



MÉXICO

GOBIERNO DE LA REPÚBLICA

Actions towards low carbon development and climate resilience in Mexico.

Ministry of Agrarian, Territorial and Urban Development

GLOBAL ABC / Mexican contribution towards low carbon development and climate resilience

Content.

- 1. Creation of a new Ministry in Mexico**
- 2. Diagnostic of the urban context**
- 3. National Urban and Housing Policy**
- 4. Instruments for Climate Action**

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Creation of a new Ministry in Mexico

Ministry of Agrarian, Territorial and Urban Development

- In 2013 President Enrique Peña Nieto, announced the creation of a new Federal Ministry with the task of establishing a New Urban Policy
- This institution was created as a required national action to control urban sprawl as well as promoting the consolidation of the existing cities.
- In order to achieve smart and sustainable urban development, the new urban model focusses efforts to promote appropriate and dignifying housing for the Mexican population.





The expansion of Mexican cities over the last 30 years...

Massive

In average, the urban surface increased by 8 times

Disorganized

Inefficient urban model and planning criteria

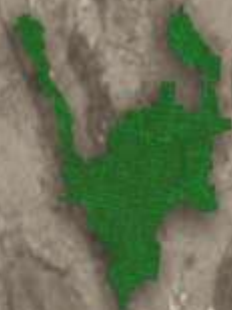
Scattered

90.6% of the dwelling inventory has developed horizontally

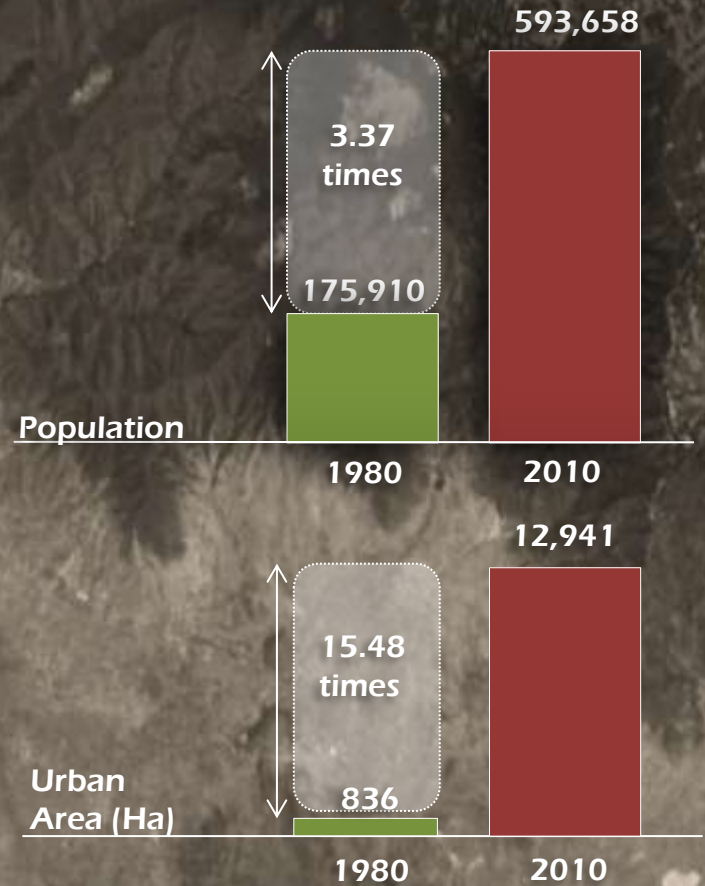
Low Density

The average density is 23 houses per hectare

Case Study: Oaxaca City, Oaxaca.



Case Study: Oaxaca City, Oaxaca.



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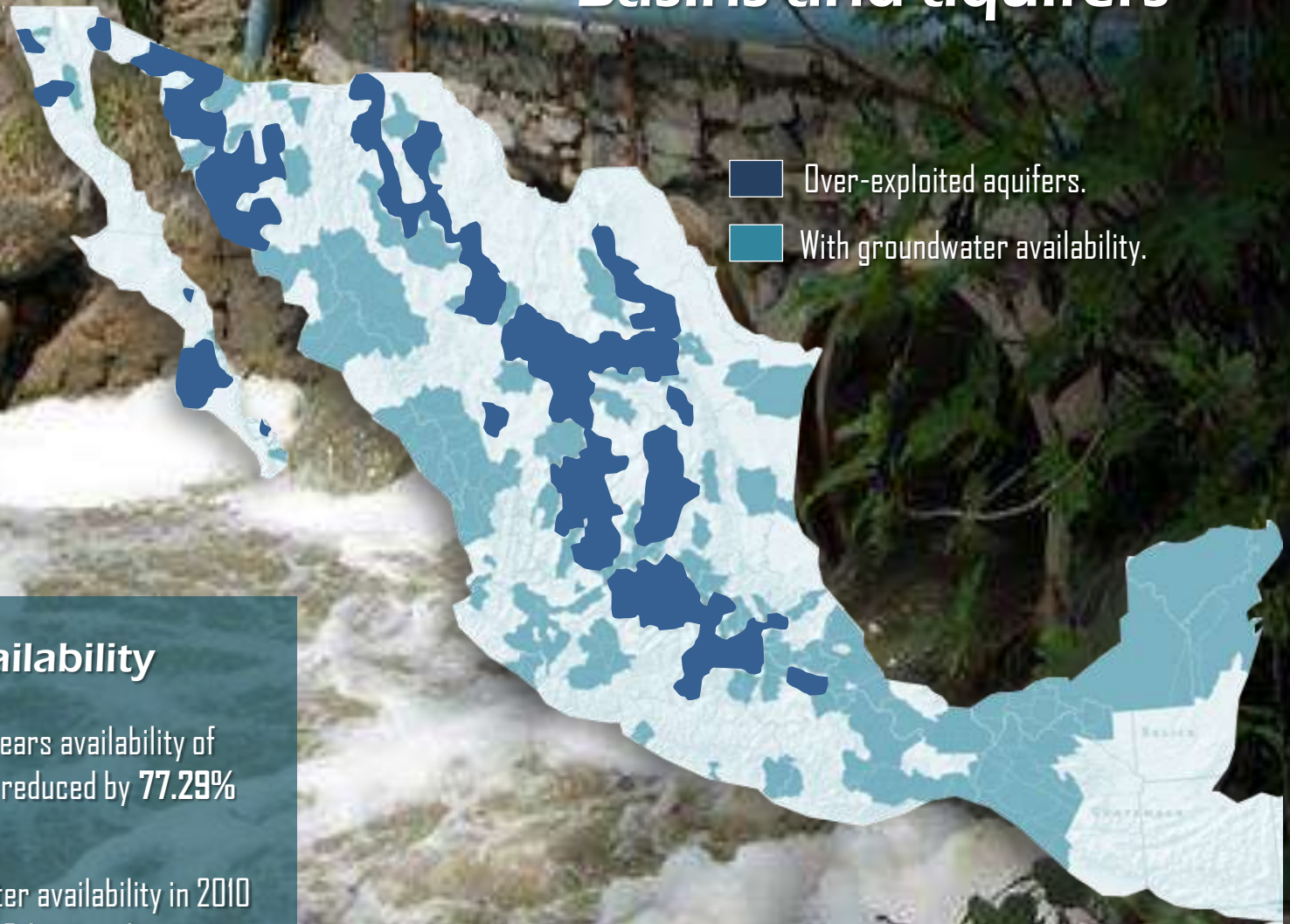
This inadequate development of the built environment has delivered **significant negative effects.**

Social

Economic

Environmental

Basins and aquifers



Water availability

- Over the last 60 years availability of water per person reduced by **77.29%**
- The estimated water availability in 2010 was only **4,028** m³/person/year

The expansion of urban borders

An aerial photograph showing a city's expansion into a valley. The foreground shows a residential area with white and red-roofed buildings. The middle ground shows a large, open area with a winding road and some greenery. The background shows a large, hazy mountain range under a clear sky.

Expansive urban model

- In 2010, the estimation of lost forests and greenlands accounted for **51Mt** of CO₂.
- It was also estimated that externalities from this urban model may generate 20.2 Mtons of CO₂ within the next 15 years. This emissions are predominately related to transportation, housing and street lighting.

Solid Waste

A yellow bulldozer is shown in the middle of a large pile of solid waste, likely at a landfill. The waste consists of various pieces of trash, including plastic bottles, paper, and other debris. The sky is filled with many birds, possibly seagulls, flying around the site. The overall scene depicts a large-scale waste management operation in a natural, outdoor setting.

Solid Waste

- Cities contribute with 37.5 Mtons of solid waste each year.
- Every day, 16,400 tons of urban waste are disposed improperly.

Ecosystems

A photograph of a dry, cracked field, likely a result of drought. The ground is brown and heavily fissured. In the background, several people are walking across the field, and there are some trees and hills in the distance under a hazy sky.

Ecosystems

Urban expansion is one of the main causes of environmental degradation biodiversity loss.

In Mexico, **500,000 ha.** of tropical and subtropical forests disappear each year.

Over **285 species** are classed as vulnerable or endangered.

Mexico remains **5° place** worldwide in deforestation.

The estimated loss of forests per year accounts to 600,000 ha. This number is equivalent to **four times the area of the Federal District**

An aerial photograph showing a city with a mix of urban development and agricultural land. The city is characterized by dense residential and commercial buildings with red-tiled roofs. Large, rectangular, brownish areas represent undeveloped or cleared agricultural land. The surrounding landscape includes green fields, some with rows of crops, and a large, circular roundabout in the lower right. The text 'Agricultural land' is overlaid in white on the upper right portion of the image.

Agricultural land

Agricultural land

The expansive urban model as well as the lack of appropriate legislation and planning instruments, has resulted in the urbanization of extensive areas of agricultural value.



Public investment

Public investment

Only **0.8%** of federal investment goes to planning and development of **urban and rural areas**

7.4% of federal public investment is intended for **Housing and community services**.

While **88.3%** of federal investments is aimed to road infrastructure, only **3.1%** is invested in **public transport**.

Only **1%** of public investment is aimed to **environmental protection**.

Air quality

Air pollution

The intensified use of private vehicles in the Mexican cities account to one fifth of the total Greenhouse gas emissions.

Air pollution is also related to several health and respiratory conditions. It also increases the chance of lung cancer by 20% as well as premature death



Housing sector

Housing sector

Mexican housing sector contributes with **32% of Mexico's GHG emissions** which account for **16.2% of the total energy** and **26% of total electricity consumption**.

There are 5 million unoccupied houses in the current dwelling stock. It is estimated that **33% of these units will require partial to total retrofitting by 2030**.

Social Inequities

An aerial photograph of a city, split vertically to show two different housing environments. The left side shows a dense, multi-story urban area with many small, weathered buildings, some with balconies and satellite dishes, and narrow, cluttered streets. The right side shows a modern, high-rise gated community with large, white, multi-story buildings with red-tiled roofs, large windows, and well-maintained landscaping, including green lawns and manicured trees. The contrast between the two areas is stark, illustrating social inequities in housing.

Social disconnection

The recent development of gated communities has created both urban and social fractures.

This housing model promotes social disparities rather than the necessary interaction as well as sense of community

Global / Mexican contribution towards low carbon development and climate resilience

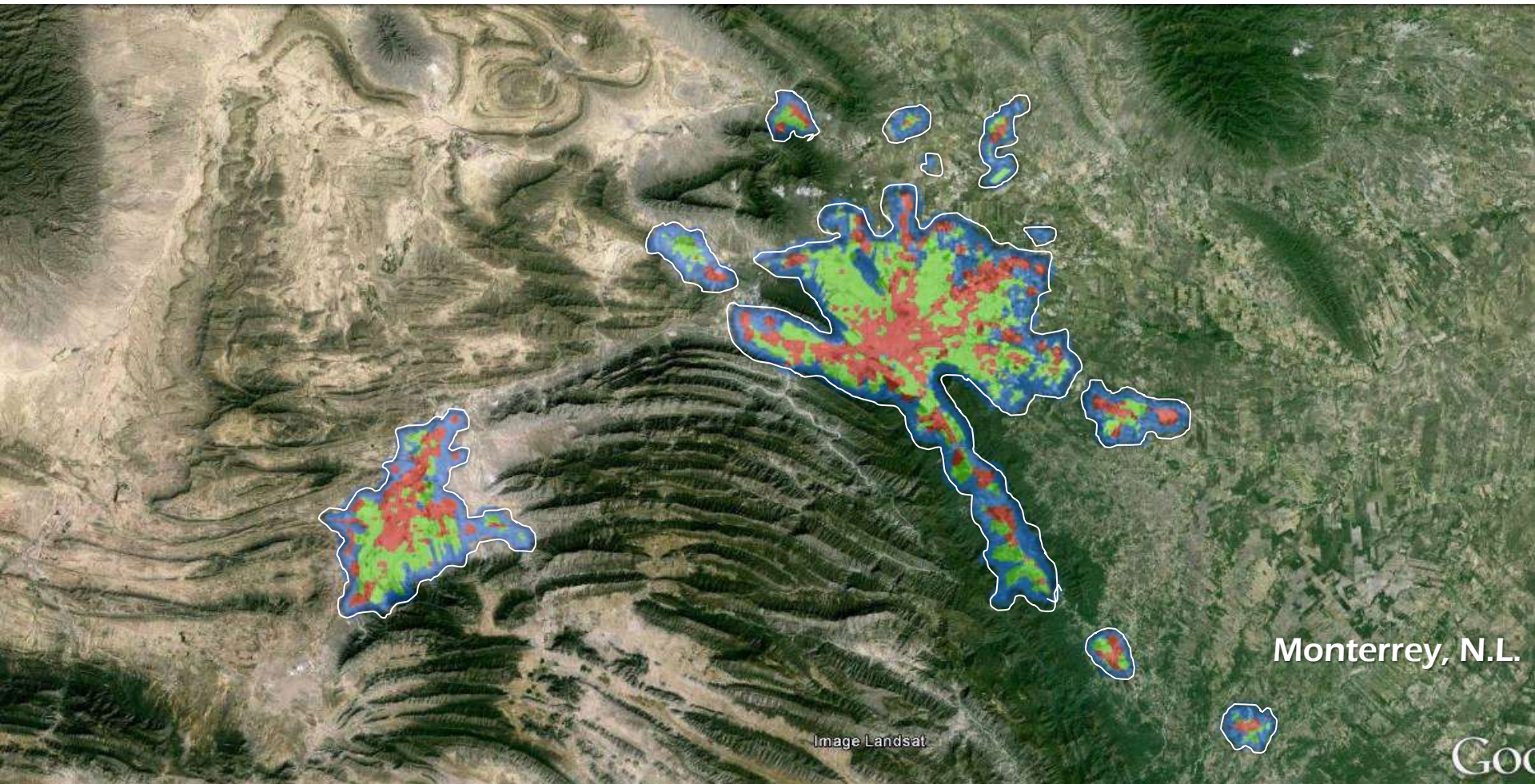
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National Urban and Housing Policy: Containing Urban Sprawl.

In Mexico, most local governments do not have an updated Urban Masterplan. In order to address urban expansion while the plans are being developed; **SEDATU has established Perimeters of Urban Restrain.** These perimeters have been created as an emerging strategy to contain urban growth by the allocating federal investment and subsidies within the established boundaries only



Monterrey, N.L.

Image Landsat

GOO



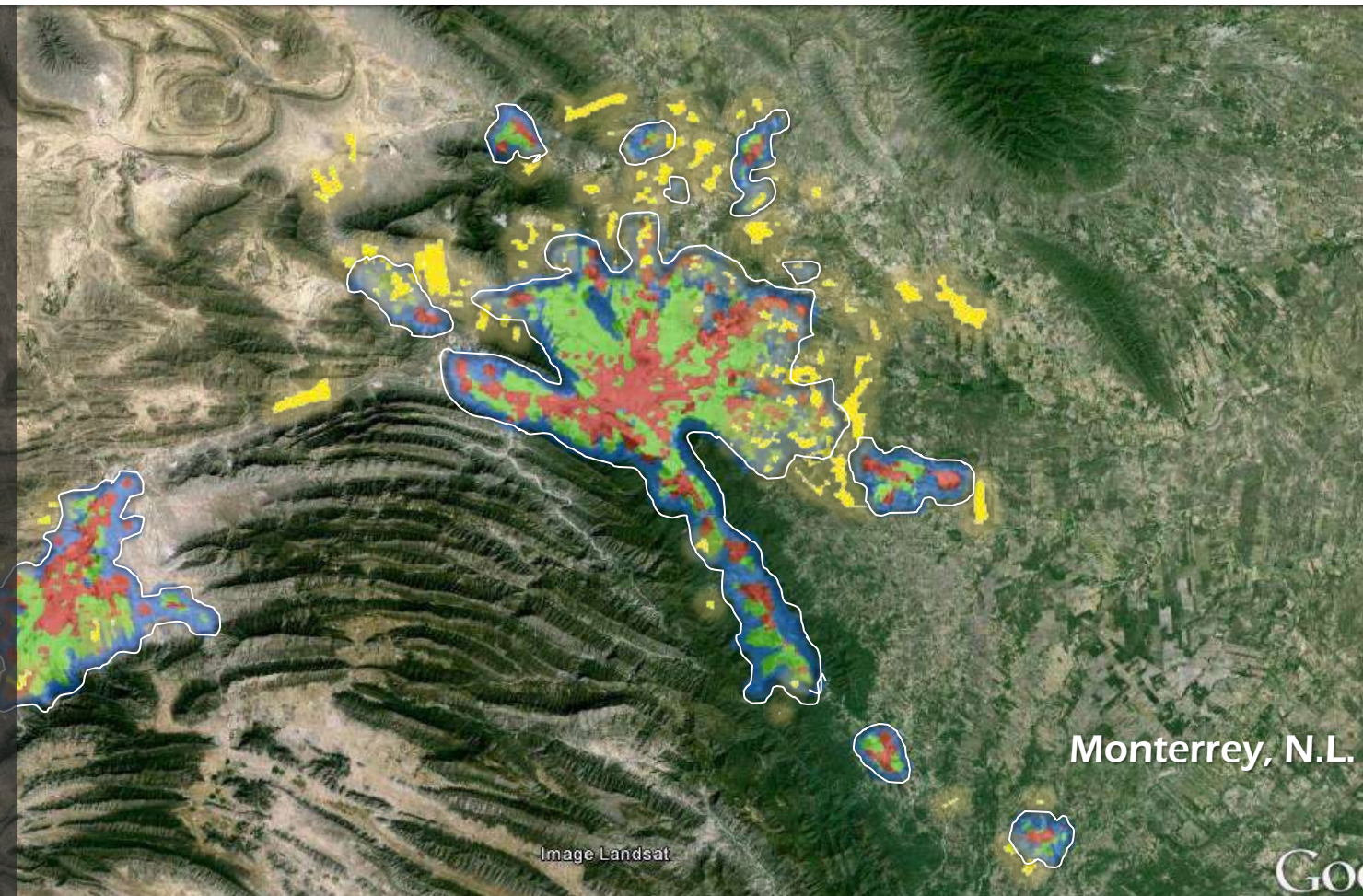
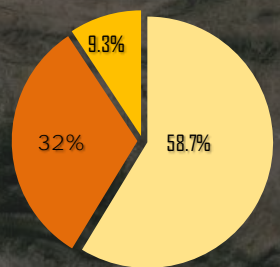
National Urban and Housing Policy: Containing Urban Sprawl.

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Land Reserves

There are **110,000 hectares** of reserves registered in Mexico
68% of them qualify to obtaining subsidies for housing projects

- 58.7%** Located within the perimeters - **64,844 Ha**
- 41.3%** Located outside the perimeters - **35,363 Ha**
- 9.3%** May obtain subsidies subject to a previous assessment - **10,288 Ha**





National Urban and Housing Policy: Consolidation of the Cities.

While restraining Urban sprawl is a core issue. SEDATU has also taken action to address other different scenarios which take place in the built environment. These actions provide **specific solutions to promote sustainable development in the existing cities**. It also seeks to create **inclusion of the population with the lowest income**.

- 1 PASPRAH
- 2 Habitat Program
- 3 Retrofitting of Public Areas
- 4 PROCURHA
- 5 Transport Oriented Development (TOD)
- 6 Intervention of Historic Centers
- 7 Reconversion of Industrial Sites
- 8 Reconversion of Train Infrastructure.
- 9 Urban NAMA
- 10 Housing Subsidies
- 11 Retrofitting of Housing Complexes
- 12 Subsidies for Land Acquisition





National Urban and Housing Policy: Strategy for Sustainable Urban Mobility



Challenges & Initiatives

- Consolidating institutional framework and regulations
- Strengthening technical capacities of local governments
- Promoting improved coordination of the sector.
- Data analysis and collection
- Promoting a social culture and habits of sustainable mobility

1

Complete Streets

2

Integrated Transport System

3

Transport Oriented Development (TOD)

4

Travel Demand Management

5

Urban freight



National Urban and Housing Policy: Strategy for Sustainable Urban Mobility

**Compact Urban
Development:**

Case Study:

Guadalajara,
Jalisco

Current Status





National Urban and Housing Policy: Strategy for Sustainable Urban Mobility

Compact Urban Development:

Case Study:

Guadalajara,
Jalisco

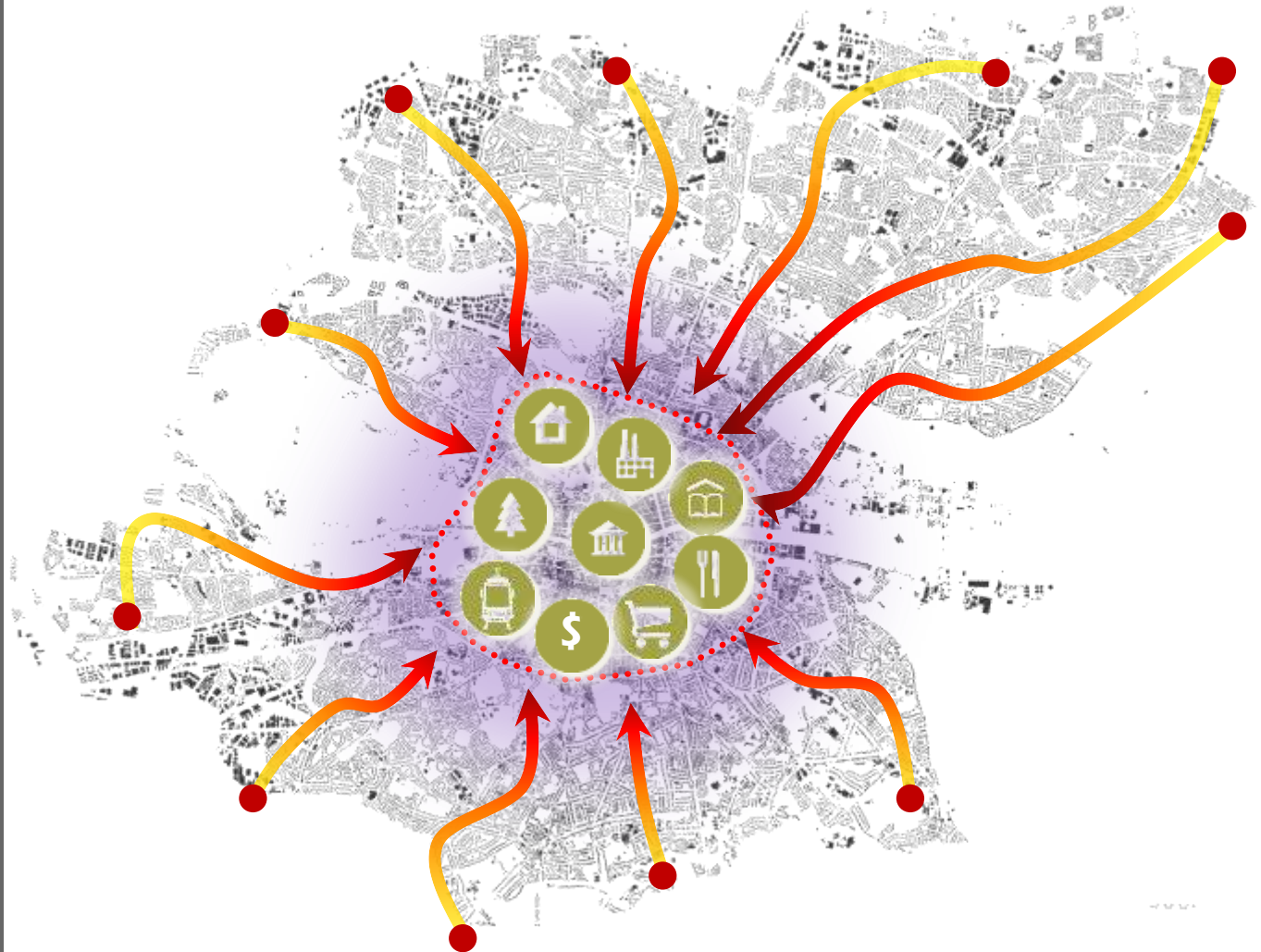
Target
Image





The Consolidation of the Cities: Polycentric Development

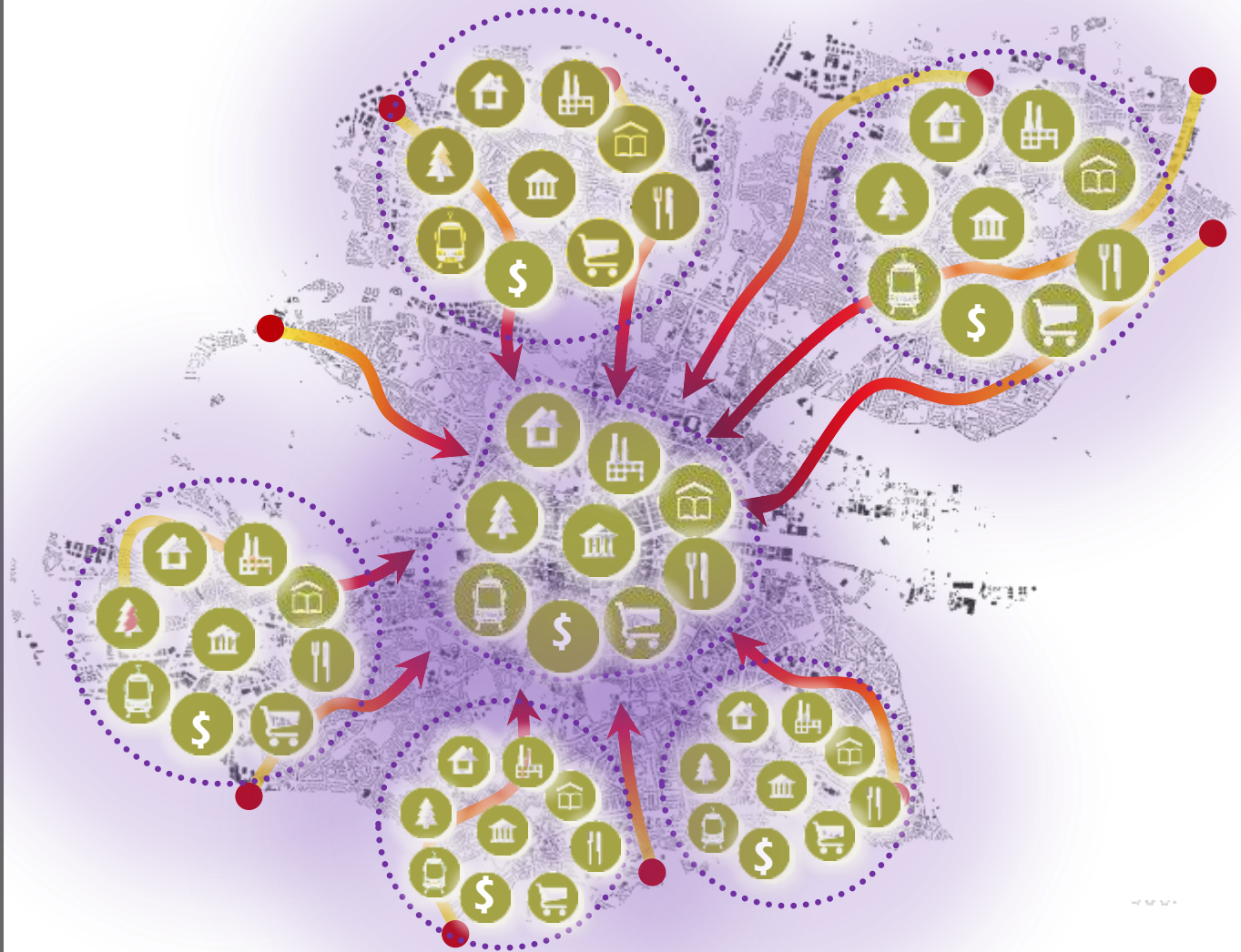
- The concentration of economic activities in central business districts as well as lack of infrastructure and equipment in the outer areas, forces people to make daily trips into the city center.





The Consolidation of the Cities: Polycentric Development

- The concentration of economic activities in central business districts as well as lack of infrastructure and equipment in the outer areas, forces people to make daily trips into the city center.
- The principle of a polycentric development is the promotion of local living and less commuting. It also contributes to the balance of urban stress in terms of transport and services.
- The objective is providing equal accessibility to basic amenities along the city. This strategy reduces the need of urban trips and load into focalized areas. It also aims for the improvement of living conditions





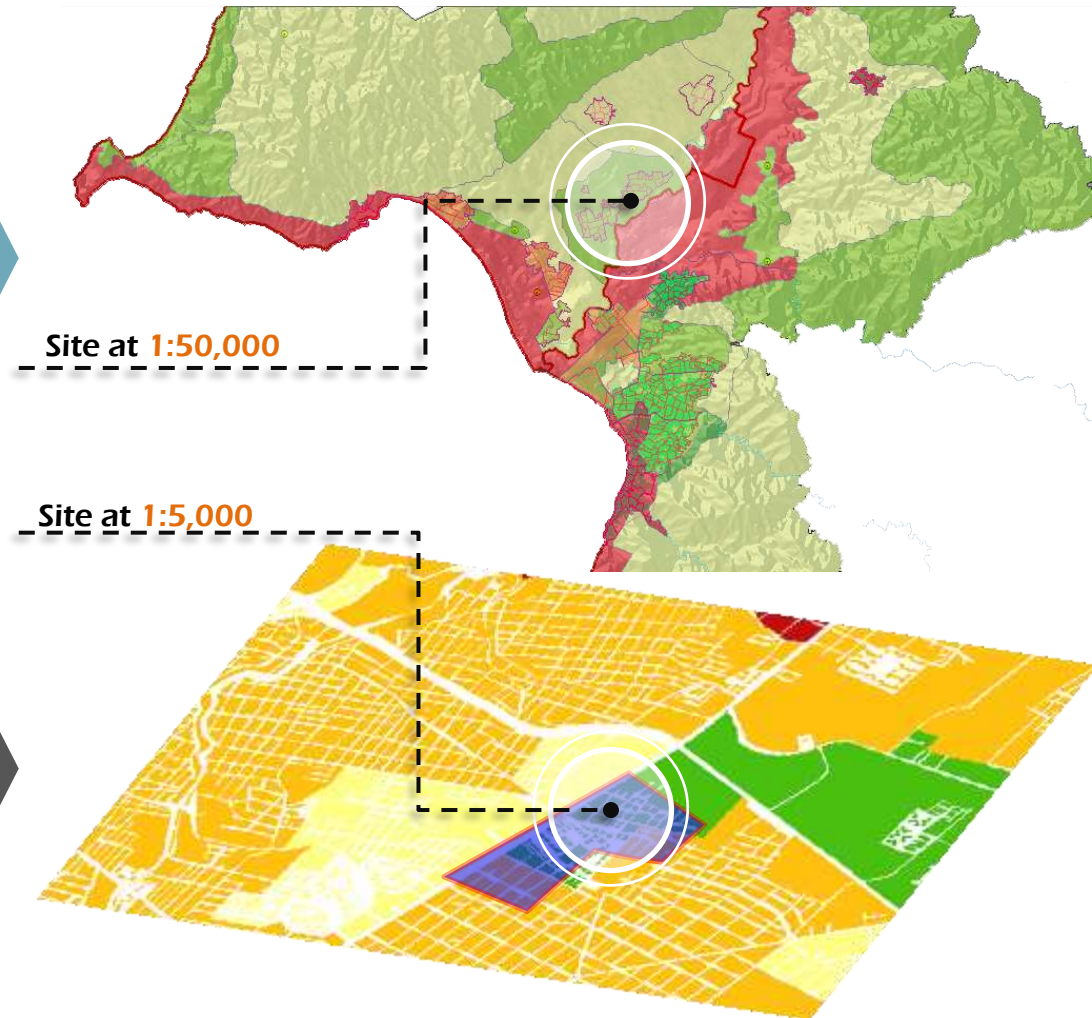
National Urban and Housing Policy: Resilience

Features of the Existing Risk Maps

- 1:50,000 scale is not appropriate for territorial planning, prevention and population resettlement
- Municipal charts only consider natural risks

Required Features for appropriate urban analysis.

- Developing 1:5,000 scale maps for increased accuracy and better decision making.
- Inclusion of other types of risks such as man-made hazards





National Urban and Housing Policy: Resilience

Achieving resilient cities requires coordinated efforts along all levels of government

All cities must:

- Establishing an institutional framework to react upon natural disasters
- Allocate resources to enable their finances resilience actions
- Ongoing monitoring of potential threats and risks in their area
- Full knowledge of the National Risk Atlas
- Being prepared at all times to address threats and guarding essential health and education services
- Enforce compliance of building regulations and technical specifications
- Provide training and spread throughout society prevention measures
- Foster natural and local reserves



National Urban and Housing Policy: Risk Management

Under presidential mandate, SEDATU and the Mexican Ministry of Governance work together to provide:

1

Holistic approach to risk management

2

Defining structural updates to territorial and urban policies

3

Delivering a Reform project to the current General Law of Human Settlements

4

Matching international standards for urban development in terms of civil protection

5

Norming, regulating, and prosecuting negligence's in human settlements in risk areas

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Instruments for Climate Action

Consolidation of Urban Reserves



In 2014 the Ministry established a subsidy program for the acquisition of inter-urban land.

The objective is to promote the development of vertical social housing (three or more levels and for 5x minimum salaries or less)

- **9,934** actions of vertical social houses
- For each subsidy the governments saves **\$1,600 USD** in other co-related items
- Each family with saves \$680 USD annually with such incentive
- It has mitigated about 360,000 CO₂eq
- Since 2014 the government has saved up to \$16 million USD



Instruments for Climate Action:

Current NAMA Housing programs

Nama for Sustainable Housing

The two objectives of the NAMA are:

1. Extending penetration of basic efficiency standards to the entire new housing market in Mexico.
2. Upgrading efficiency standards to a higher and more ambitious levels.

Nama for Sustainable Housing Retrofit

- This NAMA seeks to maximize the efficiency of water, electricity and gas consumption in existing homes, by introducing sustainable technologies and fixtures.

Hermosillo, Sonora





Instruments for Climate Action: NAMA for New Housing



The estimated **mitigation** by 2020 may achieve between **63 MtCO₂e** to **105 MtCO₂e** reductions

Objective:

- Mexican Housing NAMA is one of the leading initiatives in terms of technical design and institutional structure and coordination.
- The main concern of this NAMA is the enhancement of financial schemes in order to promote the construction of new residential units with high standard of energy performance, user comfort and water consumption. It is expected to generate incentive schemes through the **national mortgage market**.
- The initiative focuses predominantly on low-income residential dwelling and introduces minimum energy performance standards which aim to be incremental over the time.



Instruments for Climate Action: NAMA for Housing Retrofit

Estimated Leverage:

Every **\$1,000 USD** invested in sustainable technologies can mitigate up to **300 CO2 kg annually**.

20 years projection:

The estimated cost of mitigation within this period is **\$150 USD per 1 TonCO2**.

Objective:

- NAMA seeks to maximize the use of water, electricity and gas in the existing housing stock.
- The current cost and availability of these technologies is still a barrier for the Mexican market. Nonetheless the introduction of incentives to promote smart performance in houses, is expected to eventually open the market for a broader range of alternatives and affordable costs.
- After three years of operation, the Green Mortgage Program has brought the price of solar water heaters down to 40% of their original cost. This is a reference of market success and an optimistic projection for future strategies.



Instruments for Climate Action: Implementation of the Mexican Housing NAMA

NAMA Facility



Technical Component
4 million Euro, 11/2013 – 10/2017

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

CONAVI
COMISIÓN NACIONAL DE VIVIENDA

Financial Component
10 million Euro, 01/2014 – 10/2020

KfW

SfF

- Policy framework:
- Strengthening the NAMA as a public policy
 - Systematization of MRV
- Supply-side:
- Capacity building to medium and small project developers.
 - Technology transfer.
 - Integrated application of the NAMA.
- Demand-side:
- Awareness-raising for final users and local authorities.

- Financing-side:
- Credit guarantee program for bridge loans to small and medium-sized developers.
 - Subsidy program benefitting small and medium-sized developers when using selected eco-technologies
 - Project specific advisory services for small and medium project developers.

Main objectives:

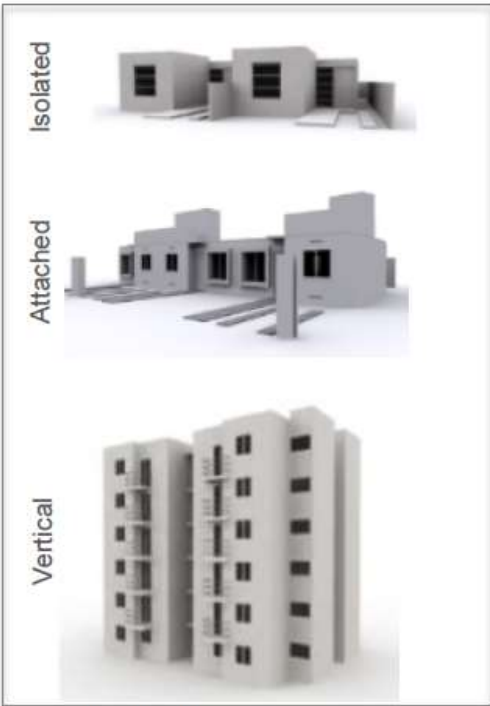
- Penetration of basic efficiency standards in the entire new housing market in Mexico
- Promotion of upgrading energy efficiency standards to more ambitious levels.



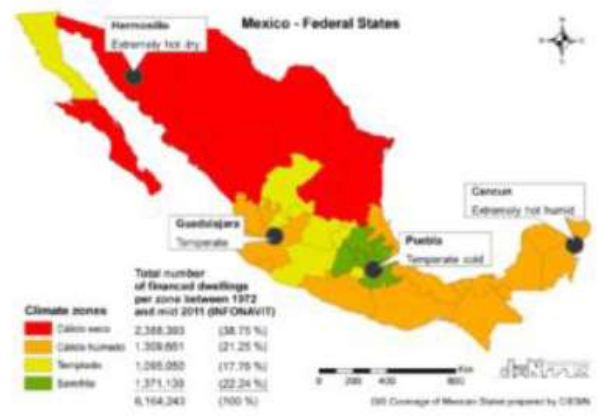
Instruments for Climate Action: Technical Design of the Housing NAMA



- Considers primary energy demand (electricity, gas, water) based on the “**Whole house**” approach.
- **Total energy** consumption for the different **housing typologies** (isolated, adjacent vertical house) in the 4 major **climate zones**.
- 2 calculation tools to reach the Global Performance Index (IDG).



Housing Typology.
Fuente: LOW CARBON architecture



Climatic zones for NAMA.
Fuente: Izn Friedrichsdorf



Global Performance Index (IDG).
Fuente: Infonavit

Instruments for Climate Action:

Programs vs Housing Units under the NAMA Program



CONAVI
COMISIÓN NACIONAL DE VIVIENDA

ecococasa
CASAS EFICIENTES PARA TODOS

ecococasa
CASAS EFICIENTES PARA TODOS

NAMA Facility



5000
housing units
(2015)

17,000
housing units
(2013-2015)

654-873
Passive housing
units
(in planning)

8,000-11,000
housing units
(in planning)

Reduction of at
least 20% in
CO₂ Emissions.

Reduction of at
least 20% in
CO₂ Emissions.

Reduction of at
least 80% in
CO₂ Emissions.

Reduction of at
least 20% in
CO₂ Emissions.

**Prioritized
Subsidy**

**Preferential
Rate in
Bridge Loan**

**Until 70% of subsidy
for extra cost of
measures**

**Credit guarantees,
preferential rate, direct
subsidy for measures**



Instruments for Climate Action:

Achievements in Sustainable Housing



Mexico is the first country in the world to implement a policy of sustainability focused on social housing in the context of NAMA.

In this administration, we have invested about 11 billion 400 million dollars to build a total of 700 thousand homes that integrate energy efficiency measures in water, gas and electricity and generate savings of at least USD\$ 25 in monthly energy expenses, to its inhabitants.

22,000 of these homes under construction are NAMA, meaning that they reduce over 20% of greenhouse gases emissions compared to conventional housing. This homes will reduce 800,000 tons of CO2 emissions throughout its life cycle (40 years).

In 2015, there have being provided 121,800 subsidies for sustainable housing, which have contributed mitigating 18,000 tons of CO2.

The Mexican government has earmarked subsidies, for energy-efficient housing construction, in this administration for more than 2 billion dollars and given the success of this program, we have received 225 million dollars from Germany, the UK and the IDB to promote the construction of such housing.

Sustainability programs in housing have received several international awards:

- Lighthouse Activities Award, UN-COP 19, Varsovia 2013.
- Green Ashden Award, Reino Unido 2015.

Development of Existing Housing NAMA.

Technical design: Step by step retrofit to the optimal energy and environmental performance.

In process: Pilot program for the retrofit of 10 homes in Merida.

Strategic alliance with FIDE to implement a Guarantee Fund of USD\$ 6 million for a line of credit of USD\$ 60 million looking for a greater range in GHG mitigation in the existing housing stock (approximately 100,000 actions).



Instruments for Climate Action:

Achievements in Sustainable Housing



Programa EcoCasa

SHF interesada en impulsar la construcción de viviendas con menor impacto ambiental en México, desarrolló conjuntamente con el Banco de Desarrollo Alemán (KfW) y el Banco Interamericano de Desarrollo (BID), el “Programa de Cooperación Financiera para la oferta de Vivienda Sustentable en México (ECOCASA)”.

- Desde el inicio de sus operaciones en 2013, en el marco del Programa ECOCASA se han desembolsado recursos por un monto de \$3,255 millones de pesos (aproximadamente \$215 millones de dólares) para poco más de 17 mil viviendas, con reducciones estimadas de 550,000 toneladas de CO2 en 40 años.
- El Programa EcoCasa tiene al día de hoy un avance del 63% respecto de la meta de 27,000 viviendas hasta el 2019. Estas viviendas, están siendo construidas por 21 desarrolladores y se ubican en 14 estados de la República cubriendo las principales zonas bioclimáticas del país.
- Adicionalmente, SHF implementará un componente de EcoCasas Pasivas con recursos no-reembolsables por parte de la Unión Europea a través del “Latin American Investment Facility” (LAIF), así como la NAMA Facility con recursos no-reembolsables de los gobiernos Británico y Alemán, los cuales contemplan metas de 600 y 11,000 viviendas respectivamente, hasta el año 2019.



Instruments for Climate Action:

Achievements in Sustainable Housing



Green Mortgage Program

Complimentary housing credit from INFONAVIT beneficiaries, so that the worker can buy a home with efficient technologies that save water, electricity and gas.

By October 1st 2015 **2,68,353 green credits** were allocated. This represents a participation of **96%** of the total credits that the institution grants.

It was estimated that each household saved about **\$2,556 MXN** pesos annually.

In terms of energy, gas and water performance it is estimated that:

- **89.14 GWh of gas and electricity** were saved each month, which accounts for the necessary load to supply 200 thousand families.
- **35 million m3 of water**. Equivalent to 9,000 Olympic pools.
- **395.7 Kilotons of CO2** mitigated. Which accounts for 175,300 planted trees.



Instruments for Climate Action:

Further steps taken: Inclusion of Home Appliances

In January 2015, President Enrique Peña Nieto announced:

“The Mortgage Credits granted by INFONAVIT will support the acquisition of energy saving home appliances, to help Mexican families paying less for utility services as well and to help the environment”

Between July and December 2015 INFONAVIT contributed to:

- Financing **2,704 home appliances from which** 79% were energy saving refrigerators, 20% low energy stoves and 1% Green labeled washing machines .
- The investment for such initiative was only **15 Million Pesos**

After 2015, credit beneficiaries can select low energy home appliances with the retailer **of their choice**

The maximum supported amount is **45,000 pesos**

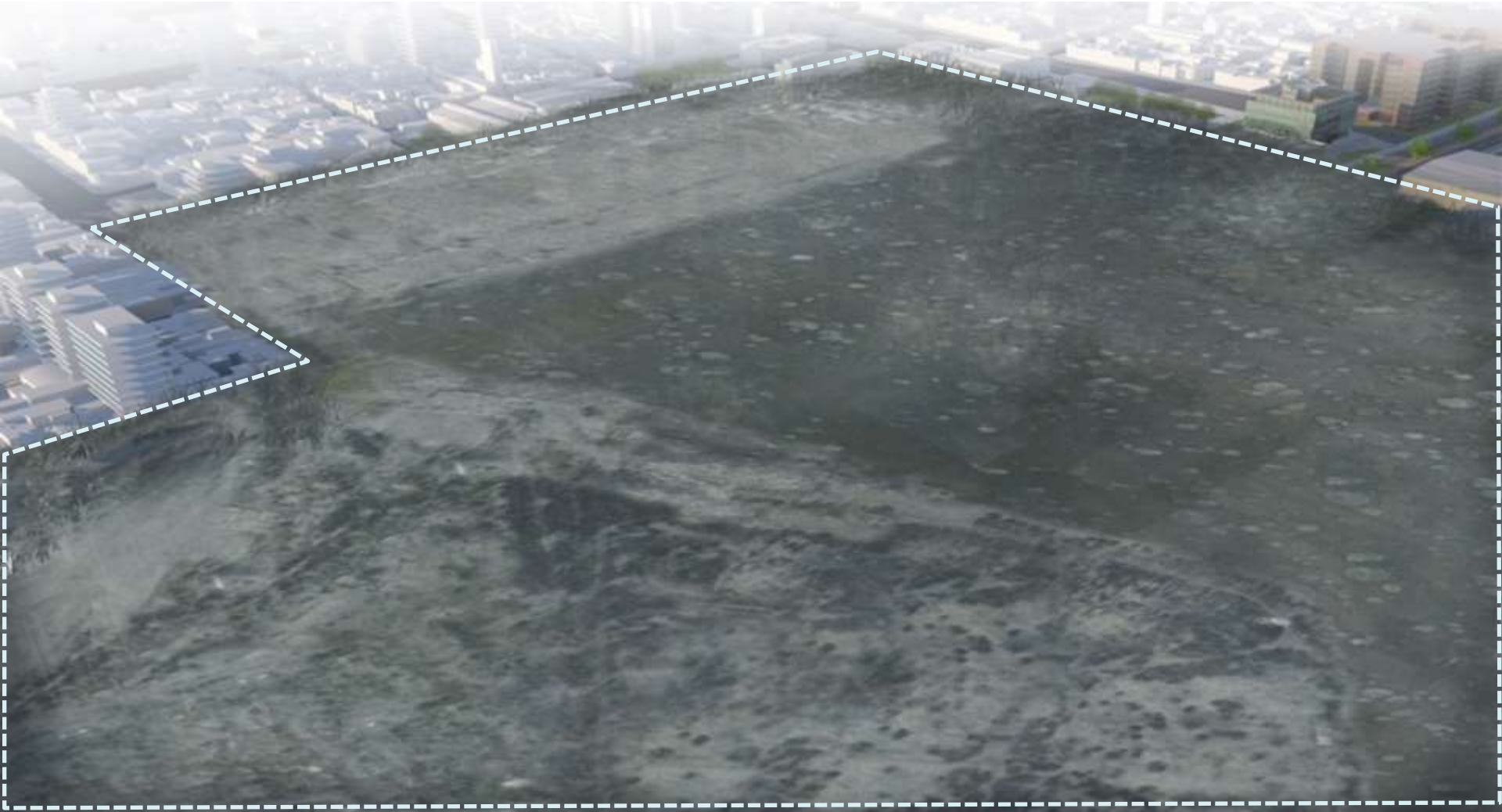
Such measures are aligned to the Mexican NAMA for sustainable housing

Up till today, the demand for such credits is located in State of Mexico 31%, Jalisco State 31%, Guanajuato 15% and the rest distributed along the remaining states (23%)

In December 2015, it was proposed establishing Trust to promote new creative solutions. 2% of the investment in eco-technologies was funded by providers.

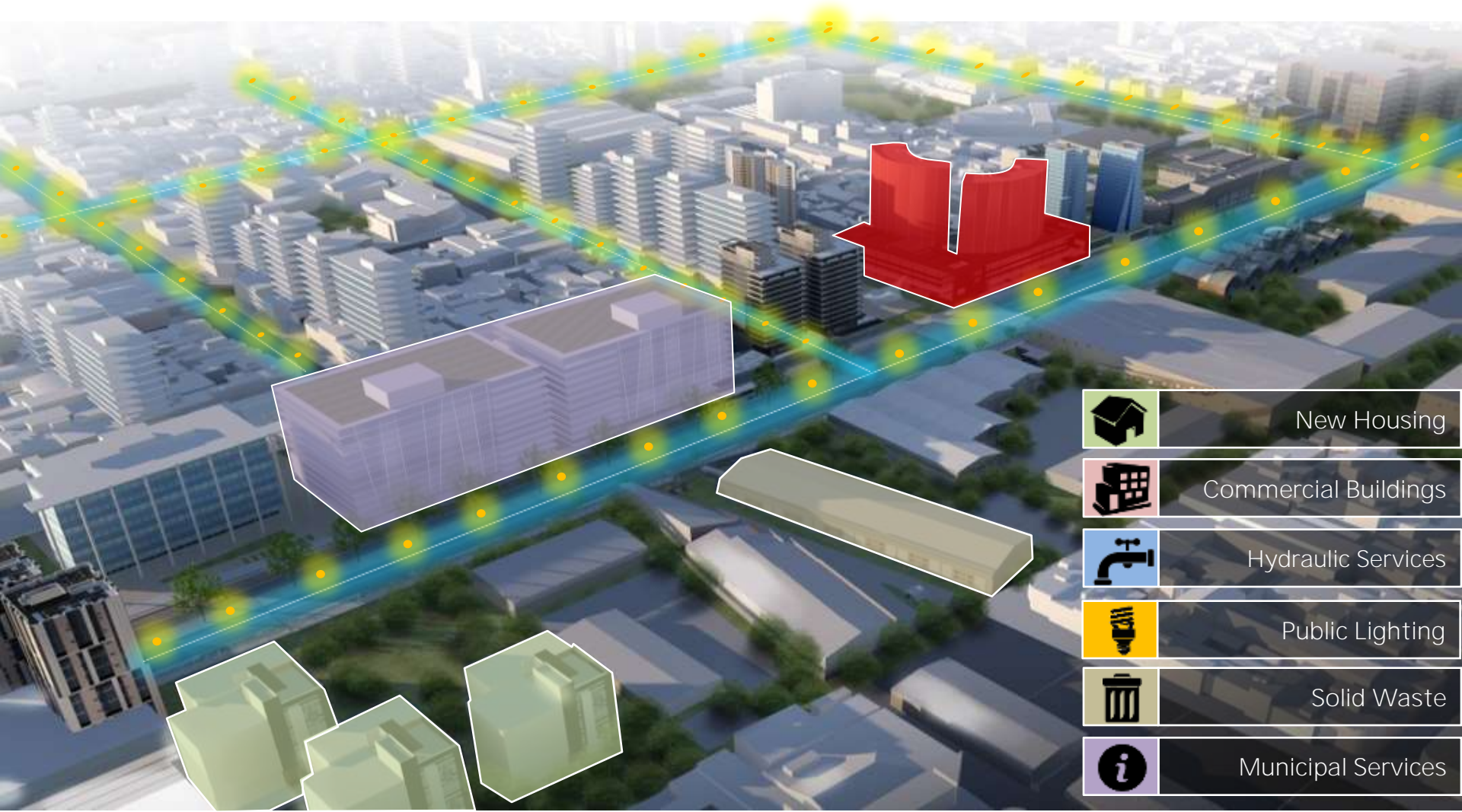








Instruments for Climate Action: Key Components of the Urban NAMA





Instruments for Climate Action: Key Components of the Urban NAMA



-  New Housing
-  Commercial Buildings
-  Hydraulic Services
-  Public Lighting
-  Solid Waste
-  Municipal Services



Instruments for Climate Action:

Legal Basis of Official Mexican Norms (NOM)

The Federal law of metrology and standards, in force since 1992, establishes that it is responsibility of all institutions across the federal public administration to build national consultative standardization committees in their fields of expertise, to issue Official Mexican Norms (NOM)

The following are some of the NOM in force which are related to energy efficiency for both buildings and internal equipment



Instruments for Climate Action:

Legal Basis of Official Mexican Norms (NOM)

No.	Official Mexican Norm	Description
1	NOM-003-ENER-2011	Minimum levels of thermal efficiency for domestic and commercial water heaters
2	NOM-005-ENER-2012	Energy factor and energy consumption levels for domestic washing machines
3	NOM-011-ENER-2006	Minimum levels for Seasonal Energy Efficiency Ratio in Central Air Conditioning Units
4	NOM-015-ENER-2012	Maximum levels of energy consumption in domestic refrigerators and freezers with hermetic motor-compressor
5	NOM-017-ENER/SCFI-2012	Minimum efficiency levels for Compact Fluorescent Lamps
6	NOM-021-ENER/SCFI-2008	Specs. for proof methods in Energy Efficiency Ratio for Room Air Conditioning Units
7	NOM-022-ENER/SCFI-2008	Maximum levels of electric energy by volume of usable cooled liter in commercial refrigerators.
8	NOM-023-ENER-2010	Specs. for proof methods in Energy Efficiency Ratio for minisplit and multisplit air conditioning units
9	NOM-024-ENER-2012	Certify Optic and thermal features of glazing systems for better energy performance in buildings fabric
10	NOM-025-ENER-2012	Minimum thermal efficiency values for domestic cooking appliances powered by gas
11	NOM-028-ENER-2010	Minimum efficiency values for lamps of general use
12	NOM-030-ENER-2012	Specifications for LED lamps integrated to a lighting system
13	NOM-031-ENER-2012	Energy efficiency specifications for LED lights for outdoors and street illumination
14	NOM-007-ENER-2004	Approved levels of Electric Density potential for lighting in buildings
15	NOM-008-ENER-2001	Preventing heat gain in buildings through façade design and performance
16	NOM-020-ENER-2011	Preventing heat gain in housing units through façade design and performance
17	NOM-032-ENER-2012	Maximum levels of electric power for equipment in sleep mode



Instruments for Climate Action:

Conclusions



There are several efforts and strategies implemented in the Mexican Framework towards low carbon buildings and urban development.

However, there are still **initiatives, policies and institutional structures** that need to be created in order to achieve the reduction targets we envision



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