carbon housing contributes to increasing the resilience vis-à-vis climate change. This project contributes therefore to both climate change *mitigation and adaptation*.

Poorly located houses result in increased expenditure in transportation, but also in a loss in quality of life, as dwellers spend a considerable amount of time in transportation, and are exposed to more stress, accidents, and pollution. As it is expected that the program will incentivize in the medium term more accessible locations, it would also contribute to mitigating these negative effects.

IMPLEMENTATION POTENTIAL

As explained in paragraphs 1.9 and 1.10 of the Proposal for Operation Development, a number of initiatives by Mexico's Government agencies engaged in housing have been aimed at improving the sustainability of Mexico's housing stock. These include the *Esta es tu casa* subsidy program of the National Housing Commission (CONAVI), the *Hipoteca verde* (green mortgage) program of the National Institute for the Workers' Housing Fund (INFONAVIT), and the Integral Sustainable Urban Developments (DUIS) Program, led by the Federal Mortgage Society (SHF).

The already strong political interest in Mexico on low-carbon housing was further fuelled by the 16th Conference of the Parties to the UNFCCC that was held in 2010 in Cancun. In particular, a sustainable housing initiative was launched by the GoM and private sector representatives.

At the 17th COP in Durban, South Africa, Mexico launched its Housing NAMA proposal. A number of development agencies (including German, British, and Canadian agencies) are currently participating in a broad effort convened by the GoM around the NAMA. CONAVI has created an Inter-Institutional Sustainable Housing Working Group, in order to coordinate the existing initiatives and find synergies in pressing topics such as monitoring and evaluation, training and capacity building, and pilot projects. IDB and KfW are participating in this working group, in order to ensure an adequate coordination between the Ecocasa Program and other similar efforts.

Timing is also opportune to address sustainability of the building sector. Due to the recent global recession, the building construction sector is suffering a severe lack of financing in Mexico. Builders and the financial intermediaries that are financing construction are therefore highly receptive to any new terms (such as efficiency requirements) that may be attached to available finance. It is now possible, therefore, to have a significant and lasting impact on the sector in terms of setting higher standards for building efficiency.

In order to cater for the unattended sectors SHF has among its goals in 2012 to support the revival of lending to developers, to continue providing financial solutions for non-affiliated workers and to continue introducing microcredit and self-production products.

The IDB has cooperated intensively with SHF over the years, helping the GoM to contribute to a more inclusive and efficient mortgage industry. In particular, the first three operations under the current CCLIP credit line, amounting to USD 1.5 billion, provided an important and timely support to the sector through SHF, supporting its countercyclical role in the aftermath of the financial and economic crisis of 2008-2009. In terms of TA actions, the Bank financed the improvements in the Public Registries and, with resources from the Spanish Fund, the evaluation and supervision of the DUIS.

From a technical and operational point of view, SHF will use its existing infrastructure and systems without modification. The Program will finance a Program Coordinator to assist in the implementation of the program and to ensure an efficient and effective interaction among SHF, IDB and KfW. It will also support SHF to carry out the Monitoring and Evaluation activities. Insofar as the developers are concerned, the experience shows that they have the required capacity to take their projects from the blueprint to the operating stages, and many companies are actively interested in low-carbon architecture.

ADDITIONAL COSTS AND RISK PREMIUM

Despite the achievements of INFONAVIT's *Hipoteca Verde*, there is a general lack of awareness about the benefits of sustainable housing, and therefore in general house-buyers are not willing to pay more for these houses. In addition, there are currently no financial mechanisms that encourage developers to build sustainable housing beyond the inclusion of some specific technologies covered by the current programs of CONAVI and INFONAVIT. In order to introduce the NAMA's "whole-house" approach, concessional financing and technical assistance are needed. The provision of bridge loans with concessional rates will set incentives for the developers to construct over time more and more energy efficient houses through the gradual incorporation of energy-efficient design features, and eventually lower-carbon building processes and locations.

GENDER ISSUES

The Ecocasa Program is related to several relevant gender issues. In particular, women and men (i) use the house in different ways; (ii) have different perceptions about the benefits of efficient homes; (iii) play different roles in the decision making process of buying a house; (iv) may require different information for making a decision to buy a house, and (v) may take different times to make financial decisions.

The monitoring and evaluation system of the Program will assess the differences in uses, times, perceptions, and decision-making roles. Finally, as part of the financial policy development study to be carried out, gender issues will be considered when developing appropriate communication strategies and financial mechanisms for low-carbon housing.