COALITION FOR URBAN TRANSITIONS

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CREATING SAFE, AFFORDABLE AND SUSTAINABLE HOUSING IN CITIES: LESSONS FROM ECOCASA IN HERMOSILLO, MEXICO

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Summary

Globally, an estimated 1 billion new homes, many of these for low income households, will be needed by 2025 at an estimated cost of US$11 trillion.[1] Without such an expansion, it is projected that the number of people affected by the global affordable housing gap will increase by 30 per cent to 1.6 billion.[2] At the same time, however, there is a critical need for a rapid and sustained reduction in greenhouse gas (GHG) emissions from home energy use and housing construction if dangerous climate change is to be avoided.

In Mexico, ambitious action in the housing sector is building adequate, safe and affordable housing while reducing GHG emissions. A key program in this area has been EcoCasa, in which housing developers receive concessional loans and technical assistance for constructing energy efficient low-income housing with at least 20 per cent fewer emissions than "standard" homes. These incentives for the supply of sustainable homes complement those of the previous Green Mortgage program that has historically focused on working with the demand for these homes. Between 2013 and 2019, homes built by EcoCasa may have saved almost 2Mt of CO_2 emissions – roughly equivalent to the annual emissions of small island states like Puerto Rico. Wider benefits have included capacity building among small and medium construction firms, and the development of more sustainable communities.

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ABOUT THIS POLICY BRIEF

This policy brief was prepared by the University of Leeds. It was developed in partnership with the Coalition for Urban Transitions, which is a major international initiative to support decision makers to meet the objective of unlocking the power of cities for enhanced national economic, social, and environmental performance, including reducing the risk of climate change. The research presented here was conducted in support of the Coalition's Economics workstream, and builds on previous University of Leeds and Coalition research on the economic and social benefits of low-carbon cities. The opinions expressed and arguments employed are those of the authors.

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Aerial view of Hermosillo.
Credit: Irvin Cardona/Shutterstock

Critical enabling factors to foster this transition include the development of technical tools to assess the environmental performance of homes (e.g. SAAVi, DEEvi, HEEVi, ACV, Sisevive-EcoCasa tools) and capacity building at construction companies.

EcoCasa provides lessons for national governments worldwide who are looking for ways to deliver sustainable and affordable homes with social, economic and environmental benefits. In order to further capitalise on the success of this program, Mexico's national government needs to take action to better coordinate housing, land-use and urban policies in Mexico, increase the level and scope of existing housing standards and explore the role of new forms of green finance. Specific actions could include better integration of land-use decisions by supporting city-level planning exercises, developing and enforcing ambitious national building standards with expanded scope and improved green labelling, placing people at the centre of design by mainstreaming the social function of housing into policy, and working with housing bodies and community and national banks to help scale up green finance and reduce the need for government subsidies.

This policy brief is one of a series on frontrunning climate actions in cities around the world. The objective of this series is to strengthen the evidence on the economic and social implications of low-carbon, climate-resilient urban development. The series focuses on providing robust data on actual or ex post outcomes of climate action, ranging from better public health to job creation to greater equity. Each case study explores some of the preconditions for the successful design and delivery of urban climate action and provides national policy recommendations that could enhance their effectiveness and benefits.

Highlights

- 23% of the global urban population live in slums or informal settlements.[3] Sustainable cities need to guarantee adequate, safe and affordable housing (Sustainable Development Goal 11), while being resource-efficient and more sustainable.
- In the past 25 years, Mexico's urban population has doubled and its urban footprint has increased sevenfold.[4] It is projected that approximately 8 million new residential units will be required between now and 2050, and that an estimated 12.6 million existing homes will require partial or total refurbishment.[5] The vast majority of these needs will arise in cities and much of it will affect low-income populations.
- More frequent and extreme weather, including heatwaves, floods, and droughts,[6] coupled with the urgent need to reduce GHG emissions, and existing and projected levels of demand for adequate, safe and affordable housing, require new approaches to housing provision, both in Mexico and in other countries.

- The Mexican government has put in place a range of policies and programs to increase the supply, and improve both the quality and affordability of housing. The EcoCasa program, launched by the national government in 2013, was one of the first pilot programs under the Nationally Appropriate Mitigation Actions (NAMA) for housing prepared for the Paris Agreement on Climate Change. By reducing the costs of both developing and acquiring low-carbon houses, the NAMA has the dual objective of reducing greenhouse gas emissions from the housing sector and improving living conditions for citizens, and particularly for low-income families.
- EcoCasa has directly contributed to the development of clear environmental standards at the national level. An evaluation tool – the Sisevive-EcoCasa – built to assess EcoCasa energy performance is now widely used to rate houses from A to G. Since its inception in 2013 the tool has been used to plan more than 325,000 homes.
- As of 2019, EcoCasa had financed 79 developers to build 57,859 energy efficient homes for 267,456 citizens in Mexico, and had certified 66,864 homes. The national government estimates that the total mitigation potential of these developments is 1,812 $ktCO_2e$ over the homes' lifetime.[7] It should be noted, however, that some follow-up work has drawn into question whether these savings are as large as the amounts being modelled, raising the importance of 'whole home' assessments of energy efficiency.
- In Sonora state Hermosillo-based developer Derex partnered with a local architect to create "Bosco", a well-located neighbourhood with a livable density and high satisfaction among residents. The Bosco neighbourhood is explored to understand how the next iteration of housing policy can incorporate these elements, and help to develop a more integrated approach to urban planning in Mexico.

1. The challenge: Creating affordable, safe and sustainable housing in cities

THE GLOBAL CHALLENGE

Increasing the supply of housing has long been and remains a major priority for national and municipal governments worldwide. Globally, an estimated 1 billion new homes, many of these for low-income households, will be needed by 2025 at an estimated cost of US$11 trillion.[8] Without urgent transformative action, the number of people affected by the global affordable housing gap will increase by 30 per cent to 1.6 billion over the same time period.[9]

Large scale public housing programs have thus far failed to deliver anywhere near the quality or quantity of homes required to address this shortfall - a deficiency that is most acute in developing countries.[10] Where such programs have been implemented, the resulting homes are often of poor quality and are not well integrated into wider urban planning.[11] Similarly, attempts to enable the market to provide decent homes, including for low income groups, have often failed.[12] Profit-making imperatives result in attempts to build the highest number of homes for the lowest possible cost, leading to substandard homes in peripheral, poorly serviced and connected areas where land is cheaper.[13] Often, the poorest cannot afford even these dwellings, particularly when transport costs are taken into account and informal sector workers face also additional barriers to home ownership such as a lack of legal recognition[14], and high levels of vulnerability to climate change. At the same time, the residential sector has a significant role to play in mitigating global climate change. It is responsible for 17% of global CO2 emissions and 27% of global energy consumption.[15] More than two-thirds of the global population whose homes and shelters comprise the residential sector, equivalent to 4.2 billion people, live in cities:[16] in total, urban areas account for more than 70% of global CO2 emissions[17] and consume around 80% of global energy.[18]

Building affordable and energy efficient homes in cities would contribute significantly to the realisation of the United Nations' SDGs (see Box 1).[19] The New Urban Agenda – a vision for the world's cities unanimously adopted at the United Nations Habitat III Conference – recognises both the need to provide more homes and the potential for energy efficient buildings to reduce greenhouse gas emissions, create new jobs, reduce energy bills and generate improvements in public health.[20] It further acknowledges the need to shift from simply building houses to a more holistic and sustainable approach that puts the needs of people and communities at the centre of urban design, and that is part of a broader agenda to promote environmental sustainability, economic opportunities and social inclusion.

Box 1. Sustainable housing and the SDGs

In 2015, all United Nations Member States adopted 17 Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development. These interconnected goals seek to address critical global challenges "including those related to poverty, inequality, climate change, environmental degradation, peace and justice".[21] Green buildings can contribute to the achievement of these goals in the following ways:

- Improving people's health and wellbeing (SDG 3: Good health and wellbeing)
- Substantially increasing the share of renewable energy in the global energy mix and making buildings cheaper to run (SDG 7: Affordable and clean energy)
- Generating green jobs in the development of energy efficient and renewable technologies (SDG 8: Decent work and economic growth)
- Making cities and communities more sustainable (SDG 11: Sustainable cities and communities)
- Reducing consumption and improving the efficient use of resources (SDG 12: Responsible consumption and production)
- Reducing emissions associated with the consumption of energy and helping to combat climate change (SDG 13: Climate action)
- Saving water and protecting natural resources (SDG 15: Life on land)

It is important to note that there are indeed hard trade-offs to be made between the current and urgent need for adequate, affordable housing and the longer-term benefit of having energy efficient housing. There is undoubtedly a dire need to provide more affordable housing, particularly in low-income countries, but also worldwide; for example, in the United States, there is a shortage of between 7 and 12 million units.[22] Wherever possible, doing so in a way that does not further contribute to climate change – and such that new buildings are able to protect their inhabitants against and withstand the impacts of already worsening climate-related threats – will be vital.

For individual buildings, this means designing and constructing resource efficient, durable homes. At the city-level, compact, connected and coordinated (3C) forms of urban development are likely to lead to the most socially and ecologically sustainable and economically productive cities.[23] Transit-oriented, mixed-use development increases the liveability of cities by improving accessibility to goods, services and employment; reduces the per capita cost of providing public services; and reduces the environmental impact of urbanisation by lowering emissions and preventing excessive conversion of rural land.[24]

In contrast, sprawled development tends to impose a host of economic, social and environmental costs, including: an increase in the cost of providing the services and infrastructure required to serve a larger area; reduced community cohesion resulting from less walkable neighbourhoods; higher pollution and emissions from a reliance on private vehicles; and the conversion of rural and agricultural land.[25]

Many municipal governments lack the human, financial and technical resources needed to pay the upfront costs for building resilient urban infrastructure, to manage the development and use of energy efficient technologies, or to oversee the level of coordination required to create 3C cities. Implementation capacity and access to finance for sustainable development are significant obstacles to developing affordable, energy efficient homes, and indeed to realising the SDGs.[26] At a higher level, a lack of coordination between national, regional and local governments impedes effective policymaking, and more widely, the work that is being led by NGOs, academia and the private sector is often conducted without awareness of common challenges and opportunities for collaboration. National policies in this context are critical for joined-up, strategic action.

THE CHALLENGE IN MEXICO

Mexico's population of 126 million is expected to reach almost 150 million by 2050.[27] To satisfy the associated increase in demand for shelter, approximately 6.5 million new residential units will be required over the same period (based on an average occupancy of 3.7 people per dwelling).[28] In addition, an estimated 12.6 million existing homes are already considered inadequate and will require partial or total refurbishment.[29] The vast majority of new homes and homes needing refurbishment will be in cities: like many countries in Latin America, Mexico is a largely urbanised country, with nearly 80% of the population now living in urban areas.[30]

As the population and incomes increase, so too will the demand for energy, especially in the construction and residential sectors. Construction already contributes an estimated 9 percent of Mexico's total greenhouse gas emissions, while the residential sector - that is, homes which are already built and generate emissions through energy use - contributes around 7%, equivalent to almost 50 $MtCO_2$ per year.[31] As of 2017 the housing sector accounted for almost a fifth of total energy use in Mexico.[32]

Mexico's housing sector not only contributes to greenhouse gas emissions but is also severely affected by the worsening climate impacts. Between 2000 and 2012, around 1.2 million housing units were affected by natural disasters, incurring an estimated cost of 22.9 billion MXN (US$920 million).[33] 70% of the Mexican population lives in areas with high exposure to climate risks and natural disasters such as floods, landslides, hurricanes, heatwaves and earthquakes; two-thirds of these are residents of urban and peri-urban areas.[34]

Mexico, like many countries worldwide, faces both a critical housing shortage and intensifying impacts of climate change. The urban residential sector has been identified as a key area in which the government can address both sustainability and development needs. The COVID-19 pandemic of 2020 has highlighted the extent to which bold and radical action is necessary, and offers an opportunity to link recovery to the pursuit of sustainability objectives.[35] The Mexican government has already made significant progress in addressing its housing deficit, in part by subsidizing the construction of social housing, which makes up the majority of the (formal) national housing stock.[36] Since 2018 a focus on subsidies to developers has been replaced by a wider set of financial instruments including loans.

These efforts, however, have been undermined by the poor quality and location of the resulting homes, which are often cheaply constructed on peripheral or un-serviced land. This lack of integration disproportionately affects the already marginalised urban poor by limiting their access to jobs and services, and increasing living costs, which in turn leads to uninhabited homes. In 2015 Mexico had one of the highest vacancy rates in the OECD with nearly 5 million uninhabited homes.[37] A consequence is higher costs for the provision of infrastructure and services such as public transport, utilities, and roads.[38] The national government estimates that the pace of urban expansion reached an average of 50 hectares (half a square kilometre) daily for the 30 years up until 2011.[39]

A further challenge lies in the buildings themselves: housing is largely constructed in the same way nationwide, without consideration for widely varying climatic conditions.[40] As a result, the indoor air temperature is uncomfortable for many occupants – particularly those living in social housing in cities in the northern desert areas – and forces them to rely on air conditioning.[41] The growing use of air conditioners in homes and other buildings will be one of the primary drivers of global electricity demand in the coming three decades,[42] and indeed air conditioners are the primary source of energy consumption in households that use them.[43] Air conditioning units are currently owned by only one-in-five homes, but with rising ownership associated electricity use is expected to increase tenfold between 2010 and 2030.[44]

Mexico's successes and shortcomings demonstrate the importance of adopting a holistic, locally appropriate and "whole house" approach to housing development. A "whole house" approach (see Box 2) is one which recognises that it is not enough to simply construct houses: homes of adequate quality that meet the needs of the intended beneficiaries must be delivered in suitable locations with sufficient access to goods and services, and developers must also consider the ways in which user practices and behaviours influence emissions.[45] Such an approach will enable Mexico to harness the wide range of co-benefits associated with energy efficient housing, generating inclusive, productive and sustainable cities.

Box 2: "Whole house" approach

A "whole house" approach is a joined-up approach to achieving energy efficiency that takes into account all aspects related to energy use that are connected to a home. Factors therefore considered could include:

- Characteristics of site and location.
- Provision of connections to appropriate services and infrastructures.
- Appropriate building design for the local climate.
- Building orientation, design and potential for passive cooling or heating.
- Adoption of insulation and air sealing to reduce energy demand.
- Use of natural light and of energy efficient lighting to reduce energy demand.
- Use of renewable energy and of more efficient forms of space and water heating and cooling.
- Incorporation of energy efficient windows, doors, and skylights.
- Adoption of energy and water efficient appliances.

Homes constructed in this way are in general more energy and water efficient and produce fewer greenhouse gas emissions compared to homes built using conventional techniques. At the same time, the "whole house" approach can benefit both developers and home owners/tenants. For developers, improved construction results in fewer callbacks and warranty claims, less construction waste is produced, and the use of new techniques and business models can improve reputation. Residents benefit from reduced utility bills and maintenance costs, increased comfort, a healthier indoor environment, and a well-connected home.[46]

2. Methodology

This case study was carried out by a team of researchers from the University of Leeds in the UK and Tecnológico de Monterrey and CIPAD (Centro de Investigacion y Proyectos en Ambiente y Desarrollo) in Mexico. In April and May 2019, the team interviewed key stakeholders in the housing sector (see table 1). The team was also able to draw on data shared by public actors that participated in the design and implementation of the NAMA Housing Policy, including quantitative measures of performance and a satisfaction survey of more than 7000 people living in EcoCasa. In addition, the authors conducted a thorough review of academic literature, reports and guidelines from the housing sector in Mexico.

Table 1: Description of interviews undertaken

SECTOR	INTERVIEWEES
International Financial Institutions	3 interviews (from 3 institutions)
National Financial Institution	1 interview
International Cooperation Agency	1 interview
Research Institute	1 interview
National Government and multi owned institutions	3 interviews (from 3 institutions)
Private sector (developers and architects)	4 interviews (+ 2 site visits)

3. Policy context

Factors including population growth, internal migration and increasing private car ownership have contributed to rapid formal and informal development in peripheral urban areas in Mexico, resulting in urban sprawl. This unsustainable and often uncoordinated form of development has been exacerbated by conflicting land-use policies, substantial investment in highways and roads, and planning permission being given to areas far on the periphery of metropolitan areas.[47] This section briefly introduces the key national public institutions and programs relevant to these issues in the context of this research on affordable and energy efficient housing.

NATIONAL CONTEXT ON SOCIAL AND SUSTAINABLE HOUSING

A constitutional right to decent housing, and an institution to develop and implement legal and policy frameworks to achieve decent housing for all, were established in Mexico with the creation of the Institute for the National Housing Fund for Workers, Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT), in 1972.

Following a shift in housing policy in the 1990s, workers registered in the formal economy contribute to health and housing funds managed by INFONAVIT either on a voluntary basis (for example if a worker is self-employed) or through their employers which are then used to subsidise housing loans. The size of loans is conditioned on the income of the worker, with lower income groups thus able to obtain relatively limited loans. For instance, workers earning less than MXN 7,192 per month (US$380), might receive a loan of up to MXN 390,000 (US$20,650).[48] Subsidised loans are often combined with mortgages from commercial banks to buy more expensive houses, but usually this can only be afforded by workers of higher income groups. Another advantage of INFONAVIT loans for low income workers,

in comparison with loans from commercial banks, is that depending on the individual housing fund and the price of the home the buyer may not need to give an initial payment for their homes.

Around 17 million workers contribute to INFONAVIT funds which provides 70% of the housing loans in the country.[49] This means that around a fifth of the population are able to buy a house through INFONAVIT.[50] About 50% of all INFONAVIT loans go to workers earning less than 4 times the minimum wage,[51] a level of income that would put a typical family below the poverty line if they rely on one income only. A majority of INFONAVIT loans are therefore directed to low income households, posing a challenge to the integration of energy efficient materials, technologies and equipment since each of these can lead to higher upfront costs. A wider challenge concerns providing access to housing to those who fall outside of the requirements of INFONAVIT programs. Data from 2019 shows that these households are concentrated in the 56% of the workforce engaged in the informal economy. These figures are likely to increase due to the COVID-19 pandemic.

Acknowledging these challenges, the national government of Mexico started exploring options to promote sustainable and energy efficient housing in the early 2000s. Table 2 below presents a summarised timeline of the main developments.

Table 2. Outline of the main developments for the promotion of sustainable housing in Mexico

1996	First energy efficiency regulations are developed for domestic appliances.
1997	The Electricity Savings Trust is created; strong promotion of efficient lighting.
2001	National Commission for Promotion of Housing (CONAFOVI) is created.
2006	CONAFOVI is reformed to CONAVI, in charge of the supervision of housing development and their contribution to sustainable development.
2007	National Strategy on Climate Change (NSCC) and National Housing Programs (NHP) are published; the need to promote sustainable housing is identified. Social subsidy program "Esta es tu casa" includes sustainability evaluation criteria. CONAVI publishes Housing Building Code (HBC). According to the NHP, INFONAVIT creates "Vivir INFONAVIT", including sustainability strategies and the start of Green Mortgage program (Green Mortgage, Hipoteca Verde).
2008	The national Transversal Sustainable Housing Program is created by the Ministry of Environment (SEMARNAT), CONAVI and Ministry of Energy (SENER). CONAVI publishes the Specific Program for Sustainable Housing Development in the Context of Climate Change. The new Sustainable Energy Use Act is published. The National Commission for the Efficient use of Energy is created (CONUEE).

2009	The Green Mortgage program is launched nationally for low income housing. CONAVI includes Green Mortgage's sustainability criteria in "Esta es tu Casa". The Water Agenda is published highlighting water scarcity issues.
2010	CONAVI includes sustainability criteria and the use of eco-technologies in HBC. SHF proposes EcoCasa program to promote sustainable housing with IADB and KfW.
2011	Green Mortgages become compulsory for new housing developers and optional in the individual open market. INFONAVIT with GIZ and UK Embassy developed System for Evaluation of Green Housing (Sisevive-EcoCasa) to evaluate environmental performance with a whole of house approach: DEEVi and SAAVi 1.0 evaluation tools are developed.
2012	The General Law on Climate Change (GLCC) is enacted and Special Program on Climate Change (SPCC) is published. SPCC includes the development of a NAMA for the housing sector. The NAMA adopts Sisevive-EcoCasa as monitoring tool. Sisevive-EcoCasa is used by other ONAVIS to evaluate performance. SHF adopts Sisevive-Ecocaas to evaluate houses built with their sustainable housing program (i.e. EcoCasa). CONAVI considers adopting NAMA criteria to allocate subsidy.
2013	Secretariat of Agrarian, Land, and Urban Development (SEDATU) is created. NAMA Facility is developed. CONAVI includes Sisevive-EcoCasa criteria in their operative rules. First homes of SHF's EcoCasa program are built.
2014	Final version of NAMA.
2015	23,914 homes are built by EcoCasa program (SHF); "Energy Consultant" experts are trained to promote the program. Committee for updating Sisevive-EcoCasa is created and a protocol is created by CONAVI, SHF, INFONAVIT and GIZ).
2016	Regulation of energy efficiency in buildings is modified (NOM-020). First actions under NAMA Facility modality are piloted; DEEVi and SAAVi are updated. 74,998 houses have been evaluated by Sisevive-EcoCasa tool. HEEVi evaluation tools is developed for SHF´s EcoCasa program.
2018	Lifecycle assessment tool (Analisis de Ciclo Vida, ACV) evaluation tool is developed for SHF´s EcoCasa program.
2019	A loan of €120 million secured from KfW for EcoCasa program until 2030.

All euros converted to US dollars on 27 November 2020, using a rate of EUR1 = US$1.20.
(Adapted from CAPSUS, 2017)[52]

The Green Mortgage Program

The Green Mortgage (GM) program, launched in 2009, was the first major investment program in Mexico linking house building and climate action. The program financed the purchase of specific approved green technologies, from specific and authorised providers, that contribute to saving water and energy in homes.

The initial approach was to focus on the potential direct economic savings to homeowners in order to allow them to repay the additional cost of investments. Financial incentives were therefore targeting the demand side of the housing market.

While starting as a pilot initiative the GM program evolved into a national compulsory policy for the building of a subset of social housing developments. By 2015 GM had provided 376,555 loans and received various international awards.[53] A need to more significantly take into consideration local climate conditions and residents' design preferences were two limitations of early GM developments. The program also did not make full assessment of the environmental performance of the houses built. These shortcomings were a motivation for the development of the Sisevive-EcoCasa evaluation tool in 2011 as part of the Program for Sustainable Energy in Mexico (PES) financed by GIZ. The experience of the GM program also informed the development of a NAMA for the housing sector in Mexico in the early 2010s.

Nationally Appropriate Mitigation Action for Sustainable Housing

Mexico is one of the largest global economies to recognise the commitments made at a subnational level to climate change as part of its Nationally Determined Contribution. This means that reducing emissions from urban housing can contribute significantly to the achievement not only of the country's climate targets, but also to the global development agenda. In 2011, the Mexican government launched the Sustainable Housing NAMA with the aim of expanding on the existing green housing standards outlined above by putting in place a financial system that promotes the construction of new energy efficient residential buildings.

The Sustainable Housing NAMA primarily targets new residential buildings for low-income families by supporting the construction of affordable, energy efficient houses. This is achieved by offering favourable financing mechanisms alongside the provision of technical and capacity support. The ambition is that these actions will ultimately lead to a wider transformation, where energy performance requirements are part of the national regulatory system and private housing developers are trained in the use of eco-technologies.

Actions to support the works under the NAMA include: the development of EcoCasa by SHF, a NAMA support program financed by BMZ which provided technical assistance to CONAVI and SEMARNAT, and the PES financed by GIZ (2009-2017), which provided technical assistance and promoted the development of Sisevive-EcoCasa.[54]

Sisevive-EcoCasa Evaluation Tool

In 2011 within the activities of PES and using funds from the UK Embassy, INFONAVIT and GIZ commissioned Gopa-Integration and Fundacion Idea to design and develop the Sisevive-EcoCasa tool. This tool evaluates energy and water use performance using a "full house" approach and estimates reductions of carbon emissions.

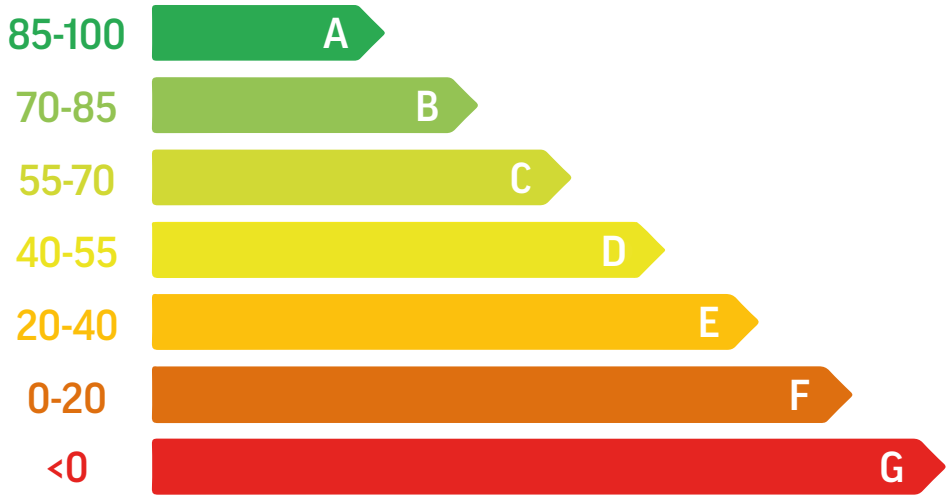
The objective of the tool is to promote the construction of energy and water efficient homes which also improve the quality of life of inhabitants. The tool provides an evaluation gradient with seven categories that inform home buyers of the performance level of houses. The performance is obtained by the results generated in the DEEVi and SAAVi tools:

- DEEVi (Energy Efficient House Design, or Diseño Energéticamente Eficiente de la Vivienda) is based on the Passivhaus tool developed in Germany. It was adapted to the local context by the Passivhaus Institut, INFONAVIT, GIZ/Gopa-Integration and CONUEE. It makes an energy balance based on architectural design and location.
- SAAVi (House Water Savings Simulator; Simulador de Ahorro de Agua en la Vivienda) estimates water use and potential savings after the inclusion of efficiency devices. It was developed by Fundación IDEA with GIZ and INFONAVIT, and it was validated by CONAGUA (National Water Commission).

The results produced by these tools are integrated into a Global Performance Index (Índice de Desempeño Global, or IDG), which is used to label houses from A to G (Figure 1). By 2018, 145,471 houses had been certified using the Sisevive-EcoCasa methodology, representing around 31% of all the new housing built since 2013.

The Sisevive-EcoCasa rating system helps to inform beneficiaries about the potential of energy efficiency as opposed to conventional houses, helps the national government in their commitment to reducing emissions from the residential sector, and lays the foundations for a national system of certification for sustainable housing.[55]

Figure 1. Sisevive-EcoCasa evaluation labels (right) based on Global Performance Index (left)



Adapted from CAPSUS, 2017[56]

SHF and The EcoCasa Program[57]

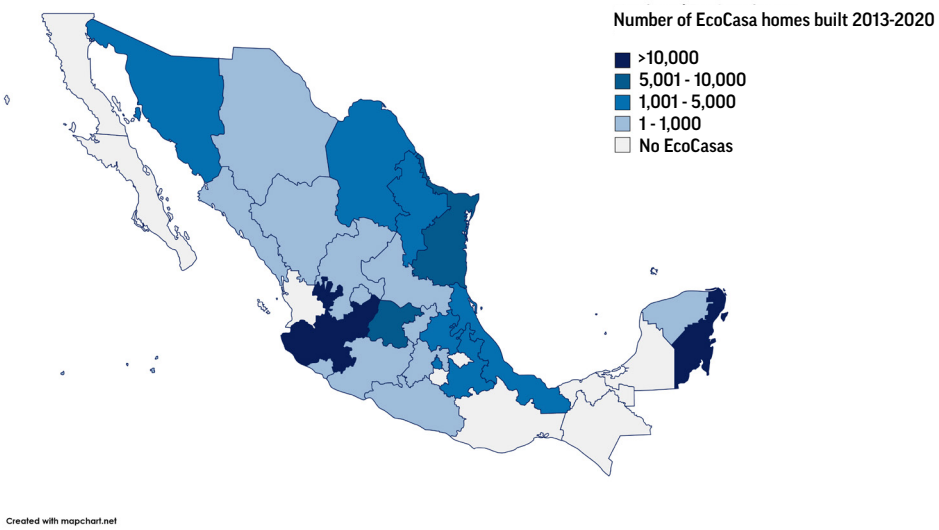
Sociedad Hipotecaria Federal (the federal mortgage society, SHF) is a national public development bank. While it was created in 2001, between 2012 and 2018 SHF's influence on the national housing market was dramatically expanded, and particularly around the promotion of sustainable housing. SHF provides financial services to the supply of the housing sector by providing direct credit, credit lines and guarantees to banks, financial intermediaries and developers. On the demand side it collaborates with INFONAVIT, Fovisste and banks to enable workers to buy homes.

EcoCasa is a joint initiative of the SHF, the Inter-American Development Bank (IADB) and the German development bank (KfW), and was capitalized with international climate finance. Initially, KfW provided US$245 million, the Clean Technology Fund (CTF) US$51.87 million, IADB US$80 million, the EU's Latin American Investment Facility (LAIF) US$8 million, and the NAMA Facility US$11.3 million. This led to a total initial investment of US$386 million and a total of US$1,066.8 million over the four stages of the program.[58] Between 2013 and 2018 MXN 12,504 million have been provided by SHF, which has attracted additional public and private investment of MXN 5,978 and MXN 21,184 million respectively for building EcoCasas (overall around US$2.15 billion).[59]

The original goal of the program was to build 32,450 EcoCasas by 2023, but by 2018 the program had already achieved 58,525 homes. As of 2019, EcoCasa had financed 79 developers to build 66,864 energy efficient homes for 267,456 citizens (see Figure 2), with estimates suggesting almost 2 $MtCO_2e$ would be saved over the homes' lifetime,[60] equivalent to emissions from the annual energy use of more than 230,000 average homes in the United States.[61] By 2018, a fourth loan for €120 million from KfW was secured to continue the program until 2030. This could enable the financing of around 154,000 new homes which could prevent 4.7 million tCO_2e, roughly 1.9% of the commitment of the national NDC.[62] In addition, in 2020 the EcoCasa Program has been listed by the Climate Bonds Initiative.[63] This opens up opportunities to access additional private finance to increase the scale of the program.

As part of EcoCasa, the SHF provides concessional loans and technical assistance to project developers that construct energy efficient low-income housing with 20 to 40 per cent less emissions than "standard" homes.[64] EcoCasa offers urban developers preferential loan credits up to 264 base points below the traditional rate depending on the environmental performance level of homes built.[65] This financial incentive enables them to include environmental design features and technologies without affecting the price of the home. The average EcoCasa price is around EUR 15,000. Measures to be implemented are proposed by the developers and may include: an improved thermal envelope, bioclimatic design solutions, and shading devices. The selling price of an EcoCasa house must not exceed the price of a comparable standard unit, a feature intended to ensure affordability for low-income families.

Figure 2. EcoCasas in Mexico



Source: adapted from Government of Mexico. 2021. EcoCasa – Sustainable adequate housing for all. Available at: https://www.gob.mx/shf/documentos/ecocasa-vivienda-adecuada-sustentable-para-todos?state=published.

In contrast with the GM program, EcoCasa does not prescribe specific technologies. Instead, the developer's designs are evaluated by the various tools designed to assess EcoCasa performance, including the Sisevive-EcoCasa tools (DEEVi and SAAVi versions 2.0), and the HEEVi and ACV tools. HEEVi evaluates housing developments in relation to its context and scores them according to criteria that include GHG emissions levels, project execution risk, expected cost, proximity to employment sources, urban context, urban services, public transport, land use regulations and availability of basic services. This tool generated a result from 0 to 100. This is one effort to assess the contribution of specific housing projects to sustainable urban development. To be entitled to funding, projects must also comply with the requirements specified in the local normative standard on energy efficiency for buildings (policy NOM-020-ENER-2011).

Box 3: EcoCasa Awards

In 2013, the UN selected EcoCasa as a "lighthouse activity" to showcase at COP 19 in Warsaw, Poland. The program was selected in the category "Financing for Climate Friendly Investment", which recognises innovations that have successfully leveraged significant private finance for climate adaptation and mitigation, and that have overcome market barriers.[66] EcoCasa has also been the recipient of the Ashden Award (for initiatives that deliver sustainable energy with social, economic and environmental benefits) in 2015, an ALIDE (Latin American Association of Development Financing Institutions) award in 2016, and a special award at the 2017 KfW Awards for Construction.

Table 3. Programs for sustainable housing operated by SHF

Program	Benefits*	All climates	Hot and very dry		Dry/ semi-dry		Temperate and cold		Temperate (vertical)	
		HEEVi	DEEVi	IDG	DEEVi	IDG	DEEVi	IDG	DEEVi	IDG
			40% comfort		60% comfort		80% comfort		80% comfort	
EcoCasa I	-260 base points 150 points for CONAVI	45	-40%	C	-30%	D	-25%	D	-25%	E
EcoCasa II	-115 base points 125 points for CONAVI	30	-30%	D	-20%	D	-20%	D	-20%	E
EcoCasa III	-100 base points 125 points for CONAVI	15	-30%	D	-20%	D	-20%	D	-20%	E
NAMA Facility	Support for investment 150 points for CONAVI	15	-30%	D	-20%	D	-20%	D	-20%	E
LAIF	70% support for investment 150 points for CONAVI	15				-80%/ A-B				

* All programs include as benefits: Priority for receiving a subsidy, and free technical support.
Adapted from Infante Barbosa, E. 2018. Financiamiento Sustentable: Construyendo el Futuro. Sociedad Hipotecaria Federal. Presentation Foro Financiamiento Sustentable Cámara Mexicana Industria de la Construcción. Available at: https://www.cmic.org.mx/comisiones/sectoriales/vivienda/2018/SHF/Foro%20Financiamiento%20sustentable/01%20Presentaci%C3%B3n%20Ernesto%20Infante%20Barbosa%20-%20SHF.

SHF's Sustainable Housing Program thus has evolved and diversified to support sustainable building, rental and urbanisation markets. In addition to EcoCasa, SHF has three other streams to promote sustainable housing:

- **NAMA Facility**: The NAMA facility provides a subsidy for the extra cost of energy efficiency measures and technical assistance. Through 2018 15 developers had participated with a total private investment of MXN$786 million and MXN$33.9 million subsidy (total US$42 million), to build 2,648 houses. The goal of this program is to build 8,000 homes.
- **LAIF-Passive House**: This stream promotes the construction of Passive Houses, defined as those that reduce GHG emissions by 80 per cent. Subsidies cover up to 80 per cent of additional extra construction costs and also provide free technical assistance. As a pilot 34 homes were built with the participation of 5 developers.
- **URBA:** This sub-program provides financing options for more ambitious urban developments and does not include only homes but also the building of infrastructure. Finance can be used in larger scale projects including power lines, water networks, streets, sidewalks and cycle-lanes, waste management equipment, parks and public spaces, health clinics, schools and cultural sites (e.g. libraries and community centres). Developers repay the loan when plots or homes are sold. Through 2018 6 projects were approved and 10 more were being evaluated.

Table 3 presents a summary of the minimum requirements for participation in the different programs for sustainable housing by the SHF.

4. The case study

ECOCASA IN HERMOSILLO

The city of Hermosillo is the capital of Sonora State in the northwest of Mexico. As of 2015, the population of 884,273 people occupied a total of 257,694 houses.[67] The city's hot desert climate means that temperatures range from zero degrees Celsius in the winter to 48 degrees Celsius in the summer, making it one of the hottest cities in the country. The climatic conditions in Hermosillo mean a higher energy demand than in temperate regions, associated largely with the use of air conditioning.[68] Building homes which naturally have a more comfortable indoor air temperature thus allows for a large reduction in energy consumption. In the state of Sonora, 3,618 EcoCasa homes were built between 2013 and 2019, leading to an emissions reduction of around 98,760 tons of CO_2e compared to the baseline scenario of standard, non-energy efficient homes over the lifetime of the buildings.

Developing Local Capacities and Models: the case of Derex

Derex is a medium size developer based in Hermosillo in the northern State of Sonora. Derex participated in both the NAMA and LAIF initiatives beginning the early 2010s with its main motivation for participation being a search for new business models. Derex successfully built one of the first developments of Passive Houses through

the LAIF program in Nogales. Features of these homes include fixed sunscreens and architecture adapted to the summer sun, thermal insulation, and energy saving lighting and appliances. With a focus on building sustainable communities, in addition to energy efficient homes, the neighbourhood offers recreational spaces, a social centre for community gatherings, and local services. Building on this experience, Derex later pioneered one of the first EcoCasa Rental projects. As part of this project Derex built homes with 67% lower carbon emissions. Critical factors which enabled Derex's participation in this projects included access subsidies to cover the extra costs, and technical support. Both the EcoCasa Rental and the Passive House schemes have enabled Derex to incorporate more and more sustainable characteristics into the homes they build – including the use of innovative materials, passive cooling through the design of ceilings, high efficiency appliances, widening their level of impact to developments outside of their involvement in EcoCasa. The conditions that were required under EcoCasa – including the energy efficiency, emissions reductions and social aspects – are now part of their core business model. This shows how the EcoCasa scheme has interacted with other initiatives to catalyse the development of higher standards by enhancing the skills base, building technical capacities and aiding in the development of new products and business models in the construction and development industries.

Incorporating Sustainability: Bosco Neighbourhood

Bosco is a sustainable community in Hermosillo developed by Derex and renowned architect Alberto Kalach in 2014.[69] Together, they developed a housing complex using green building techniques such as green roofs and improved ventilation – without increasing the investment required compared to "business as usual" development.[70]

This project did not receive funding from the EcoCasa program (rather, it was developed under the Green Mortgage program), but Derex applied experiences and knowledge acquired during the building of Passive Houses in Nogales and EcoCasa rental projects, and the development was aided by the Sisevive-EcoCasa tool. By assessing Bosco (Figures 3 and 4), we can imagine a more integrated future for housing policy in Mexico.

Figure 3. Exterior of houses in the Bosco Development

Figure 4. Interior of a house in the Bosco Development, showing the corridor and living room/kitchen

The Bosco neighbourhood comprises affordable housing on well-located, relatively central land. To achieve this, Derex applied for and was granted a change to local permitting arrangements, allowing them to build at a higher than usual density. As a result, Bosco was able to accommodate 120 units per hectare, rather than the average 80 to 100 units, without compromising on dwelling size. The use of local materials and innovative construction processes further helped to keep building costs low and to create jobs in the wider community. Beyond the housing itself, attention was paid to the design of the neighbourhood and the building of local community amenities. For example, a community centre was built and was initially managed by the developers before control was gradually passed to the community as it became more established. It now serves as a gathering place for Bosco residents and is a central aspect of high levels of resident satisfaction with the scheme.

In addition to revealing the successes of the EcoCasa program, challenges faced by Derex speak to wider challenges the industry is facing as it seeks to address Mexico's sustainable housing gap. There are few providers for some construction materials and equipment. For instance, for one of the projects, efficient windows needed to be imported from Spain and there were issues in customs which delayed the project. Similarly, there were no local providers of high efficiency ceramic bricks, and transportation costs to Hermosillo were higher than the cost of the bricks themselves. Derex also faced challenges determining the most effective program to participate in, and noted that the compliance and administrative cost of participating in programs added to costs. Compliance under the building energy efficiency regulations, a requirement to access SHF's concessional loans, were seen by Derex as being too challenging to meet in Hermosillo due to its extreme weather.

Scaling the benefits

As Mexico's population grows towards 150 million by 2050, 6.5 million new homes will be needed, including a large number for low-income families who face even greater barriers to adequate housing. Building these homes while meeting Mexico's climate targets, and without compromising a need for capacity and resources to be devoted to other challenges, requires learning from and improving existing programs like EcoCasa whilst also developing a more integrated approach to urban challenges.

TOWARDS HIGHER STANDARDS

Gradual increases in building standards, for example from GM to the wider adoption of the Sisevive and HEEVi ratings systems of EcoCasa, can spur developers to build greener and better located dwellings, resulting in further reductions in GHG emissions and lower housing bills for residents. These actions can also provide more certainty for financing institutions, both around the value of assets they are lending against and around the ability of homeowners to maintain payments (since monthly bills are lower). The policies described in Mexico and where Derex has been involved show also a diversity of economic incentives that becoming more innovative. While GM offers a specific set of incentives to buyers, EcoCasa provides incentives, tools and capacity building to incentivise the supply of housing. Financial resources have come from international climate finance and is expected to diversify via climate bonds; this has proven critical along with technical international cooperation to scale up the scope of these programs.

However, setting standards that are beyond the technical capacity of small and medium sized construction companies can lead to compliance issues and may slow the pace of adoption of sustainable standards. Similarly, the construction of energy efficient houses without adequately informing residents of how to use them and without supporting more sustainable behaviours may result in a mismatch between the potential and actual emissions reductions.

The development of more stringent energy efficiency standards should therefore proceed in tandem with measures to provide technical assistance and to promote awareness raising and behaviour change. Working collaboratively with municipalities, developers, construction firms, banks and wider stakeholders can create a road map to net zero buildings as one means of navigating this opportunity. In addition, energy efficiency ratings that are clearly communicated to the real estate industry and developers, homeowners and mortgage companies will help the value of standards to be reflected in home prices. This co-evolution of technical standards, industry capabilities, consumer awareness, market demand and green finance is crucial in the transition towards sustainable homes and communities. However, it is important to recognise that the absence of any one element of this system could be enough to slow or stop progress.

Technical assistance and tools

Technical assistance and tools provide a clear approach for integrating and evaluating environmental benefits, and to building the capacities of the different stakeholders involved. In Mexico this process has taken more than ten years since the first efforts to integrate eco-technologies in social housing. If the Sisevive-EcoCasa evaluation and labelling tool is widely used to assess all housing developments this will provide valuable information to potential buyers that might enable them to consider additional factors and long-term costs and benefits in their purchase decisions. Information about Sisevive-EcoCasa, and the other tools available, could be disseminated to show how they work and identify opportunities to increase their transparency and adoption.

The availability of these tools online is critical to their success: Sisevive-EcoCasa's online portal has enabled developers from all over the country to use them to evaluate and certify the houses they build. The works around the preparation of the NAMA and frequent training and communication events have helped to substantially increase the technical capacity of mid and small sized construction firms in Mexico. Evidence of this can be seen not only in the number of certified EcoCasas far exceeding initial targets, but in the continued growth of buildings certified using the Sisevive-EcoCasa rating system.

Evaluation tools generate estimates of expected savings and environmental performance. However, monitoring programs need to consider the actual behaviour of inhabitants. Assessments of real GHG reductions using the Sisevive tool sometimes may fail to consider user behaviour. For example, in the northern part of Mexico, many occupants turn air conditioning on before closing windows or blinds, thereby reducing the thermal benefits of better design and factors such as improved insulation. This highlights the need for awareness raising and education among residents, and this can be enabled through a focus not only on sustainable design of new houses and communities but also on the need to support sustainable behaviours amongst the residents of those houses and communities. A more intense and proactive educational and awareness campaign targeting the population is needed.

From sustainable homes to eco-communities

A broader challenge will be shifting the focus of housing policy and programs from energy efficient homes to sustainable communities. While best practice examples exist, more widely the communities built by GM or the EcoCasa program bear strong resemblance to the ones residents have moved from. In terms of the overall quality of life in EcoCasa areas, analysis from the EcoCasa survey show residents view their new communities as being broadly similar to those they previously lived in: nearly half of residents (46%) report private motorised transport as their primary means of mobility. This signals a sustained preference for private vehicles, possibly related to the poor integration of developments with public transport networks.

Transport planning, house building and community development need to be more formally integrated. Investments in mass transport options, including bus rapid transit, light rail and metros can provide relief for congested motorways and incentivise more and higher density housing development by improving access to jobs, services and amenities across the city. But mass transit built without coordinated urban planning leads to 'white elephants' and housing without access to transit leads to empty homes. Similarly, building well-located, vibrant and liveable communities is important – that is, neighbourhoods that put people at the centre of their design. These provisions are generally important for achieving inclusive, zero-carbon cities but are particularly necessary for low-income populations that rely more heavily on public transport to access opportunities and participate in society, and on the social networks of their communities.[71]

The national government can take a number of specific actions to better support compact, connected and coordinated urban development. Support for city-level urban planning exercises from the federal government can help to coordinate planning and development, whether between different levels of government, across different agencies and between the government and private or community actors. Such exercises, when conducted in a participatory way, can also help to develop a shared vision of what urban areas and new communities could look like in the future - and in so doing, develop a space for conflicts to be explored before budgets are spent or 'shovels hit the ground'.[72] Complementary actions include the development of a national land and planning proposal registry to provide transparency around planning decisions and provide valuable information for urban stakeholders – whether public, private or civic. In addition, guidelines can be developed around access to sustainable transport options, including sidewalks, bike lanes, traffic calming measures, and the amount of space dedicated to parking.

PROSPECTS UNDER THE COVID-19 PANDEMIC

In late February 2020, the first case of COVID-19 appeared in Mexico. Along with the health and humanitarian crises, the economy is suffering and the national GDP is expected to shrink by about 10% in 2020.[73] Through July 2020, 1.1 million formal jobs were lost and by September only 200,000 of these had been recovered.[74] Although SHF has secured financing to continue promoting its sustainable housing programs, if reduced formal economic activity persists demand for mortgages via the social housing system will likely be lower, construction of EcoCasa will slow, and the housing gap will grow larger. Reinforcing the commitment to low income sustainable housing will therefore be critical in the months and years ahead to help Mexico rebuild better from the current crisis.[75]

5. Policy recommendations

1. **Integrate land use, transport and wider urban development policies**

   EcoCasa and other sustainable housing programs have demonstrated the potential for Mexico to realise the benefits of sustainable homes, but it has not yet fully unlocked the potential of connected and coordinated city-wide development. It is necessary to create and/or adapt and align existing legal frameworks governing housing, urban development, transport, environment and climate action. "Location is everything", a refrain from the real-estate industry, needs to be embraced by national policymakers, urban planners and housing developers. Access to jobs, amenities and services determine whether new developments support economic agglomeration (and its economic benefits), and sustainable communities (with their social and environmental benefits). Specific actions to further support this include:

   - Developing a national, online, open-access, land and planning proposal registry system to support land-use planning decisions. Identify optimal zones for development through approaches such as HEEVi
   - Supporting city-level plans that establish development and non-development areas wherein housing institutions can and cannot provide financing and align these plans with long-term transport planning.
   - Establishing and enforcing higher standards for new developments around walkability, access to public and non-motorised transit options, the proximity of employment opportunities, and other services and recreational options, and build these into the training course for road design and green infrastructure the administration has been developing.

2. **Develop a national building code with ambitious building standards**

   The implementation of a national building code with ambitious environmental standards can provide benefits to both homeowners and home builders. Homeowners can enjoy more comfortable homes and savings on their energy bills, and homebuilders can develop new skills and capacities and improve their competitiveness in the market. New standards need to consider not only construction, but also the way residents' behaviours and practices determine energy use and emissions. The relationship between homes and communities should also be considered. Since regulation of land use and urban development is determined locally, it is necessary to engage with local planning authorities to require the evaluation, certification and construction of sustainable homes as part of their urban development policies. Enforcing requirements around neighbourhood design, including on walkability, green space, local commerce and access to services, amenities and transport, can yield broad-based social, environmental and economic benefits. Specific actions to support this include:

- Co-creating a roadmap for net-zero new homes in consultation with housing construction firms and wider stakeholders and aligned with Mexico's climate targets.
- Developing and enforcing the national building code, and making the associated construction standards and regulations flexible at the local level so as to ensure homes are locally appropriate.
- Making a plan to gradually increase minimum requirements over time - this could be linked to market Green Mortgages, with stricter requirements coming into force for more expensive Green Mortgages.

3. **Generate technical information and tools to evaluate and label sustainable housing and make the public aware of it**

   Access to the most complete information on the characteristics of houses, their condition, and the long-term cost and benefits of living in them, can help buyers to make better decisions. In fact, as many of the features characterising sustainable homes generate direct economic savings to occupants, the widespread use of tools can help to support demand for increasingly ambitious measures. This requires the preparation of evaluation and certification tools to assess the environmental performance of homes, which are easy to use, online, and regularly updated. This should be accompanied by a communication strategy to make the general population aware of the advantages of sustainable homes. Developing a green labelling program so that members of the public can identify low carbon buildings, the real estate market can value their benefits, and owners can become aware of future opportunities to improve the efficiency of their homes is one way of realising this opportunity.

4. **Ensure the social function of housing is mainstreamed into housing policy**

   EcoCasa has demonstrated the opportunity to make housing affordable without compromising on quality. Taking this further, policymakers need to look to neighbourhoods such as Bosco to put people at the centre of the design process, making not only functional neighbourhoods but also liveable communities. As such, it is important that quality is measured not only based on the number of units built and inhabitants served, but also on a wide range of more qualitative criteria that captures the social function of housing. Location and connectivity is key, as is the liveability of the neighbourhoods and dwellings. Further developing standards to include and enforce criteria around access to services, community amenities, cultural institutions and infrastructure can help ensure the social function of housing is considered in new projects.

5. **Work with commercial banks, bank regulators, National Housing Bodies (ONAVIS) and municipalities to scale finance to sustainable communities**

Consolidate a financial architecture to support incremental incentives for the increasingly ambitious supply and demand of sustainable housing. This should be flexible enough to accommodate different needs according to climatic and economic contexts. Concessional finance (in this case from KfW and the IADB), and support from CONAVI (and now SEDATU), have enabled SHF to provide low carbon housing in Mexico to low income residents. Scaling green housing to low income residents will require a larger role for private finance but can also provide benefits to the financing community and general public. For homeowners, green finance options can reduce mortgage rates. For banks, homes with green standards have lower running costs, and are therefore lower risk for their portfolios. Developing these policies in partnership with National Housing Bodies can help to make mortgages not only greener and lower risk, but more accessible to low income populations. Specific measures can include:

- Work with members of the finance community to export the Green Mortgage and EcoCasa standards to commercial mortgages and when possible for self-construction practices.
- Devise innovative approaches to correct incentives that promote city sprawl and the building of efficient homes in inefficient locations and create options to finance the construction of integrated sustainable infrastructure.

6. Conclusions

Job creation and efficient economic growth, the development of transport networks, and Mexico's GHG emissions all critically depend on when, how and where homes are built in Mexican cities over the coming decade. If designed poorly, far from urban centres and mass transport, and built in insufficient numbers, the housing sector will lead to Mexican cities failing to meet their potential. If designed to increasingly ambitious standards, connected and coordinated with transport planning, and built at a rapid pace, the housing sector can lead sustainable development.

The results in this policy brief emphasise the opportunity to be leveraged from scaling the successes of Green Mortgage, EcoCasa, and the wider set of initiatives around housing the national government has pursued in recent years. EcoCasa alone can be attributed with saving almost 2 $MtCO_2e$ from the 66,864 energy efficient homes it has already funded over their lifetimes; moreover it is expected to contribute to nearly 1.9% of the NDC. Wider benefits include capacity building among small and medium construction and development firms, which will provide economic and environmental benefits long after the programs have finished.

Specific actions outlined in this brief provide a pathway to realising this opportunity. Actions to integrate land-use decisions include developing a national land and planning registry and support for city-level planning exercises. Increased building standards with expanded scope and green labelling can achieve higher levels of economic, social and environmental benefits from new homes. And working with housing bodies and community and national banks can help to scale green finance and reduce the need for government subsidies.

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ABOUT THE COALITION FOR URBAN TRANSITIONS

The Coalition for Urban Transitions is the foremost initiative supporting national governments to secure economic prosperity and reduce the risk of climate change by transforming cities. The Coalition equips national governments with the evidence and policy options they need to foster more compact, connected and clean urban development. The Coalition's country programmes in China, Ghana, Mexico and Tanzania provide models for other countries on how to effectively develop national urban policies and infrastructure investment strategies.

A special initiative of the New Climate Economy (NCE), the Coalition for Urban Transitions is jointly managed by C40 Cities Climate Leadership Group and the World Resources Institute Ross Center. A partnership of 35+ diverse stakeholders across five continents drives the Coalition, including leading urban-focused institutions and their practice leaders from major think-tanks, research institutions, city networks, international organisations, major investors, infrastructure providers, and strategic advisory companies.

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