

Winner case study summary

EcoCasa, Mexico



EcoCasas in Hidalgo



Sra Martinez Hernandez outside her EcoCasa in Monterrey

“EcoCasa has shown how financial incentives for building developers can stimulate the growth of energy-efficient, affordable housing on a large scale. The model could be replicated far and wide, making the housing sector much more sustainable in Mexico and beyond.”

Ashden judging panel

The challenge

Mexico has a significant housing shortage with an estimated deficit of 9.6 million homes. Many of these are needed by families on low incomes. The urgent need for new housing could be the chance to improve energy efficiency in the housing sector, bringing lower bills and CO₂ reductions. However, neither housing developers with tight margins nor purchasers with low incomes can cover the extra cost of energy efficiency measures.

The EcoCasa approach

EcoCasa is a partnership between the Mexican National housing bank, SHF, and international banks IDB and KfW. The programme provides low-interest construction loans to developers to build ‘EcoCasas’ – affordable new

“My home stays cool in summer and warm enough in winter, without air-conditioning or heating”

Sra Martinez Hernandez,
EcoCasa owner, Monterrey

homes that cut CO₂ emissions by at least 20% - without passing on extra costs to purchasers. Developers may cut CO₂ emissions in whatever way they chose, but are encouraged to focus on the building fabric, for example through insulation and shading. SHF supports them with guidance and training, and uses an energy model to check that sufficient CO₂ savings will be achieved. After a loan has been awarded, SHF regularly checks the construction progress, to ensure that efficiency measures are used correctly.

Already nearly 9,000 families are

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9,000

EcoCasas completed



20%

or more CO₂ saving



US\$200

typical annual saving on energy bills

enjoying the benefits of EcoCasas, with greater thermal comfort as well as around US\$200/year saving on energy bills. The energy model estimates that these homes save in total around 7,000 tonnes of CO₂ each year, or at least 280,000 tonnes of CO₂ over their lifetime, a significant contribution to Mexico’s commitment to cut greenhouse gas emissions. Detailed monitoring will soon provide more insight into the benefits achieved.

Why they won

The 2015 Ashden Award to EcoCasa recognises how the partnership is not just providing new homes that are sustainable as well as affordable, but is also transforming the whole construction sector through its support to housing developers. The approach has great potential for replication.

EcoCasa profile

Partnership between development banks.
US\$156m committed for loan finance
27,600 EcoCasas planned

Case study

EcoCasa, Mexico

Background

Mexico has a significant housing shortage. The current housing deficit of an estimated 9.6 million homes includes both an urgent need for many new homes, and also for improvements to many existing homes. But this housing challenge is also an opportunity. Housing is responsible for about 17% of energy use in Mexico, and the need for new homes could be a great chance to improve standards of energy efficiency in the sector. Efficiency would bring lower bills to benefit householders, and CO₂ reductions to benefit the global environment. This opportunity was recognised in 2013 in Mexico's new National Housing Policy, which aims to achieve better and more sustainable urban design as a whole, reduce the housing backlog and provide dignified housing for all.

However, a major challenge is that energy efficiency measures increase the cost of building a house. Housing developers are reluctant to cover this cost unless they are required by law to improve efficiency because they need to sell houses in a highly competitive market. Purchasers who are already struggling to afford a home are unlikely to pay more for efficiency.

The EcoCasa programme was set up to tackle this challenge, and to do so in a way that supports the government aim to improve the whole housing sector. The programme works by providing low-interest construction loans to developers to build 'EcoCasas' – affordable new homes that cut CO₂ emissions – without passing on extra costs to purchasers.

The partnership

The EcoCasa Programme, set up in 2012, is a partnership between the Mexican housing development bank, Sociedad Hipotecaria Federal (SHF), the Inter-American development bank (IDB) and the German Development Bank (KfW). The international banks provide low-interest rate loans to SHF for lending on to housing developers (US\$106 million from KfW and US\$50 million from IDB). IDB also made a US\$2.3 million grant to SHF for technical assistance. 11 SHF employees work directly on the programme, with support and supervision from IDB and KfW.

How the programme works

What is an EcoCasa?

An EcoCasa is a newly-built home that emits at least 20% less CO₂ during use than a standard home (and in addition, a minimum of 12 kg/year less CO₂ per m² of floor area in hot climate zones). Cutting energy and CO₂ should not be achieved at the expense of comfort: EcoCasas are designed to provide an internal temperature of between 20 and 25°C throughout the year

EcoCasa performance is specified in terms of CO₂ reduction rather than energy reduction, because the programme is part of the Mexico's national programme to reduce greenhouse gas emissions (see box).

Energy saving measures that have been found to be cost-effective for EcoCasas include increased insulation in hot, dry regions of Mexico (to reduce the need for energy for both air-conditioning and heating); increased thermal mass in hot humid regions (to

Mexico's NAMA for sustainable housing

NAMA (Nationally Appropriate Mitigation Action) programmes were initiated by the UNFCCC, and set out how a country plans to mitigate its emission of greenhouse gases, within the context of its priorities for national development in a particular sector. Mexico's NAMA for sustainable housing has been designed to supplement its existing initiatives on energy-efficient housing, by extending the penetration of basic energy efficiency standards to the entire housing market through support to housing developers and by upgrading standards to more ambitious levels.



The Mexican Government wants low-income families to have the chance to move out of informal housing



A huge sign promotes the housing development in Monterrey, which will have 1,000 EcoCasas

reduce the need for air-conditioning); and solar water heaters in temperate zones (to reduce the use of gas). Other measures frequently used are shading, improved glazing, enhanced natural ventilation and solar-reflective paint.

How are EcoCasas designed?

SHF identifies housing developers who own sites that already have building approval for social housing development, explains the loan scheme, and encourages them to propose designs for EcoCasas.

A key strategy of the programme is that developers have the freedom to cut CO₂ emissions in whatever way they chose. Following a 'whole house approach', SHF does not specify how EcoCasas should be designed, or what technologies should be used. Instead it provides guidance and training for developers to learn about different approaches and to identify what is most appropriate and cost-effective for their sites. If the initial design does not achieve sufficient CO₂ saving, then it is refined and re-modelled through discussion between SHF and the developer, until the requirements are met.

In this way, not only does the programme provide housing that is energy efficient, it also increases expertise within the building sector as a whole.

How does the loan work?

When a developer, site and EcoCasa design have been approved by all three partner banks, SHF draws up a detailed contract with the developer for an agreed number of EcoCasa homes. The loan offered for the EcoCasas will be at an interest rate about 2% lower than the market rate, and for a maximum of 65% of the construction cost (excluding land and services). An average project is for about 300 EcoCasas, and is usually part of a larger development, but this varies between developers.

SHF carries out monthly inspections of the sites to ensure that EcoCasas are being built correctly. The EcoCasa loan is disbursed in stages, linked to satisfactory completion of different phases of construction. This process helps to support builders who may be using unfamiliar techniques or materials.

How much do EcoCasas cost and how are they marketed?

US\$1 = 15.4 Mexican pesos (MPX), April 2015

EcoCasa measures add between MPX 6,000 and 12,000 (US\$400 and 800) to the cost of building a house that will sell for between MPX 250,000 and 900,000 (US\$16,600 and 60,000). A condition of the low-interest construction loan is that the EcoCasa must be sold for no more than equivalent baseline home. Most purchasers get a mortgage through one of two government-backed savings-and-loan providers. Those on the lowest incomes are also eligible for a government grant towards the 20% deposit that is needed.

Developers promote the option of buying an EcoCasa through their normal marketing strategies. For example, developer Gadol made a short promotional video at their site in Hidalgo that includes information about some of the benefits of EcoCasas and features two owners.

Achievements

The EcoCasa programme started in 2013. By the end of April 2015 it had set up contracts with ten developers and lent them a total of US\$171 million for building 12,320 EcoCasas. With 8,872 of these EcoCasas (551,000 m² floor area) completed and an average of 3.9 people per Mexican household, already 34,600 people benefit.

Environmental benefits

EcoCasas that have been contracted to date save about 0.8 tonnes/year CO₂ on average, according to the energy model. This is equivalent to 7,000 tonnes/year CO₂ saving for the EcoCasas built to date. With an expected lifetime of 40 years or more, they should provide a total saving of at least 280,000 tonnes CO₂. This makes an important contribution to Mexico's commitment to cutting greenhouse gas emissions.

"The EcoCasa team have introduced us to new ideas and provided training, as well as low-interest loans."

German Figueroa, Finance Director, Grupo Gadol

Modelling energy use

EcoCasa energy models were developed from the work of the Passivhaus Institute. The EcoCasa baseline is the house that would otherwise have been built (because CO₂ reductions must be 'additional'). It could be a standard, low-cost Mexican house with concrete foundations and walls, single glazed windows and a standard boiler. But many developers already include some sustainability measures to meet the requirements of the main mortgage lender, and these measures must be included in their EcoCasa baseline. In addition, many low income households cannot afford air-conditioning and heating, even where these are needed to keep a home between 20 and 25°C. The model therefore takes into account their actual use by the target income group in the particular geographical region.



In Hidalgo, standard houses are built using poured concrete (above) while EcoCasas are built using insulating ceramic bricks (below)



Actual savings will be measured as part of a detailed monitoring and impact evaluation programme which started in March 2015 (see box).

Benefits for households

Households benefit from lower energy bills. At current prices for electricity and gas, bills are predicted to be 28% or US\$200/year lower on average in an EcoCasa. Since the target households earn between US\$4,000 and 20,000 year, this can be a significant saving.

Anecdotally, EcoCasa owners are very positive about their homes, citing low bills and comfort. One owner at Hidalgo told the visiting Ashden Assessor that, because of his low bills, he had convinced a work colleague to buy an EcoCasa. Sra Hernandez Martinez at Monterrey (see photo) said that her EcoCasa stayed cooler in summer, and was warm enough in winter, without the need for air-conditioning or heating. Her bills were about US\$300/year lower than in her previous home.

The results of the monitoring and impact evaluation programme will provide objective comparisons of bills, indoor temperatures and perceived comfort.

The wider urban context

Developers who take part in the programme are gaining skills and experience in building houses to higher standards of energy efficiency. Not only does this give them a competitive edge with purchasers, they will need these skills to meet increasingly strict government regulations in the future.

The programme has shown how it is possible to move the usually conservative construction industry towards more sustainable practice. This is an important step for Mexican government as it works to transform the housing sector and achieve better and more sustainable urban design as a whole.

The future

The loan funding from KfW and IDB will be recycled 2.5 times, enabling the EcoCasa programme to finance the construction of 27,600 EcoCasas by the end of 2019. This will provide new, energy-efficient homes for 108,000 people. As the programme progresses, additional sustainability criteria will be required covering water use, transport and embodied energy. Although nearly half the planned houses are already completed or under construction, the programme is still actively recruiting new developers to spread the acquisition of new skills as widely as possible.

The success of the programme to date has attracted funding for other related work to be included. This includes loan finance through the NAMA facility for smaller developers to build 11,000 houses and subsidies for higher-income housing built to Passivhaus specifications. All this contributes to the Mexican government's aim to transform the housing sector.

Many other countries struggle to increase the energy efficiency of affordable housing and have an urgent need to build more. Two key features of the EcoCasa programme (financial incentives targeted at housing supply, and regular checks on build quality as a factor in disbursing loans) have wide relevance elsewhere. There is particular interest from IDB and KfW to support similar programmes elsewhere in Central and South America.

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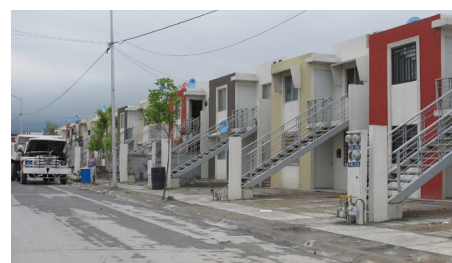
Impact evaluation

A 60-house pilot for a detailed monitoring and impact evaluation of 600 households has started at a large housing development in Monterrey. This is comparing the experience of families in EcoCasas with those in otherwise-identical baseline homes. The monitoring includes half-hourly measurement of temperature and humidity, and monthly recording of electricity and gas use, over a period of about 18 months. This is complemented by a detailed survey of the household at the beginning and end of the period, including information on family makeup, appliance use, and perception of comfort. Households were selected on a randomised basis, to minimise bias.



“For us, the monitoring of the EcoCasa programme is really important. It will help us understand what brings most benefits to homeowners, and that will guide how we build in future.”

Oscar Villagran, Head of Technology and Sustainability, Grupo Sadasi



In Monterrey, sun-shades (shown on the yellow house), wall insulation and passive ventilation are used in EcoCasas