

## GREEN MORTGAGE PROGRAM INFONAVIT - MÉXICO

### 1. PROJECT NAME AND LOCATION

The Green Mortgage Program applies to all cities in which Infonavit formalizes credits within the 32 states of Mexico.

It's worth mentioning that the Institute formalizes between 475 and 500 thousand credits a year. It is attached a table with credits formalized with Green Mortgage per State during 2011.

Credits formalized under the Green Mortgage Program		
FEDERAL ENTITY EXERCISE	FORMALIZED TOTAL	GREEN MORTGAGE TOTAL
AGUASCALIENTES	8,136	7,030
BAJA CALIFORNIA	25,652	22,150
BAJA CALIFORNIA SUR	3,456	2,565
CAMPECHE	2,434	2,085
CHIAPAS	5,119	4,587
CHIHUAHUA	18,416	15,356
COAHUILA	19,444	16,565
COLIMA	3,623	2,836
DISTRITO FEDERAL	18,504	12,383
DURANGO	5,124	4,493
GUANAJUATO	23,320	20,385
GUERRERO	3,605	2,924
HIDALGO	9,860	8,719
JALISCO	40,398	34,202
MEXICO	43,956	36,070
MICHOACAN	9,948	8,904
MORELOS	6,601	5,410
NAYARIT	3,596	2,867
NUEVO LEON	53,902	45,109
OAXACA	1,617	1,284
PUEBLA	13,871	11,998
QUERETARO	13,279	11,243
QUINTANA ROO	14,672	12,340
SAN LUIS POTOSI	8,803	7,328
SINALOA	11,928	10,029
SONORA	18,621	16,232
TABASCO	5,680	5,091
TAMAULIPAS	20,768	17,975
TLAXCALA	2,107	1,652
VERACRUZ	18,397	15,887
YUCATAN	10,314	8,700
ZACATECAS	2,849	2,416
<b>Resultado total</b>	<b>448,000</b>	<b>376,815</b>

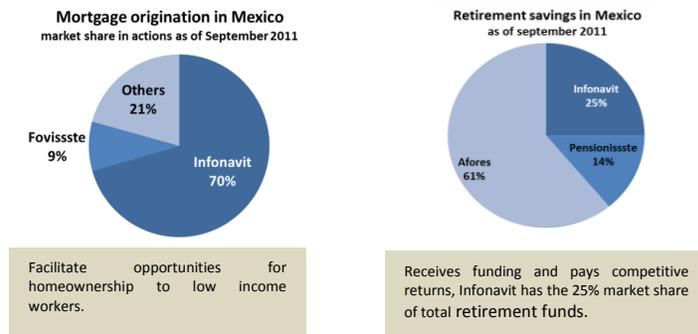
### 2. ORGANIZATION MAKING THE SUBMISSION

Infonavit was founded in 1972 by constitutional mandate, is an autonomous institution in which the corporate government includes equal representation of:

- **the labor sector** (the working sector)

- the employer sector and
- the Federal Government

Has a dual nature in the Balance sheet: as a Social Mortgage lender (assets) and as a Pension Fund (liabilities) both are the axes from which all action takes off in Infonavit, which is also a **Fiscal authority** for collection of mortgages and contributions.

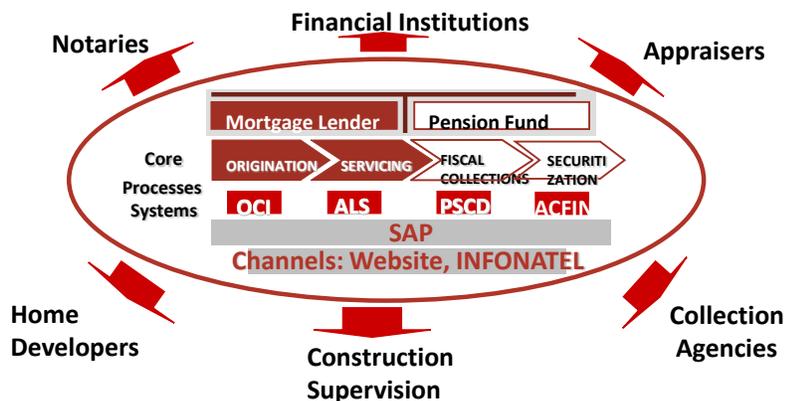


For its projects development and the making of its activities, Infonavit has **4,000 workers** and operates through a nationwide network in Mexico's 32 federal entities Originates directly to borrowers without intermediation of banks, financing companies or brokers.

In order to ensure that the nearly **19,000 people that work for our suppliers**, have the skills and attitudes of the Infonavit Culture, a series of courses have been created, to encourage a better performance of the suppliers that makes an impact on our users satisfaction. The topics that these courses embrace are: vision, mission, values, culture of excellence, social orientation, internal control practices and code of ethics.

### Operating Model

Infonavit operates the credits administration, however, is supported by outsourcing services, with notaries, financial institutions, appraisers, collection agencies, construction supervision and home developers.



As mentioned, Infonavit is a social financial Institution with the double mandate of administrating the resources of the Housing National Fund (Fondo Nacional para la Vivienda) and operating a financing system which allows the workers to satisfy their housing needs.

The mission, vision and targets of Infonavit are the following:

### Mission:

- To contribute to the welfare of our workers and their families, by upholding the obligations toward social responsibility that have been entrusted to us:
- Making lending products accessible to them, as well as information allowing them to make the best decision to meet their housing needs and to develop family equity according to their interests,
- Promoting the creation of sustainable and competitive residential spaces that generate social wellbeing, in order to develop more human and harmonious communities,
- Enhancing the knowledge of workers and their families on issues of savings, lending, wealth and retirement, and to promote a culture that prioritizes living in communities that generate social wellbeing and added value,
- Offering returns on savings to improve their purchasing power and retirement planning.

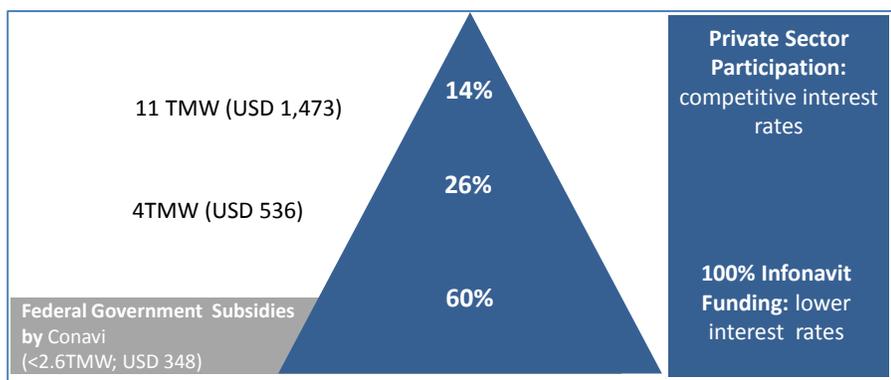
### Vision:

Through a tripartite foundation and institutional autonomy, we will contribute to the progress of Mexico, serving as the institution that embodies the efforts of workers to grow their family equity and welfare by financing their housing needs in a sustainable environment, in order to develop their individual and community potential, thus improving their quality of life.

### Institutional Objectives:

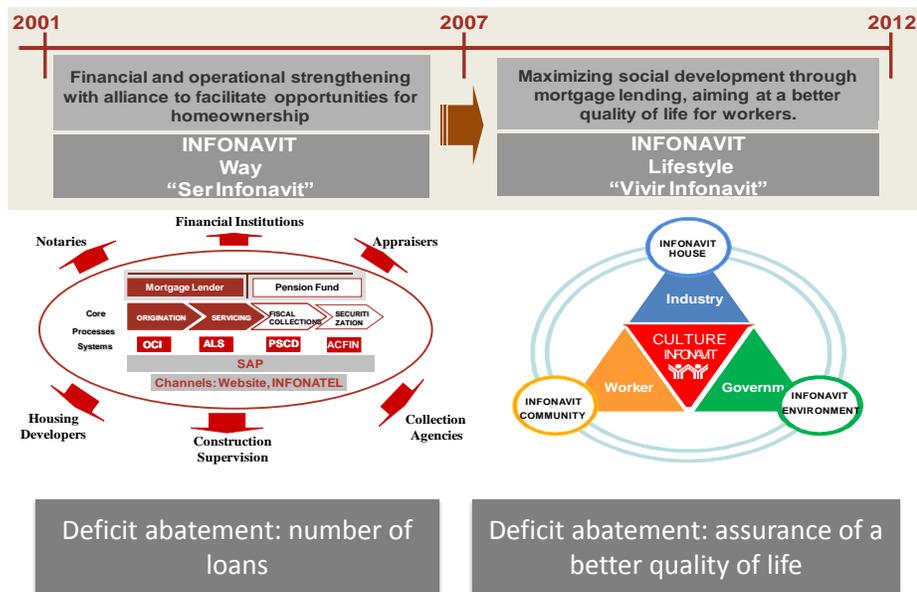
- To be able of generating social welfare in competitive and harmonious communities,
- To provide financing to meet the housing needs of workers, beneficiaries and borrowers,
- To improve the quality of life of our beneficiaries within a sustainable environment in which they can fully develop their potential as individuals and citizens,
- To provide beneficiaries with competitive returns on their savings.
- To ensure long-term financial viability.
- To increase resources available in support of workers.

Infonavit serves mostly low income workers (<4TMW), lending them at low interest rates and supporting this lending by competitive rates coming from higher income workers lending.



From **2001 to 2007**, Infonavit's administration focused its efforts mainly to financially strengthen the institute, make transparent its operations, make its processes more efficient and to create a cultural transformation of its employees oriented towards the excellence in the service, all to better serve the high demand for housing due to the lack of housing supply and the mortgage market.

Since **2008**, the institute, having achieved the previously mentioned objectives, refocuses its efforts to provide a better quality of life to its right holders and credit holders through financing for them, not only a home but a patrimony by which they can find the social, environmental and economic conditions favorable to develop and improve their quality of life creating sustainable surroundings, houses and communities.



### Quality of life: Key initiatives

- Housing
  - **Green-mortgages:** 668, 962 between 2007 - 2011
    - During 2011 we formalized 376, 815, the 75% of originated loans.
    - Since 2011 all of the originate loans must be green mortgage.
  - **Digital homes:** internet access to most of funded houses.
    - Facilities for borrowers who earn less than 4TMW to get a computer
  - **Beyond Banking Award 2010** by IDB for Green-mortgage program
  - **UNDP** gave a recognize in 2011 for the green mortgage program about the better practice for the Heater Solar Water Application.
  - Rating A+ by the Global Reporting Initiative (GRI)
  - ECUVE index measures the housing elements that contribute the most on quality of life
- Environment
  - **Municipal competitiveness assessment program**
  - 118 municipalities participating
  - 62 have already got the Basic degree of Sustainability
  - Property Taxes Program: 6 municipalities participating (Cajeme, Hermosillo, Nogales, Tijuana, Mexicali y General Zuazua).
- Community
  - **Neighborhood organization:** labor competency standards of the local professional promoter.
  - **Property taxes program**
  - Mandatory course prior to credit application
  - Boys & Girls Club and Community centers

The civil association **Housing and Sustainable Environment** was formed in order to create the Ecological Footprint of Housing in Mexico, which will assess the environmental performance of housing projects.

### Further Opportunities for INFONAVIT

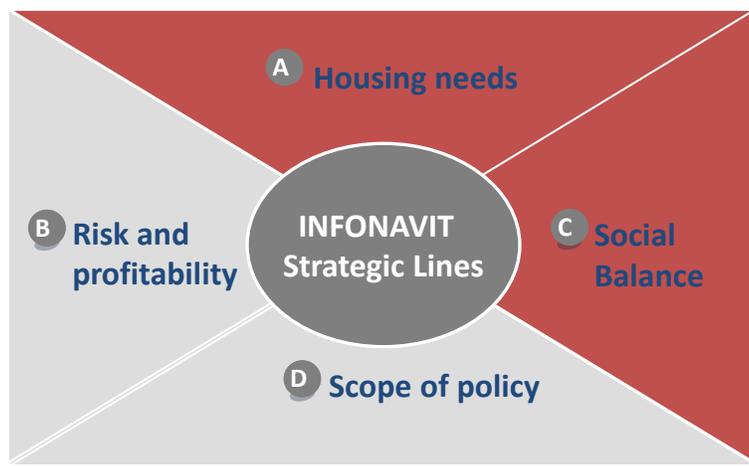
**INFONAVIT’s strategy over the following ten years must respond to several points:**

Significant reduction on the number of households affiliated with basic housing needs:

- There are still ~ 3.3 million affiliated households with housing needs,
- 1.4 million of them lives in substandard housing

### Meeting the housing needs of currently underserved segments:

Serving members who do not qualify under the current model and new segments, INFONAVIT could have a greater impact on the housing needs of Mexico.



### 3. PROJECT CONTEXT

**Green Mortgage is an integral strategy that emerges from the need to offer to our credit holders a better quality of life by promoting sustainable housing development.**

Mexico like the planet in general, is suffering the climate changes consequences, same that affect significantly our society and we can view it on the high pollution levels as being one of the 12 more polluted countries in the world.

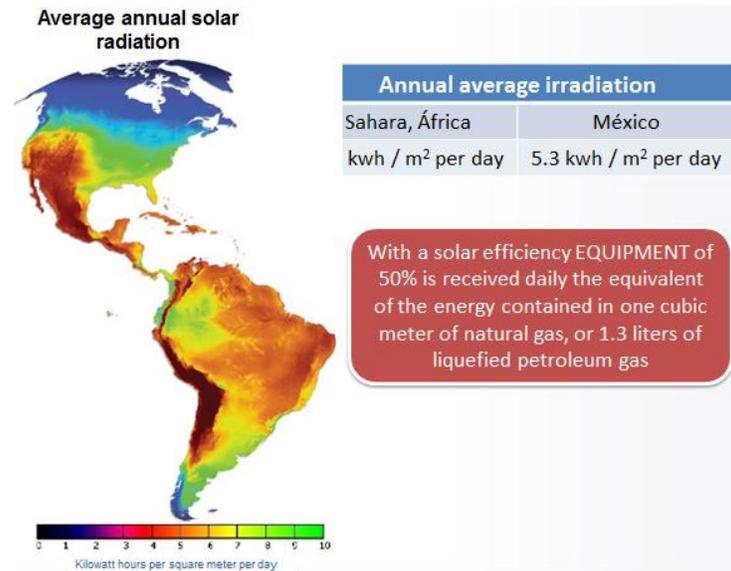
Thus, there is a serious crisis in water supply as a result of besides the climate change effects that has increased the drought periods, due to the absence of public policies that encourage the treatment and reuse of this important resource, as well as the lack of awareness to give a proper use from the users. It is important to mention that the 60% of the homes of low income workers do not have water meters so the municipalities charge fixed fees.

In the field of energy, Mexico is the first lp gas consumer, same that is used for both coking and water heating, being one of the most polluting products between those used for this same purpose in the world.

Regarding to electricity, derived from in large part of Mexico prevails a warm zone, electricity consumption is too high in cities located in this area because higher temperatures reach 45 ° C during periods of summer , leading to bigger use of air conditioning, and in cases of low-income people are often energy-inefficient equipment. There is a significant population of this level that due to lack of resources sacrifice their comfort zone substantially because of the inability to access such equipment or count on thermal materials and bioclimatic design homes.

It should be noted that Mexico is located in a geographic area with significant solar radiation than before the Green Mortgage program was not exploited nor was there a program or public policies provided for their use.

## Solar Thermal Energy



On the other hand, the great impulse that was given to mortgage loans once Infonavit strengthened, providing all workers primarily for those with low income the opportunity to obtain a home and this demand led to a major construction industry, however, the construction methods for the design and materials were not the most efficient according to bioclimatic zones of this country, so that there are very cold in winter and very hot in summer houses, with high electricity consumption.

*Therefore designing a program like Green Mortgage whereby it is recognized in advance the worker's savings in family expenses generated by the use of environmental technologies and also supports the optimized use of natural resources and renewable energies, also represents for Infonavit the commitment to improve the quality of life of our accredited support to policies of climate change mitigation and encourages a culture of respect for the environment.*

Below is a table showing the environmental technologies that are financed within the program:

ELECTRICITY	WATER
SAVING LAMPS (COMPACT FLUORESCENT LAMPS)	ECOLOGICAL LEVEL TOILET 5 LITRES MAXIMUM
COMBINATION OF SAVING LAMPS (COMPACT FLUORESCENT LAMPS) AND AIR CONDITIONING	ECOLOGICAL LEVEL SPRINKLER WITH INTEGRATED SAVING DEVICE
REFRIGERATOR	WATER SAVING DEVICES VALVES IN BATHROOM SINKS
ROOF THERMAL INSULATION (WITH NOM MX 460)	WATER SAVING DEVICES VALVES IN THE KITCHEN
WALL THERMAL INSULATION ON	ISOLATING VALVES
ROOF REFLECTIVE COATINGAS FINAL COAT	FLOW CONTROL VALVE FORWATER SUPPLY PIPE
WALL REFLECTIVE COATINGAS FINAL COAT	HEALTH
POWER SAVER BY VOLTAGEOPTIMIZATION	PURIFIED WATER FILTERS
GAS	AT HOME PURIFIED WATER SUPPLY
SOLAR WATER HEATER WITH FLAT INSTANT GAS BACK UP	WASTE SEPARATION. CONTAINERS (IN THE HOUSEHOLD)
SOLAR WATER HEATER WITH VACCUM PIPES WITH INSTANT GAS BACKUP	
FLAT SOLAR WATER HEATER WIITHOUT BACKUP	
SOLAR WATER HEATER WITH VACCUM TUBES WITHOUT BACKUP	
GAS INSTANT WATER HEATER	
GAS WATER HEATER	

#### 4. PARTNERSHIPS WITH OTHER ORGANIZATIONS

For *Green Mortgage* program design and planning, as well as for its development and definition of technical aspects in terms of efficiency, Infonavit summoned and coordinated both, governmental and nongovernmental organizations related to the subject.

For the definition of eco packages to be incorporated into the homes according to the bioclimatic zone as well as for savings analysis each one of them would generate (data necessary to calculate the minimum and maximum amounts to finance and their amortization periods) and standards consideration that should be complied in terms of quality and efficiency it was worked in coordination with the following agencies:

- *Comisión Nacional de Vivienda (CONAVI)* Housing National Commission. Is the regulator of housing in Mexico and the one which establishes the public policies to follow in the field.
- *Organismo Nacional de Normalización y Certificación de la Construcción y Edificación, S.C. (ONNCCE)* Ruling and Certification of Building and Construction National Agency.
- *Comisión Nacional del Agua (CONAGUA)* Water National Commission. It is the water regulator organism in Mexico.
- *Asociación de Empresas para el Ahorro de Energía en la Edificación, A.C. (AEAEE)* Business Association for Energy Saving in Buildings.
- *Comisión Nacional para el Uso Eficiente de la Energía (CONUEE)*. It is a regulatory agency on the matter.
- *Asociación Nacional de Fabricantes de Aparatos Domésticos (ANFAD)* National Association of Domestic Appliances Manufacturers.
- *Universidad Nacional Autónoma de México (UNAM)*.

For the **definition** of bioclimatic areas, we rely on the National Institute of Ecology/ Instituto Nacional de Ecología, SEMARNAT, CONAGUA, UNAM, Institute of Meteorology/ Instituto de Meteorología, CONAVI, CONUEE, among others.

*Developers* (home builders) are the actors with whom Infonavit worked to implement the program, implementing eco-technology in their homes to offer.

*The National Housing Commission/ Comisión Nacional de Vivienda* is an important strategic partner to promote the implementation of this program as from 2009 the President of the United Mexican States, Felipe Calderon Hinojosa, established as a policy the requirement that all homes that are purchased with a subsidy from the Program "This is Your House" implemented by the institution and that will be formalized with a credit granted by Infonavit, had a *Green Mortgage*.

*Standardizing and certifying agencies/Organismos Normalizadores y Certificadores*. To ensure quality, efficiency and safety of the equipment as well as the agile incorporation of new ecotechnologies, Infonavit works with these agencies which issue the certificate of compliance with quality and efficiency standards of equipment.

*Enervalia*, a consulting firm expert in energy efficiency projects, monitoring, measurement and evaluation, hired by Infonavit to perform the tasks assessment and verification the consumption savings, return on investment, savings in water m<sup>3</sup> kw/h CO<sub>2</sub>emissions reduction well as assessments of user satisfaction.

#### ***Green Mortgage also has the support of international partners resource sharing and advisory.***

The *German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU)* which counts with funds used for the "*International Initiative on Climate Protection*" through the **GIZ**, signed a "Collaboration Agreement" with Infonavit in May 2010, by which the GIZ provides a total subsidy of 2.5 million Euros through the 25,000 solar Roofs Program, in order to encourage the use of solar water heaters reducing approximately 20%

of equipment costs to borrowers and encourage their use and reducing 161.250 tons of CO2 to the environment. Up to now there has been an advance of 11.369 subsidies.

The **GIZ** has also supported by consulting on best water heating and photovoltaic practices and technical specifications. It played an important participation in the development of new technical specifications for the current Solar Water Heaters. Has also participated with resources in the development of the installation of training workshops on Solar Water Heaters and coordinates with Infonavit the certification of such equipment installers.

It supported with resources and advice a study on energy efficiency and alternative solutions in social housing currently built in Mexico, same that has been used as a base for the housing rating system project in terms of energy and solar efficiency Infonavit is developing along with this agency.

**USAID**, Independent Federal Agency responsible for planning and managing economic and humanitarian assistance outside the United States worldwide, helped with resources for the implementation of a practicing laboratory (implementation ecotechnologies in already inhabited housing) to analyze new environmental technologies regarding efficiency, consumption and quality, acceptance of the beneficiaries and proven results before uploading them to the Green Mortgage catalog.

*Distributors of Environmental Technologies for Individual Housing Market.* Ecotechnologies suppliers for homes already built and offered in the individual open market that were not registered by developers in the Housing National Register.

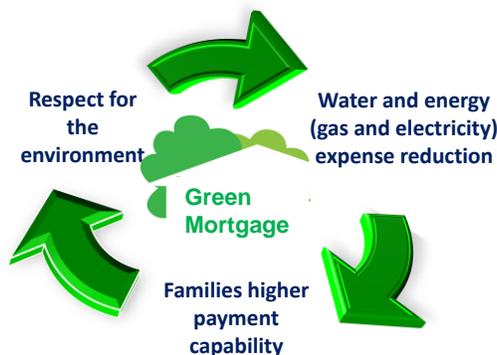
### **Financing**

Regarding financing, the development of *Green Mortgage* Program systems and management, Infonavit provides all the resources and is the project leader, who sets the guidelines, policies and controls for operation and implementation.

## **5. PROJECT DESCRIPTION**

Infonavit committed to **quality of life** of their accredited, the **care of natural resources** and **respect for the environment**, generated the **Green Mortgage Program**.

It creates a **virtuous circle** by: providing an additional amount of credit for workers to acquire homes with environmental technologies that help borrowers to reduce their expense for energy and water consumption while reducing the CO2 emissions that pollute the environment.



This seeks in matter of environmental, culture, savings, health and comfort impact, the following:

**Environmental impact:** To promote the incorporation of new and improved eco-techniques that are more efficient and environment friendly.



**Culture:** To encourage Green Mortgage as an instrument of cultural change towards sustainability.

**Savings:** To promote eco-technologies that impact more in reducing consumption and at lower cost.

**Health:** To promote the use of technologies that contribute to the health of the borrowers and their families and also that optimize and secure the use of better environmental practices.

**Comfort:** To promote the placing of eco-technologies that provide comfort and welfare of accredited and their families within the housing they live in.

### Program Implementation:

Savings Assurance: To grant this additional amount the Institute established that the amount of environmental technologies installed per home should generate a minimum saving of \$215.00 pesos.

This minimum saving was determined for the segment of low-income workers up to 4 TMW (Times Minimum Wage), this is between 138 and 552 dollars a month. This program was directed from 2009 to 2010 for lower income workers for being 60% of our rightful and it was important to demonstrate that if the economically disadvantaged segment could be a successful program in other segments of workers with higher wages, there would be no problem. The results of those two years were excellent, benefiting in this period to 251, 726 families. From 2011 extends the benefit of this program to all beneficiaries of the Institute.

GREEN MORTGAGES YEARS 2007, 2008, 2009, 2010, 2011	
CONCEPT	FORMALIZED CREDITS
<b>2007</b>	
With Subsidy	
Without Subsidy	593
<b>Total</b>	<b>593</b>
<b>2008</b>	
With Subsidy	34
Without Subsidy	1,097
<b>Total</b>	<b>1,131</b>
<b>2009</b>	
With Subsidy	67,468
Without Subsidy (*)	37,930
<b>Total</b>	<b>105,398</b>
<b>2010</b>	
With Subsidy	81,512
Without Subsidy (**)	64,816
<b>Total</b>	<b>146,328</b>
<b>2011</b>	
With Subsidy	91,475
Without Subsidy	285,340
<b>Total</b>	<b>376,815</b>
<b>Green Mortgage total</b>	<b>630,265</b>
Individual Open Market and ecological	38,693
<b>Green Mortgage + eco home Total</b>	<b>668,958</b>
(*) In addition there are more than 15,382, ecological homes without GM	
(**) In addition there are more than 23,311 ecological homes without GM	

In order to assess the savings from eco-technologies and ensure the greatest benefits to the accredited, with the equipment that had the biggest impact on their consumption, eco-technology packages were established for each bioclimatic zone established by the National Ecology Institute as we see in the box below:

Ecotechnologies from Green Mortgage			
Ecotechnology	Semi-cold weather	Temperate weather	Warm weather
Saving valves	X	x	X
Shutter releaser sprinkler	X	X	X
Double discharge valve WC	X	X	X
Low consumption lamps	X	X	X
Solar water heater	X	X	
Instant water heater			X
Roof thermal insulation	x		X
higher insulation wall insulation			X
Air conditioning			x

**Ecotechnologies selection criteria:**

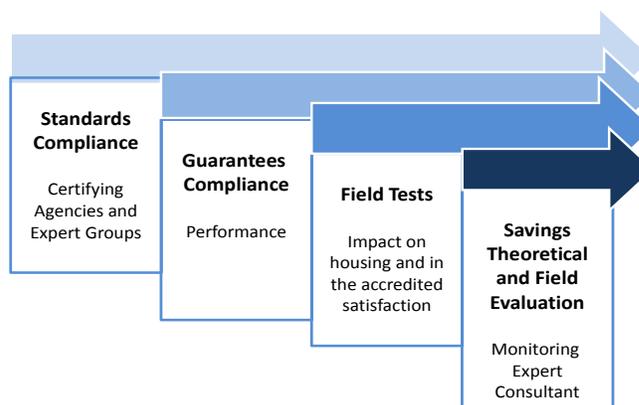
- Quality and Safety
- Water and energy consumption efficiency
- Warranties and useful life

These three criteria are measured by requiring certificates of compliance, where we are told the level of efficiency that has each one of them. These certificates are issued by the Standardization Agencies and certifiers approved by the General Standards Bureau, a government institution.

**Return on Investment:**

Through an analysis of the Price / Amortization by housing type (economic, traditional and co-financing), and bioclimatic zone in which it is going to be implemented. This analysis is done by the outsource consulting firm once we have the certification and efficiency, considering we cannot finance eco technologies that have a return on investment exceeding 5 years.

The validation process is the following:



The dynamism in technological development constantly incorporating new environmental technologies in the market caused the risk of not taking advantage of more efficient equipment due to lack of Mexican standards or technical specifications, for this reason and derived from the fact that standardization agencies and certification in Mexico are authorized to develop standards and test protocols to evaluate the equipment, Infonavit signed a **Cooperation Agreement with the National Housing Commission (CONAVI) and the Agencies for Standardization and Certification of Products (ONNCCE, ANCE, and NORMEX CNCP) to issuing technical opinions on environmental technologies that contribute to sustainability in institutional housing programs.**



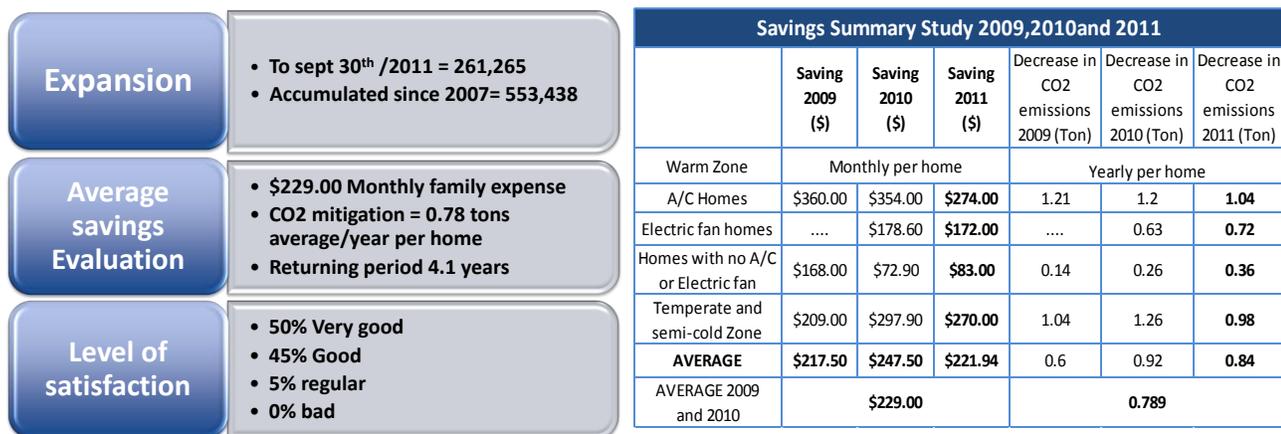
This agreement target is:

- To ensure the homologation of test protocols between the certifying agencies for environmental technologies to be financed by Green Mortgage
- Establish the terms of collaboration to make transparent the process of agencies participation in the products and systems certification to be incorporated into CONAVI and INFONAVIT programs.
- To ensure the lightening of the development of protocols in the absence of the standard for the regulation of a new product, and make the follow up regarding quality of companies and products.

For the implementation of this project It was considered in the first stage from 2009 to 2010 to be conducted only in new homes that were built by developers that register their bid on the National Register of Housing, to which were invited to participate voluntarily offering their homes with eco-technologies packages already installed, from which the installation is verified by the site supervisors authorized by the Institute. Once the house is already completed and endorsed by the supervisor, it can be offered to the beneficiaries of the Institute and when the credit is formalized the developer get paid the mortgage on the house plus the additional amount of eco package called Green Mortgage.

In order to verify the expected savings generated by the eco-technology packages, a consulting firm expert in the field was hired, to this day there have been 4 semester evaluations in which we can observe in addition to savings in household spending, kWh, water m3 and CO2 emissions avoided, the satisfaction of the accredited, consumption habits and customs, quality of facilities and equipment, building materials among others.

### Summary of monthly savings proven by the evaluation of the expert company



### Accumulated Savings Equivalencies from 2009 to May 2011

**Water: 34,081,475 m3** required to supply during a year 199, 248 homes a year with water saving devices. Toluca has inhabited homes 188.948s.

**Electric Energy / Electricity: 393,181 MWh** required to illuminate 327, 651 homes for one year with saving lamps. In Quintana Roo, there are 330.147 inhabited houses

**Gas: 479,967 MWh** needed to supply for one year 324.351 homes a year with solar and instant water heater. The Borough Gustavo A. Madero has 320.210 inhabited houses.

## Strategy 2011

### Mandatory for all loans and flexibility in the selection of ecotechnologies:

During 2009 and 2010 we could see the savings generated by each technology, bioclimatic zone and wage segment, which we already had the tools to launch as a mandatory basis to all loans granted by the Institute starting in 2011, likewise in order to raise more awareness to the borrowers by the savings generated, it was authorized that each right holder will select the ecotechnologies to incorporate into their homes according to their needs of saving and consumption, provided that they comply with a saving determined by salary segment and the amount to grant is in accordance with their ability to pay.

Income	Minimum amount of savings required	Green Mortgage Additional Credit
Lower than 6.99 TMW	\$215.00	Up to \$ 17,468 (10 minimum wages)
From 7 to 10.99 TMW	\$290.00	Up to \$26,202 (15 minimum wages)
From 11TMW forward	\$400.00	Up to \$43,670 (25 minimum wages)

### Simulator

To achieve this we have designed a **Green Mortgage simulator** that provided to the right holder to choose the ecotechnologies that will allow meeting the monthly savings established by income level and considering the bioclimatic zone in which the home is located.

In this simulator you can enter your income data, the city where you live and the type of home you are purchasing (vertical or family) thus the simulator tells the bioclimatic zone where your home is, the approximate maximum amount granted of Green Mortgage at that income level to which you belong, and displays a catalogue of ecotechnologies that can be selected already in a package to meet the required saving or the list of those where you can choose the ecotechnologies and will give you the amount of savings each one of them generate and since you have complied with the saving, shows you the total cost of the same.

View the simulator in <http://201.134.132.145:82/simuladorHVWeb/home/simulador.jsp?entrada=T>



**Simulador de Hipoteca Verde 2011**

Esta herramienta le permitirá conocer el ahorro mínimo mensual a cumplir de acuerdo a la capacidad de pago del solicitante de crédito, y elegir las ecotecnologías. Para ello debes proporcionar los siguientes datos:

Tipo de oferta:	<input checked="" type="radio"/> Derechohabiente del Infonavit	Salario mensual:	<input type="text"/>
Prototipo vivienda:	CASA SOLA	Edad:	-Seleccione--
Estado:	GUANAJUATO	Por favor escribe la siguiente palabra tal como se muestra.  <input type="text"/>	<input type="text"/>
Municipio:	SALAMANCA	Si no puedes visualizar los caracteres prueba con otra palabra	<input type="text"/>
Zona bioclimática:	TEMPLADO SECO	Ahorro mínimo mensual a cumplir:	Monto aproximado para ecotecnologías:



**Green Mortgage Simulator 2011**

This tool will allow you to know the monthly minimum saving to comply according to the payment ability of the credit solicitor, and choose the ecotechnologies.

Therefore you must give the following data:

Offer type	Infonavit right holder	Monthly wage	
Home prototype		Age	
State		Please write the following word exactly as it is shown	
Borough		If you cannot visualize the characters, try with <u>another word</u>	
Bioclimatic zone		Monthly minimum saving to comply:	Approximate amount for ecotechnologies:

### Permanent updating technologies.

With the previous scheme where there was only one authorized package of ecotechnologies that could be installed by bioclimatic zone, it was very hard to incorporate new technologies because they had to make the application to various committees and government agencies. With this new scheme, It was permitted the fast and permanent updating catalog of ecotechnologies program participants.

### Distributors of Environmental Technologies for Individual Housing Market.

Derived from that from 2011, all new and existing homes should incorporate Green Mortgage, it became necessary to establish the mechanism for the assurance of the supply of eco-technology to existing homes or new that Infonavit beneficiaries purchase with an owner of individual market(referring to the sale of new or used house made not by a developer in large volume but for a low- volume housing builder, or by a particular) because until 2010 as mentioned above only new homes built by developers were being financed with Green Mortgage.

Before implementing the Green Mortgage in Individual Open Market we noted that there were no market dealers that sell and install each and every eco-technology as a whole but that its marketing was very sparse. There were water equipment dealers, but did not sell solar water heaters, for example, which was a challenge to equipment supplying and that the accredited could not be sent to different stores to acquire eco-technologies and also for Infonavit it was a problem to control the payment of such equipment and ensure they complied with performance certificates. For this reason and in order to make a more worker friendly and with the Institute itself, we promoted the development of a new distribution market: vendors who have an inventory of all environmental technologies, that distributed and installed them, for which we negotiated with them as an incentive for early direct payment by Infonavit, which was a very good negotiating point for the recognition of the seriousness of the Institute.

At the time we have over 43 contracts with providers who have ability to trade at a national or regional level, assuring that the supplying and installation of efficient and quality equipment achieve savings on family expense and in CO2 emissions.

The list of suppliers and of environmental technologies they offer, is published on the internet Infonavit webpage [www.infonavit.org.mx](http://www.infonavit.org.mx)

These providers should fulfill among others, the following requirements requested by Infonavit:

- Deliver together with the environmental technology a copy of the document that ensures the compliance with the standard or with the DIT issued by the appropriate agency, in case of that the equipment does not have a label certifying its efficiency.

- Instructions with technical and installation specifications of each environmental technology offered to the beneficiary.
- Equipment warranty and customer support service center list.
- The installation of the equipment that require specialized manpower such as solar heaters or toilets.

### **Total of granted credits**

Since 2007 start date of the pilot program in the State of Mexico, **668, 958 green credits were granted** which represent the same number of accredited benefited plus their families members which in Mexico for most of them are formed by an average of four people. This number includes loans **38.693** exercised during 2009 and 2010 that were not financed with a green mortgage, for not having all required environmental technologies but with saving bulbs, all water equipment, water heaters and some eco-technology instant joint as a treatment plant, rainwater harvesting and photovoltaic lighting, that's why we consider them green credits.

**Total of Green mortgage loans granted 630.265.**

*The Green Mortgage program is permanent in its application and is in continuous improvement and as mentioned, from 2011 applies to all loans financed by Infonavit and followed up to take control and care of opportunity areas for improvement actions as is the certification of installers of solar water heaters in order to ensure their proper functioning.*

We are constantly adding new environmental technologies, which generates that also are being created new standards and testing protocols to ensure quality and efficiency, also creating new jobs and investment.



### **Towards where are we going**

**Green Mortgage program continues and extends to a new challenge**, are being carried out analysis and measurement over constructive design and as a future project we contemplated to implement a rating **system for housing in energy efficiency and environmental matter**, which are expected to be implemented by the end of year.

This system will take into account 3 components:

- Energy consumption
- Water consumption
- CO2 consumption

For evaluation are considered 3 parameters::

- Home architecture
- Constructive Systems and materials
- Incorporated Ecotechnologies

Expected benefits:

<b>Country</b>	→	Creating homes and communities in harmony with the environment. encourages the setting of standards for energy efficiency and environmental impact
<b>Infonavit</b>	→	Potential of the Green Mortgage. The system allows the efforts targeting and incentives, and establishing standards of energy efficiency and environmental impact
<b>Right holders</b>	→	More information to the person entitled to buy his/her home. Economic savings as a result of the decrease in gas, water and electricity bills
<b>Industry</b>	→	The system allows you to give added value to homes. Competition is encouraged and rewards the developer who makes the effort to improve energy and environmental performance

## b) Financial Information

As for the costs generated by human resources, adaptation of systems and planning, are not quantified because Infonavit destined one of its areas to carry out by exploiting resources it already has.

Resources for Green Mortgage financing are the same as Infonavit has under its management same that come from the National Housing Fund, which brings together contributions by law that employers must provide to the employee as a benefit to acquire a home. The purpose of the creation of Infonavit was the administration of those resources. For this program is contemplated to continue for now only with Infonavit resources, which uses a percentage for its administration of the fund mentioned.

**The economic flow generated by the total mortgage loans arranged with green mortgage is as follows:**

**The amount includes the total mortgage lending plus the green mortgage.**

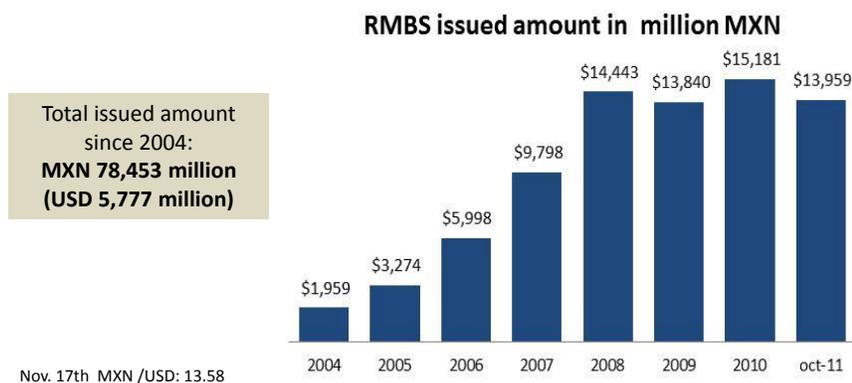
	Credits	Economic Flow	Average
2009	105,398	19,966,054,633.88	189,434.85
2010	146,328	29,943,155,843.99	204,630.39
2011	376,815	104,805,430,009.60	278,134.97

## Infonavit Source of funding

As mortgage lender and fiscal authority, INFONAVIT's main sources of funding are:

- **Payroll contributions** (~36% of cash flow)
- **Loan amortizations** (~52% of cash flow)

In addition, since 2004 INFONAVIT has a RMBS issuance program that increases its sources of funding, representing around **12% of total revenues**.



### c) Social aspects

In this program, the participation of beneficiaries is that they choose eco-technologies to incorporate in their homes according to their need for savings in water consumption and energy. Have begun to develop an awareness of the benefits of the Green Mortgage concerning environmental culture and use of natural resources.

As support a comic book was developed to train people in these areas and was made. a video On the other hand, to spread the program were published posters (400), diptychs (200,000), web pages, video, informational signage.



<http://www.youtube.com/watch?v=A9fhHTzkNfs>

[http://www.youtube.com/watch?v=WvHkk\\_n7how](http://www.youtube.com/watch?v=WvHkk_n7how)

### d) Environmental and economic aspects

The Green Mortgage program has generated a favorable environmental and economic impact. With the use of environmental technologies that finances are cared of natural resources, and therefore the environment and so it benefits the family budget and promotes job creation (so far not quantified) by the push to strengthening suppliers in terms of number of offices to install, or people to hire to properly serve the existing demand. To this it must be added these products manufacturing industry /environmental technologies which in addition to looking for skilled workers include engineers, designers, researchers, etc. To improve and efficient the product design and operation as well as strengthening and /or development of marketing and promotion departments.

It also has prompted the search for higher quality products generation by establishing as mandatory the standards certification. Currently in HV cannot be bought products that do not have the required quality.

**The Green Mortgage is an effective sustainable instrument to promote:**

- Saving and Awareness in the efficient use of resources
- Partnerships for Climate Change Mitigation
- Incentives policies of efficient use of technology rather than consumption subsidies

- Clean technology development and a new industry.
- Efficient and capital gain building designs
- marketing tool in the marketing of housing
- A better quality of life to society.

## 6. BARRIERS ENCOUNTERED

Among the main barriers the program has faced and passed, are:

The lack of standards to regulate the quality and efficiency of the new products because as previously mentioned, by being pioneers in implementing sustainability in low-income housing, Infonavit was forced to be more creative as to how to implement it, make alliances for technical analysis for the use of environmental technologies as well as ensuring of eco supplying. For example, suppliers of solar water heaters which were improving their product and service offered.

Another barrier was the lack of standardization among the protocols of certification agencies and rulers to the development of tests in the absence of standards, a barrier that was waged by the agreement signed between them which were mentioned in previous sections. The consensus with regulatory agencies achieved that quality regulations that do not impact on the cost of the products, were established because 66% of the right holders segment to serve is a very low income one.

The lack of environmental awareness in society, initially was opposed to the program because it suggested that the resources should be destined to other projects.

The adaptation of the systems, and convincing Infonavit authorities to implement a project of environmental respect a barrier more to jump, since the Infonavit's objective was mainly financial. The program was authorized because it was demonstrated the benefit that low-income right holders would have those that were paying high costs both for comfort and economic for housing construction inefficient materials like concrete. Also pointed out that the irregular supply of water generated by the crisis has been deteriorating the quality of life of our accredited.

Education in the maintenance of equipment is a barrier that we are bypassing through videos and comics, however, we believe that there are still areas of opportunity to attend to reach a larger population.

## 7. LESSONS LEARNED

The Green Mortgage program has stimulated the quality and improved technical specifications to fulfill through the certification of saving products installed in homes as well as the establishment of new standards and specifications, changes in the marketing and distribution.

At the beginning of the program was not known the reach of institutions or sectors this would impact on its implementation, for example, there were not invited to participate all of the certifying agencies only worked with one, the risk that generated was that different protocols were used and that there were different specifications for products in terms of efficiency and affect the accredited, which was solved with the signing of the approval previously commented.

The volume of credits which formalizes the Infonavit is a major attraction for eco-technology manufacturers and suppliers who generate significant pressures to be referred in the program, trying to level off at Infonavit specifications, quality or, put bans on certain products have proved their efficiency by affecting interests of some of them. In Infonavit we have been able to deliver these items by working with transparency in a very coordinated way with standards agencies and regulators, associations of manufacturers and suppliers, academics and experts, avoiding that the decision-making is seen as discretionary of Infonavit.

## Assurance of the ecotechnologies supply

At the beginning of the program when setting up the ecotechnology packages for bioclimatic zones, it was requested the certification of all products, however, in terms of solar water heaters did not have the capacity by the laboratories responsible for testing to attend the demand for equipment to be certified, this taught us that we should do so gradually additions in those cases presented similar conditions.

Give wider dissemination to ecotechnology users so they know their equipment, benefits, use and maintenance of those, to ensure life.

With the flexible Green Mortgage, we found that people have increased their satisfaction with the use of environmental technologies and also create a greater awareness and number of people who buy their homes by the savings they generate these environmental technologies, than when aligned to pre-established packages.

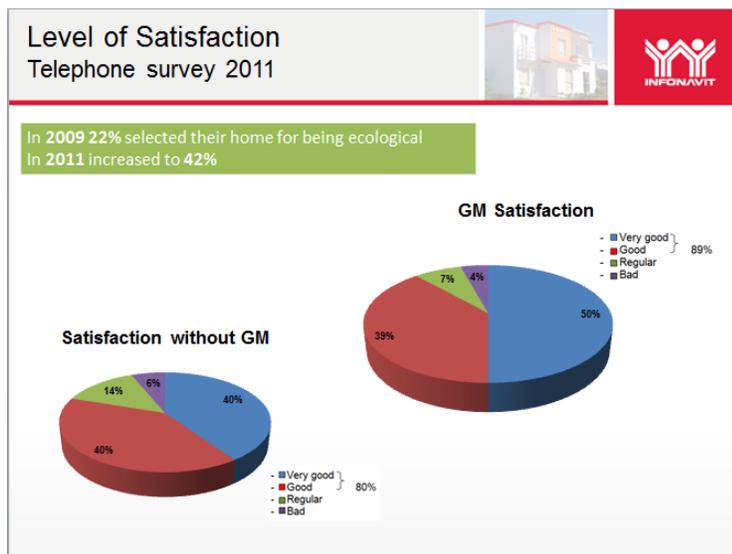
## 8. INNOVATION AND IMPACT

The first innovative feature of the project was the design of the scheme to recognize the increase in worker's ability to pay, savings generated by the eco-technology to provide a credit for its acquisition.

***Once the scheme was ready, the greatest innovation was that the incorporation of environmental technologies would be in greater number in all the houses for low-income workers that are more difficult that they agreed to them because of the lack of resources as well as knowledge of their benefits and environmental awareness.***

Integrate into a single program to all the institutions involved: academic rulers, government and industry to work coordinately for the same purpose was a job that required to innovate in the way of convincing and involving those who were by nature of their activity and and extent become part of it.

The impact consumption savings generated in the accredited that acquires a home under the Green Mortgage program, is without doubt the first reason why is looking for a home with these eco-technologies. Below are the results of a telephone survey conducted in October satisfaction 2011 that accredited housing were equipped with eco-technology.



Below are the savings in pesos with and without environmental technologies:

## Evaluation of Gas Consumption



More than 130 000 Solar Water Heaters installed since 2009. 256 certified equipment

93% no longer use gas in summer and 70% in winter

Average Monthly Savings = \$ 201.00

### Semiannual evaluation of savings by using SWT in Economic Home

Consumption	2009	2010	2011
Without Ecotechnologies	\$250	\$304	\$279*
With Ecotechnologies	\$59	\$79	\$91**
Saving	\$191	\$225	\$187

\*winter, less cold

\*\* bigger expense because of the increase of gas use

			Increase of gas price						
2002	2003	2004	2005	2006	2007	2008	2009	2010	2011*
2%	21%	10%	6%	18%	4%	4%	-5%	5%	4%

The **gas savings**, product of the Green Mortgage, **cumulative** to May 2011 is **479.967 MWh** necessary for **324.351 homes** per year with water heater instant and solar The Borough Gustavo A. Madero in Mexico City has 320.210 occupied homes.

## Evaluation of Electrical Energy Savings

Thermal Insulation and Saving Lamps



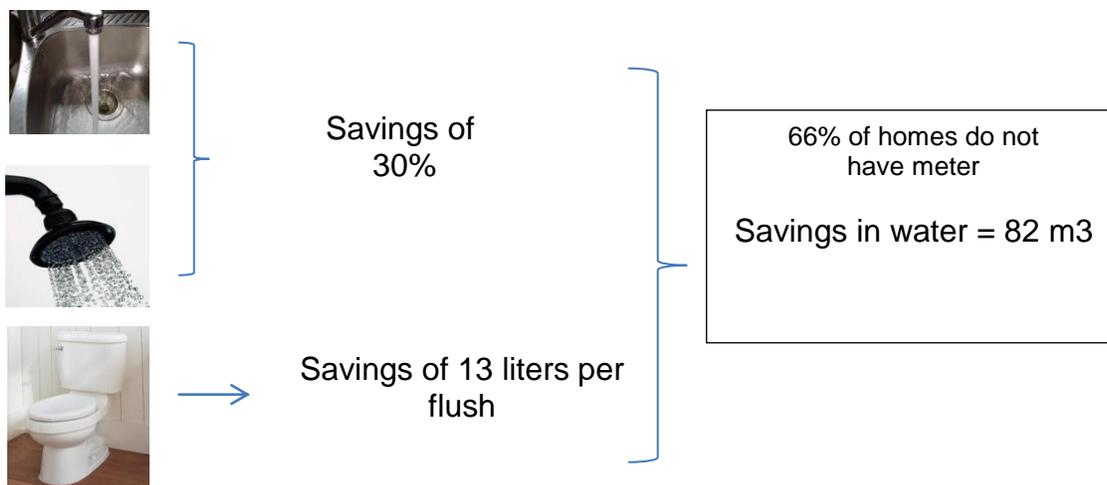
Monthly average saving \$ 206.00 pesos in an economic home

Consumption	2010	2011
Without Ecotechnologies	\$587	\$373
With Ecotechnologies	\$349	\$198
Saving	\$237	\$175

Electricity consumption without ecotechnologies		
Type of home	Temperate zone / semi-cold	Warm zone
Traditional	\$268	\$349
Co financing	\$570	\$774

The accumulated savings of Electric Power, have contributed to the saving of **393.181 MWh on electricity** in May 2011, equivalent to lighting **327,651** homes. In **Quintana Roo**, there are **330.147** occupied homes.

### Flow rates on housing



In **summer** the average monthly consumption of bottled water was 264 L equivalent to \$ 230.  
SUMMER \$230      WINTER \$107

The accumulated water savings in homes with Green Mortgage up to May 2011 is of **34.081475 m3** needed to supply **199 248 homes** a year with water saving devices. **Toluca** has 188.948 occupied homes.

The savings and benefits mentioned have caused in State & Local authorities good reactions and acceptance.

Currently we already have in the Federal District government, tax incentives for those who incorporate ecotechnologies in their homes. CONAVI, established as a condition for granting the subsidy, that homes have ecotechnologies.

It is being developed the commercial building rating system. In some States of the Republic is being analyzed the change of its regulations to incorporate eco-technologies in building regulations.

### **Field studies target:**

Starting from Enervalia's first study in each semiannual assessment has incorporated new indicators to be considered, in order to have more objective information of the house. As shown in the table below:

Target



To Analyze:

- Savings: \$, CO2, Kwh and M3
- Opportunity areas
- Recommendations, continuous improvement

959 visits performed

Target 2009

- Calculate savings obtained through eco-technologies
- Assess user satisfaction
- Ensure installation of eco-technologies

Target 2010

- Calculate savings obtained in other times of the year
- Assess user satisfaction
- Detect customs of users
- Study the condition of the equipment over time (durability)
- Identify areas for improvement and areas of opportunity
- To study the opportunity of incorporation of new eco-technologies

Target 2011

- Calculate savings from eco-technologies and satisfaction
- Identify uses and habits of users, and customs, areas for improvement
- Expand the representative sample of study
- Study the feasibility of incorporation of CSA in warm zones extremes
- GIZ supervision on CSA with German Subsidy
- Study homes of all socioeconomic sectors, new and used
- Analysis of appliances used
- Talks with industry, CCR, about outcomes of previous assessments



The savings generated by the eco-technologies in terms of household expenses, kW hours of energy and m3 in water and reductions in CO2 emissions.

The level of satisfaction of the accredited, awareness about the optimum use of natural resources and caring for the environment and a culture change from the providers to offer efficient and quality products.

#### Weaknesses

It is necessary to encourage more the culture in the maintenance and care of equipment as well as promote the certification of solar heater installers.

There is no capacity for larger volume and permanent monitoring due to lack of resources.

## 9. RECOGNITION

Having started the sustainability for our accredited in the lowest income segment, has been recognized internationally by several countries.

In September 2009, Mexico received the “Star of Energy Efficiency” award for its Green Mortgage program, a distinction given by The Alliance to Save Energy, a non-profit organization in Washington, D.C. that promotes energy efficiency around the world. The award was given to President Felipe Calderón Hinojosa, in acknowledgement of the work of the National Housing Commission (CONAVI) and the Institute of the National Workers Housing Fund (Infonavit) in promoting energy efficiency in housing for low-income workers.



Also the Inter-American Development Bank (IDB) recognizes the Infonavit Green Mortgage program, with one of its Beyond Banking 2010 awards. The objective of this award is to recognize environmental, social and corporate governance sustainability projects implemented by financial entities in Latin America and the Caribbean. The awards were launched in March 2010, and more than 120 proposals in eight categories were received. An independent committee of experts reviewed the proposals and selected the top three in each category. Finally, the contest was opened to the public through Internet voting, which named the Green Mortgage program the winner in the Planet Banking category with more than 16,000 votes, for its understanding of and response to global climate change.

An award given to Infonavit by the United Nations Development Program (UNDP), in under the XXXV National Solar Energy Week, held in the city of Chihuahua in October 2011 through the Transformation and the strengthening of Solar Water Heaters Market Initiative, such as Best Practice in the Application of Solar Water Heaters in the Housing category, for the Green Mortgage Project.



**Media** in which the Green Mortgage Program has been discussed through interviews with those responsible or by contributions or forum participation in 2011:

Hábitat	Finanzas Personales	Expansión
Diseño con contenido	Instituto Mexicano de	Núcleo Radio Mil
México al Día	Urbanismo	Al Consumidor
Mundo HVAC&R	Don Dinero	El Financiero
Canal 40	Excélsior	Consumo Inteligente
Notimex	Foro En Concreto	Revista del Consumidor
Mi Casa Sustentable	Consultorio Fiscal	TV Azteca
Reforma	Teorema Ambiental	

The project improves accessibility to an environmentally friendly home, it should be noted that Mexico is the first country that has managed to incorporate into housing for low-income workers efficient eco-technology, which has given us recognition and visits of leaders of these issues in countries like *Brazil, Chile, Colombia, Kenya, Canada*, among others, who want to implement it and ask us for advice

## 10. TRANSFER AND SCALING UP

This program was implemented nationally from 2009 in the low-income segment. Since 2011, it is mandatory for all loans that are financed by Infonavit in all cities and in all segments.

### **Adoption by other institutions**

In 2009, the program adds CONAVI as mentioned earlier for the homes that will be financed with a subsidy granted by the federal government.

The Housing Fund of the Institute of Security and Social Services for State Workers (FOVISSSTE), is on analysis to adopt this system.

Government officials from Latin American countries have visited us to know it, like Brazil, Panama, Guatemala and with increased interest, Colombia and Chile, who asked us to provide support for information about the program and its implementation, and have asked for formal talks.

#### *Barriers for transfer and scaling up*

A barrier to the continuity of the program can be the change of Federal Government Administration with which it can change the priorities and sustainability do not get as supported as during this administration.

Infonavit, to counteract this is working in coordination with civil institutions, governmental and nongovernmental organizations and academics with the aim that they could defend this program if necessary.

Another barrier to expand this program to the outside, is that the international financial crisis which we are facing, prevents the interested countries to implement and that the support of countries with green funds, withdraw from the market.

## **11. CONTACT POINT FOR FURTHER INFORMATION**

- Name of organization: Instituto del Fondo Nacional de la Vivienda para los Trabajadores
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- Telephone number: (55) 53226871
- Email address: [esgarcia@infonavit.org.mx](mailto:esgarcia@infonavit.org.mx) ; [bgarcia@infonavit.org.mx](mailto:bgarcia@infonavit.org.mx)
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- Name of contact person: Maria Estela García Heredia, Sustainable Housing National Coordinator And Beatriz Adriana García Vázquez, Promotion Manager