

2025 vision for

# Mexico City

on  
climate change



“In an increasingly urban world, sustainable development in cities is key to addressing the environmental challenges of global scale.

Cities are engines of progress and innovation, which is why Mexico City, being the third largest urban agglomeration in the world, has taken local climate commitments with concrete actions and strategies for balanced and sustainable growth in the short, medium and long term.

With a vision of a Sustainable Capital, Mexico City implements a development policy committed to the balance between the preservation of the environment, social harmony, respect for public space and economic development, with tangible results to improve the quality of life of our citizens, while promoting civic culture, responsible participation and shared responsibility with the environment”.

**Dr. Miguel Ángel Mancera Espinosa**  
Mayor

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**ACRONYMS**

\*By its acronym in Spanish · \*\*By its acronym in German

100 Resilient Cities	100RC
Agriculture, Forestry and Other Land Uses	AFOLU
Alliance for Risk Sensitive Investment	ARISE
National Risk Atlas	ARN*
Black Carbon	BC
Leadership group of cities against climate change	C40
Carbonn Cities Climate Registry	cCCR
Clean Development Mechanism	CDM
Mexico City	CDMX*
National Communications Center	GENACOM*
National Disaster Prevention Center	CENAPRED*
Inter-Ministerial Commission on Climate Change	CICC*
Inter-Institutional Commission on Climate Change of the Federal District	CICC-DF*
Carbon Dioxide	CO <sub>2</sub>
Carbon Dioxide equivalent	CO <sub>2</sub> eq
Conference of Parties of the United Nations Framework Convention on Climate Change	COP
Virtual Center on Climate Change of Mexico City	CVCCCM*
Danish Energy Agency	DEA
Federal District (Mexico City)	DF*
General Directorate of Risk Management	DGGR*
General Directorate of Civil Protection	DGPC*
Federal Official Gazette	DOF*
Economic Commission for Latin America and the Caribbean	ECLAC
Local Climate Action Strategy of Mexico City	ELAC

Greenhouse Gases	GHG
Deutsche Gesellschaft für Internationale Zusammenarbeit	GIZ**
Hydrofluorocarbons	HFC
ICLEI— Local Governments for Sustainability	ICLEI
National Institute of Ecology and Climate Change	INECC
National Inventory of Greenhouse Gas Emissions	INEGEI
Intergovernmental Panel on Climate Change	IPCC
Energy, Industrial Processes and Product Use	IPPU
Institute on Policies for Transportation and Development	ITDP
General Law on Climate Change	LGCC*
Institute on Policies for Transportation and Development	ITDP
General Law on Climate Change	LGCC*
Law on Mitigation and Adaptation to Climate Change and Sustainable Development of the Federal District	LMACCDSDF*
United Cities and Local Governments	UCLG
Monitoring, Reporting and Verification	MRV
National Risk Atlas	NRA
Mexico City Climate Action Program	PACCM*
National Emissions Registry	RENE*
Sustainable Energy for All	SE4ALL
Environment Ministry	SEDEMA*
Mexico City Health Ministry	SEDESA*
United Nations Framework Convention on Climate Change	UNFCCC
United Nations Office for Disaster Risk Reduction	UNISDR
World Mayors Summit on Climate	WMSC
World Resource Institute	WRI

## Executive summary

**The Vision for Mexico City includes international, domestic and local climate policies as of 2015.**

It presents the current situation of Greenhouse Gases (GHG) and particle emissions of Mexico City (CDMX), the total amount of which is 30.7 million annual tons of carbon dioxide equivalent (CO<sub>2</sub>eq). The largest source is transportation, with 45% of emissions, and the proportion of Black Carbon (bc) comprises the majority, with 1,222 annual tons.

It also identifies the principal risks caused by natural phenomena (floods, landslides, seismic activity, etc.) and their impacts on CDMX, as well as the consequences to the health, forestry and biodiversity sectors, and hydraulic resources.

This document includes the progress of actions in mitigation, adaptation, policy changes and the Resilience Strategy as of 2015, in accordance with the seven strategic areas of the 2014-2020 Mexico City's Climate Action Program (PACCM, by its Spanish abbreviation), and reports progress in the accumulated reduction of emissions of 2.3 million tons of CO<sub>2</sub>eq — that is 34% of the goal set for 2018.



It also includes the implementation and projection of actions focused on development low in GHG and particle emissions, as well as an increase of resilience to climate change and the adoption of the guiding principles of the PACCM: improved quality of life, consensus with implementers, inclusion of decision makers and society, promoting cohesion and collective participation, gender equality, governance and flexibility to redefine measures<sup>1</sup>.

The main objective of the Vision for CDMX is **to increase the quality of life and sustainable well-being with low levels of carbon in Mexico City** and includes 102 actions distributed across three pillars:

## 1 Mitigation

The mitigation CDMX's goal for 2025 is to reduce GHG and particle emissions by 31.4 million tons of CO<sub>2</sub>eq compared to the base year 2012 —the base line of GHG and particle emissions projected for 2025 is 36.6 Mton CO<sub>2</sub>eq—.

## 2 Adaptation and construction of the Resilience Strategy

The adaptation goal will pursue increase the adaptive and resilience capacities by 8.8 million people, addressing the reduction of vulnerability to the effects of climate change and the construction of the CDMX Resilience Strategy.

Regarding the latter, the Strategy represents a transversal vision for the city in the long term, in which the government, private sector and civil society comprehensively understand and address across multiple levels, disaster-related situations and integral risk management.

<sup>1</sup> Centro Mario Molina para Estudios Estratégicos sobre Energía y Medio Ambiente, A.C. (Mario Molina Center for Strategic Studies in Energy and the Environment), 2014-2020 Mexico City Local Climate Action Strategy. June 2014.

<sup>2</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, 2014-2020 Mexico City Climate Action Strategy. June 2014.

## 3 Transversal policies

Accordingly, the transversal policies strengthen the synergic effects between the mitigation and adaptation actions, and contribute toward the 2025 mitigation goal. The relevance of the Climate Change Environmental Fund is also considered to be a mechanism to provide incentives for the implementation of actions for this Vision.

The CDMX Vision for 2025 includes the monitoring, reporting and verification of the actions through the online Monitoring System of the PACCM with the proposed indicators, which helps to provide certainty over compliance with the goals.

## Purpose of the document

2

**To demonstrate to climate change decision makers CDMX's progress in the 2015 political climate and the outlook for 2025 in: mitigation, adaptation and construction of the Resilience Strategy, as well as transversal policies, which will help the city face the challenges and opportunities arising from climate change.**

# Climate polices of Mexico

Amid the effects of climate change in Mexico, the country has developed international, domestic and local climate policies.

Scheme 1 illustrates their involvement.

# International and domestic

## SCHEME 1

International commitments of Mexico and the domestic political climate for the 1997-2015 period

International	Year	National
Mexico presents to the United Nations Framework Convention on Climate Change (UNFCCC), the First National Communication, Inventory of Greenhouse Gas Emmissions (INEGI, by its Spanish abbreviation), for 1990.	1997	
The Kyoto Protocol takes effect, and Mexico participates in the Clean Development Mechanism (CDM) as a carbon credit market.	2005	The Inter-Ministerial Commission on Climate Change (CICC, by its Spanish abbreviation) is created by presidential decree.
Third National Communication before the CMNUCC, along with an update by INEGI.	2007	Mexico includes sustainability in the guiding principles of the National Development Plan (NDP) with Climate Change objectives. The first National Climate Change Strategy is published.
Fourth National Communication before the CMNUCC, along with an update by INEGI.	2009	The 2009-2012 Special Climate Change Program (SCCP), to contribute toward the goals of the NDP, is published. It includes 105 objectives and 294 goals. The aspirational goal was 51 million tons of CO <sub>2</sub> eq and to make Mexico less vulnerable.

International	Year	National
Fifth National Communication before the CMNUCC, along with an update by INEGI of 2010.	2012	The General Law on Climate Change is published, ensuring continuity of the climate change policies. It includes aspirational goals to reduce GHG emissions: 30% by 2020 from the base line and 50% by 2050 from the emissions levels of 2000.
	2013	The National Climate Change Strategy (NCCS) is published, a guiding instrument for planning. It defines the vision for the next 10, 20, and 40 years in terms of mitigation and adaptation.
	2014	The 2014-2018 sccp is published. It has five objectives, 25 strategies and 199 lines of action. Its objective is to reduce the vulnerability of Mexico, and the contribution of the Federal Government to meet the goal of reducing GHG emissions 30% by 2020.
The contribution is in two components: mitigation and adaptation.	2015	The National Emissions Registry (RENE, by its Spanish abbreviation) and its regulations were created in 2014-2015. Compiles the supplies in terms of GHG emissions in the different productive sectors of the country.

**1 MITIGATION**

**UNCONDITIONED REDUCTION**  
Mexico commits to reduce GHG emissions and SLCPs 25% by 2030: a GHG reduction of 22% and Black Carbon by 51%.

**2 ADAPTATION**

**CONDITIONED REDUCTION**  
The commitment for reduction of 25% may be increased by up to 40% in a conditioned manner, subject to the adoption of a global agreement.

Mexico includes commitments up to 2030. The priority is to protect the population from the diverse impacts of climate change.

Source: Original compilation with information from INECC, SEMARNAT, LGCC and PECC 2009-2012 2014-2018, 2015.

## Local: Mexico City

The CDMX climate policy has been in existence since the 2000s decade, via the Environment Ministry (SEDEMA, by its Spanish abbreviation), beginning with the Plan Verde (Green Plan), which considered a medium-term route (15 years). It contains specific strategies and actions in energy matters and climate change to guide the city, along with public policies, Climate Action Strategies and Programs focused on improving the quality of life of the city's population, and the implementation of actions to face climate change.

In 2008, the city was the first entity in the country to develop and orchestrate a State Climate Change Program, amid the need to adopt measures for mitigation, adaptation, communication and environmental education<sup>6</sup> (scheme 2).

Source: Original compilation with information from ELAC[1], SEDEMA[2], PACCM[3], Entity of the Federal District[4], 2015.

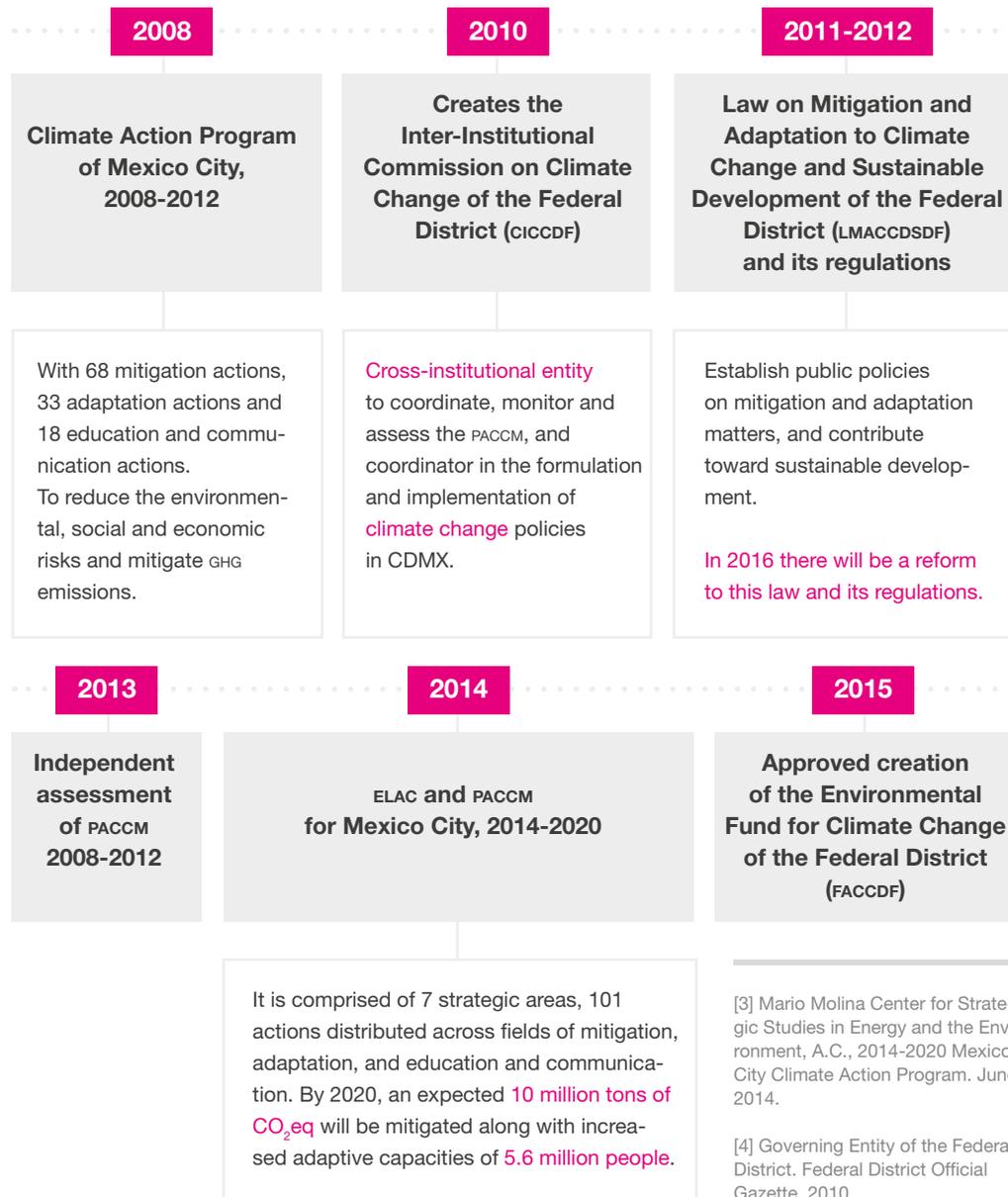
[1] Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Local Climate Action Strategy. June 2014.

[2] Environment Ministry. Greenhouse Gas Emissions Inventory, Mexico City Metropolitan Area, 2006. Mexico.

### SCHEME 2

#### 2004-2014 Mexico City climate policy





**SCHEME 3**  
Participation of Mexico City in international initiatives on climate change



Source: Original compilation [1], 2015.  
[1] With information from: C40 Climate Leadership Group available at: <http://www.c40latammayor-forum.org/es/forum/about>. Last viewed: August 2015. uCLG The world network of local and regional cities and governments. Available at: <http://www.uclg.org/es/home>. Last viewed: August 2015. Third Capital Government Report. Mexico City Resilience Strategy. 2014. SENER. Prospective on Renewable Energy 2013-2027. 2013. Mexico.

Based on the above, outstandingly, CDMX has received international recognition for its progress in sustainable and urban development (scheme 4).

**SCHEME 4**  
International recognition for Mexico City, 2013-2014

- 1** Ciclociudades  
Prize for best practices on urban cycling, from the Institute for Transportation and Development Policies (ITDP).
- 2** C40: Air Quality  
The city competed with 120 cities around the world for programs to improve Air Quality in the Mexico City Metropolitan Area (ProAire) during the last 23 years.
- 3** Audi Future Award  
Prize for the Living Mobilities project for Mexico City, for deploying the urban operations system.

Source:  
Original compilation with information from SEDEMA, 2015.

The city has also collaborated with the following institutions: British Embassy in Mexico, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), GmbH, CTS-Embarq México and the Danish Energy Agency, among others.

## 4 Mexico City's current situation

# GHG and particle emissions of Mexico City

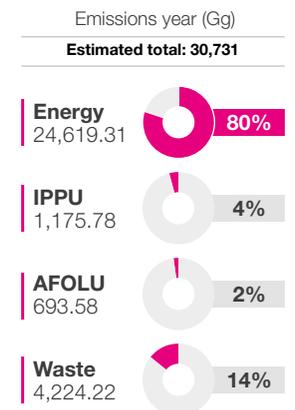
The National Inventory on Greenhouse Gas Emissions (INEGI) 2013, reported 665 MtCO<sub>2</sub>eq of total emissions for Mexico. The transportation, industry and energy generation sectors contributed around 62 % of domestic emissions<sup>12</sup>.

The total GHG and particle emissions of CDMX in 2012 were 30.7 MtCO<sub>2</sub>eq. The energy sector accounted for 80 % of total emissions. Regarding Black Carbon (bc) — a short-lived pollutant— it totaled 1,222 tons. bc has a high potential for global warming, which could be between 800 and 1,400 to 20 years<sup>13</sup>, although there is great uncertainty in that regard. In the category of mobile sources, which considers transportation with gasoline and diesel, it represented 97 % of these emissions. It is relevant to mention that inventories of the city are updated every 2 years.

<sup>12</sup> INECC. Available at: [http://www.inecc.gob.mx/descargas/cclimatico/2015\_inv\_nal\_emis\_gei.pdf]. Last viewed: September 2015.

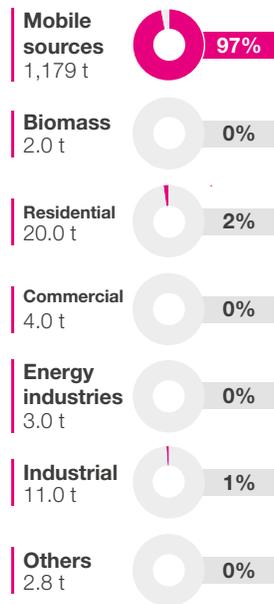
<sup>13</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June 2014.

**GRAPH 1**  
CO<sub>2</sub> eq emissions  
by category, 2012



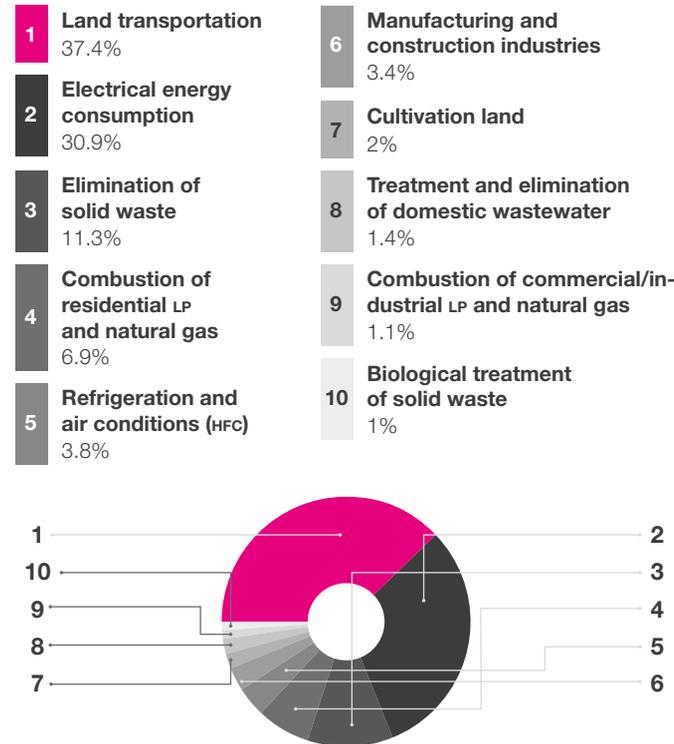
The sources that contributed the greatest percentage of emissions in the 2012 inventory were: transportation, electrical energy consumption and elimination of solid waste.

**GRAPH 2**  
Black Carbon emissions, 2012



Graphs 1, 2 y 3  
Source: Prepared with information from ELAC 2014-2020.

**GRAPH 3**  
Key sources of GHG and particle emissions, 2012



## Risks due to natural phenomena and their impact in Mexico City

Floods, landslides, earthquakes, forest fires and pandemics have affected the city. The series *Impacto Socioeconómico de los Desastres en México (Socio-Economic Impact of Disasters in Mexico)*, published by the National Center for Disaster Prevention (CENAPRED, by its Spanish abbreviation), includes data from the General Directorate of Risk Management (DGGR, by its Spanish abbreviation) and the General Directorate of Civil Protection (DGPC, by its Spanish abbreviation), through the National Communications Center (CENACOM, by its Spanish abbreviation), which analyzes the physical origins of phenomena and evaluates the socio-economic impacts of the damages suffered in the public, private and social sectors. The methodology adopted is of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC)<sup>14</sup>. Table 1 includes the compendium of impacts in the city for the period 1980-2013.

<sup>14</sup> SEGOB. CENAPRED. Series 14. Socio-Economic impact of disasters in Mexico.

<sup>15</sup> Injured, evacuated, wounded and victims are considered.

<sup>16</sup> Current dollars as of the year of the event. From the Bank of Mexico; the average annual price of the dolar was obtained, 1980-2014 period. The economic impacts represent the direct costs.

<sup>17</sup> Includes: grasslands, mature trees, reforested areas, shrubs and matorral shrublands.

**TABLE 1**  
Socio-Economic impacts due to natural phenomena in CDMX, 1980-2013 period

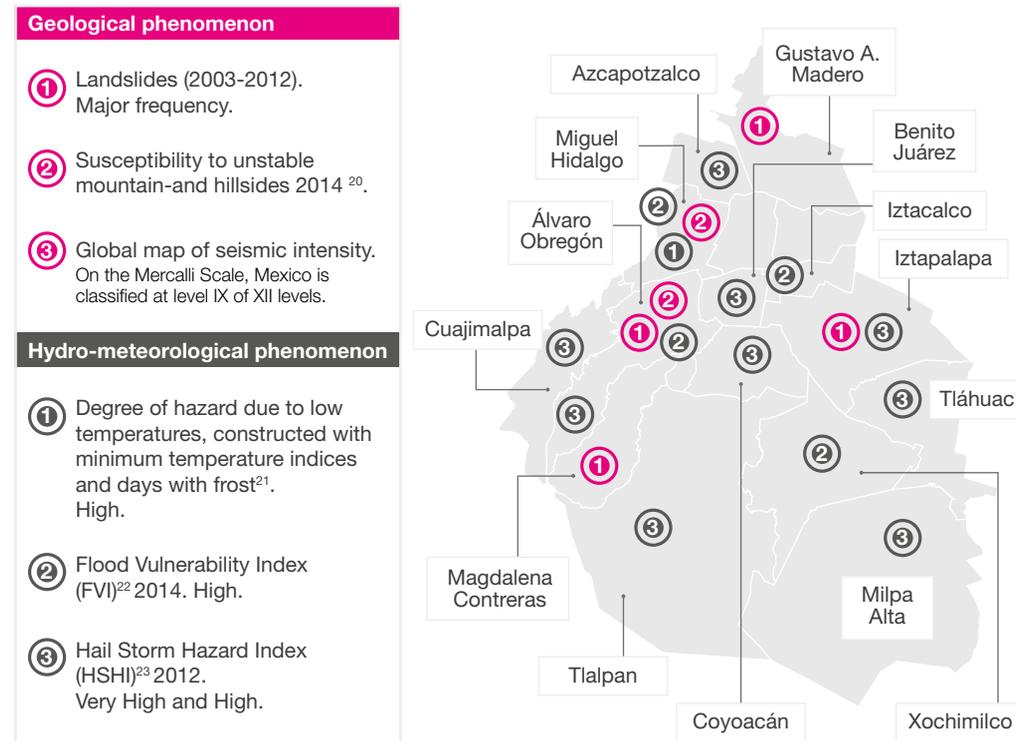
Source: Prepared with information from the Series on Socio-Economic Impacts of Disasters in Mexico 1980-2013, 2015.

Phenomenon	Affected population <sup>15</sup>	Economic impact (millions of dollars <sup>16</sup> )
 <b>Hydro-meteorological:</b> rain, flooding, wind, hail and overflow of wastewater.	49,970	32.4
 <b>Geological:</b> landslides and earthquakes.	6,338	4,100
 <b>Forest fires</b> (8,657 forest fires).	17,549 hectares affected <sup>17</sup>	2.7
<b>Accumulated total</b>	<b>56,308</b>	<b>4,135</b>

Hydro-Meteorological phenomena account for 89 % of the accumulated total. The total accumulated economic impact of \$4,135.4 million dollars (mdd) represents 74.4 % of the economic losses of catastrophes of Latin America and the Caribbean in 2011, which totaled \$5,558 mdd<sup>18</sup>. These impacts due to natural phenomena and climate variability shed light on the importance of reducing vulnerability and strengthening the city's adaptation.

**MAP 1**  
Boroughs of CDMX with a high degree of vulnerability and hazard

Source: Original compilation with information from ANR, CENAPRED, 2015.



Health phenomena, such as influenza, have caused great losses to the city. The economic losses between 2009 and 2012 totaled \$4,331 mdd, and affected 2,259 people. If we consider the effects of natural and health phenomena, this totals \$8,466 mdd.

The National Risk Atlas (ANR, by its Spanish abbreviation) is the guiding instrument for the disaster prevention policy in Mexico. It identifies and reports the risks of disasters in the country. With information from ANR and the history of geological and hydrometeorological phenomena that have affected the city in the past decade, it has been possible to identify the boroughs with high levels of vulnerability and hazard. Of the city's 16 boroughs (*delegaciones*), 14 are categorized to have high levels of vulnerability and hazard (map 1). In addition, the city ranks level IX on the *Mercalli Intensity Scale*<sup>19</sup>, which measures seismic intensity.

In the area of health, the hypothetical scenario of an increase of 1°C to 2°C in the average annual temperature of the city would lead to an increase in the presence of the *Aedes aegypti* mosquito —a carrier of dengue fever— and would effectively increase the propagation of vector-borne diseases, along with other health consequences, as shown in scheme 5.

In the area of hydraulic resources, the city faces a high degree of vulnerability over the availability of water due to the effects of climate change, in addition to the rising demand for water, the increased degradation of aquifers and catchment areas, among other factors. The distribution of volumes concessioned in 2013 for the city were distributed for the following uses: public supply, 97 %, industrial self-supply, 2.9 %, and agricultural sector, 0.1 %. Scheme 5 shows the most important impacts of natural phenomena by sector.

<sup>18</sup> Swiss Re Economic Research & Consulting.

<sup>19</sup> The Mercalli Scale is the product of 52 intensity maps of high-magnitude earthquakes occurring between 1845 and 1999. The scale includes XII levels. Level IX: General panic. D-type constructions destroyed; B-type buildings with major damages. General damages of foundations. Ruined structures. Serious damages to reservoirs. Broken underground piping. Expansive soil cracks. In areas of flooding, ejection of sand and mud; springs and sand craters appear.

<sup>20</sup> The susceptibility of unstable mountain and hillsides includes factors such as: the slope, lithology and land use, and the Basic Guide for preparing the State and Municipal Hazards and Risk Atlases, Geological Phenomenons of 2006.

<sup>21</sup> The degree of hazard due to low temperatures uses parameters of days with frost and minimum extreme temperatures. It has five levels. Very high, high, medium, low, very low.

<sup>22</sup> The Flood Vulnerability Index is based on the occurrence of deaths and on the damages caused by the flooding event, at the municipal level. It includes four levels: the high level includes the number of deaths reported by the Health Ministry and extraordinary damages.

<sup>23</sup> The HSHI considers the number of days with hail on the New National Atlas of Mexico.

**SCHEME 5**

**Current situation and impacts due to natural phenomena in various sectors**

Impacts on health	Forestry sector and biodiversity	Water resources
<p>Increased incidence of allergic reactions and asthma due to dispersion of allergens.</p> <p>Changes in ecosystem equilibrium and as a result, transmission of infectious diseases carried by animals.</p> <p>Increased morbidity due to heat, dehydration, cardiovascular diseases and digestion problems due to potable water contamination.</p>	<p>Reduced precipitation in different boroughs obstructs aquifers from refilling.</p> <p>The 2050 scenario indicates a reduction of the following forest types: oyamel, pine-aile, pine and mesophyll mountain; also reduction in grassland areas and species.</p>	<p>The 2050 scenario predicts reduced natural availability of water due to climate change — between 13% and 17% for the city.</p> <p>Water supply is critical in the following boroughs: Iztapalapa, Álvaro Obregón, Tlalpan, Tláhuac, Xochimilco and Milpa Alta.</p>

Source: Original compilation with information from PACCM 2014-2020, 2015.

<sup>24</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June 2014.

<sup>25</sup> *Idem.*

<sup>26</sup> CONAGUA. Statistics on water in Mexico. 2014 edition. Mexico.

<sup>27</sup> Agricultural use: fishing, multiple uses, other users. Urban supply: domestic, urban public. Industrial self-supply: agroindustrial, industrial services, commerce.

The above background and context on the current situation of Mexico City with respect to GHG and particle emissions, the risks and/or hazards due to natural phenomena, and the impacts to the health and forestry sectors, biodiversity, and hydraulic resources, were key elements for the design and planning of ELAC, the 2014-2020 PACCM and the Vision for Mexico City, 2025.

5

Mitigation, adaptation and transversal policy actions as of 2015

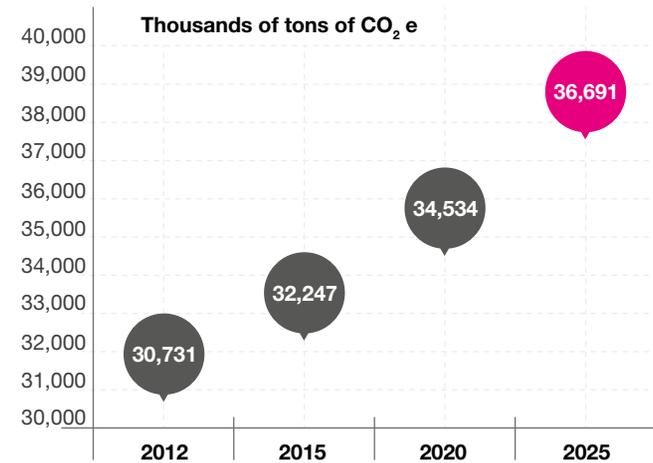
**The 2014-2020 PACCM lines of action address the needs of CDMX in terms of climate change.**

The 2014-2020 PACCM lines of action address the needs of CDMX in terms of climate change. Design of the base line<sup>28</sup> of the mitigation actions for the city include macroeconomic assumptions by productive activity, a review of historical electricity and fuel consumption, and their progress in the economy<sup>29</sup>.

The categories included in this hypothetical scenario include: energy, industrial processes and use of products, Agriculture, Forestry and Other Land Uses (AFOLU) and waste. The energy category accounted for 80 % of emissions in 2012, and the subcategory of transportation totaled 47 %. Short-Lived Climate Pollutants (SLCP) emissions, such as methane and hydrofluorocarbons, are included in this projection. The following graphic shows the base line and GHG and particle emissions projection for the city.



**GRAPH 4**  
Base line and GHG and particle emissions projection for the city



Category	% representation in 2012
Energy	80
Industrial processes and product uses	4
AFOLU	2
Waste	14

Source: Original compilation with information from PACCM 2014-2020, 2015.

<sup>28</sup> The base line of GHG and particle emissions is a projection of future emissions over a period, in the absence of actions to mitigate emissions. It is a tool to identify potential mitigation actions. Source: INECC, 2015.

<sup>29</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June 2014.

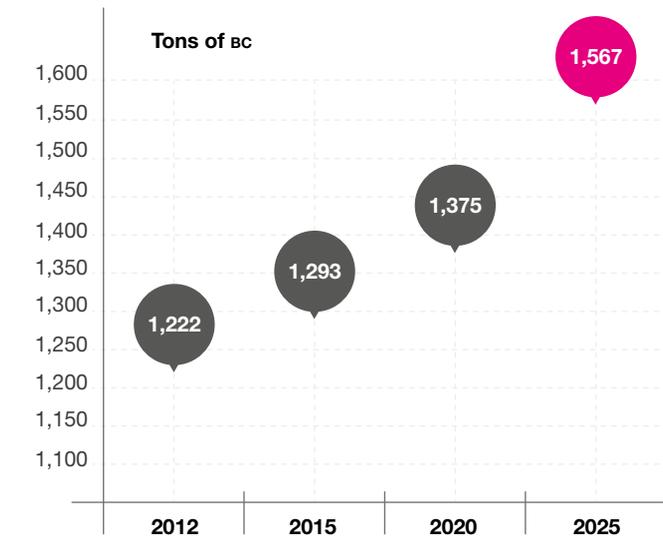
<sup>30</sup> SEDEMA, Directorate of Air Quality, 2015.

Another important SLOP is BC, a component present in suspended particles and linked to the incomplete burning of heavy fuels and biomass. The city is currently promoting the BC monitoring program due to BC's effects on air quality, visibility and its contribution to global warming. The goal for 2015 is to install five sites for periodic measurement. In recent years, a study has been developed on improving air quality for the next 20 years, including the participation of researchers from the Harvard School of Public Health and Mexican institutions.

The results would contribute toward the benefits in public health and the economy related to pollution reduction. They would also provide elements to design new policies that improve air quality in CDMX<sup>30</sup>.

According to monitoring, the greatest contributor of emissions is mobile sources, which totaled 96.5 % in 2012. The projection of BC emissions is as follows:

**GRAPH 5**  
Base line and projection of BC emissions of the city



Category	% representation in 2012
Biomass	0.2
Residential	1.6
Commercial	0.3
Energy industries	0.3
Manufacturing industries	0.9
Mobile sources	96.5
Others	0.2

Source: Original compilation with information from PACCM 2014-2020 and the Directorate of Air Quality (SEDEMA), 2015.

Efforts by CDMX in this category:

BC monitoring.

Study on the health effects of suspended particles.

On the other hand, the development of the base line in the adaptation category has been challenging. Its development includes indicators derived from exposure to a hazard and to disturbing phenomena, as considered in the PACCM 2014-2020. Along these lines, 5.6 million people were identified to be vulnerable to climate change due to various factors. The adaptation goal for 2020 is to ensure that number of inhabitants build resilience to the adverse effects and be benefitted by the adaptation actions designed in this program.

## Overall goals as of 2015

The progress results for mitigation actions as of 2015, based on the goals set in the PACCM 2014-2020, are shown in table 2. Progress from June 2014 to October 2015 was 34.4 % in the reduction of GHG and particle emissions for the 2018 goal.

**TABLE 2**  
Progress of mitigation actions of the PACCM 2014-2020

Mitigation	Reduction of emissions, tons of CO <sub>2</sub> eq
Use of bicycle as a means of transportation in Mexico City and the reduction of vehicle emissions.	866,348
Use of organic waste and tree/plant trimmings for composting.	769,811
Recovery of separated waste at selection plants.	361,467
Implementation of new BRT lines of the Metrobús.	168,127
Actions for modernization and energy efficiency in the Collective Transportation System (STC, by its Spanish abbreviation).	49,152
Strategic installation of taxi bases in the city.	32,277
Other actions.	48,600

Source: SEDEMA, 2015.

The accumulated reduction was 2.3 million tons of CO<sub>2</sub>eq for the June 2014-October 2015 period.

Regarding the results of progress in actions for adaptation and construction of the Resilience Strategy for the city as of 2015, based on the goals established in the PACCM 2014-2020, shown in table 3.

**TABLE 3**  
Progress of adaptation actions and construction of the Resilience Strategy of the PACCM 2014-2020, as of October 2015

Source: Original compilation, with information from SEDEMA, 2015.

Adaptation	2015 progress		
Epidemiological Monitoring	The Mexico City's Health Ministry (SEDESA, by its Spanish abbreviation) performs entomological monitoring at 119 risk sites for diseases transmitted by food, water and those associated to climate change, such as dengue.		
Resilience Strategy	Stage 1 (finalized)	Main results:	
		<ul style="list-style-type: none"> <li>• Mapping of stakeholders.</li> <li>• Preparation of the city's profile.</li> <li>• Inventory of current actions and programs.</li> <li>• Identification of principal assets.</li> <li>• Current and potential impacts and tensions.</li> <li>• Perception of key actors.</li> </ul>	
	Underway	Six focal areas in development:	
Coordination of the creation of a vision for a megalopolis <sup>31</sup> .		Resilient territorial planning of CDMX.	Resilient future for the water basin of the Mexico City Metropolitan Valley.
Resilient equipment.		Resilient economy.	Sustainable and resilient mobility.

<sup>31</sup> The states comprising the megalopolis include: Hidalgo, State of Mexico, Mexico City (Federal District), Morelos, Tlaxcala and Puebla.

Regarding the results on the progress of transversal policy actions in the category of education and communication, based on the goals set in the PACCM 2014-2020; they are presented in table 4.

**TABLE 4**  
Progress of the transversal policy actions, as of 2015

Source: SEDEMA, 2015.

Transversal policy	
<p><b>Implementation of schemes for intermodal mobility: expansion of the bike-sharing program ECOBICI</b></p> <p>Growth over 60% — the fourth-largest bike-sharing system in the world and the largest in the Americas.</p> <p>It currently has 6,000 bikes and 444 stations distributed in 42 neighborhoods (colonias) in three boroughs (<i>delegaciones</i>) of the city, covering a surface area of 34.37 km<sup>2</sup>.</p> <p>The system's 190,000-plus users have made more than 28 million trips in 5.5 years, preventing the emission of 1,978 tons of CO<sub>2</sub>, equivalent to 6,000 trees planted. 87% of trips made on ECOBICI are combined with another form of transportation.</p>	<p><b>Cycler infrastructure and equipment</b></p> <p>In September 2014, the Massive Bike Parking Area (Biciestacionamiento Masivo) at Pantitlán transit station was opened, which is the first of its kind in Mexico, with capacity for 416 bikes and personalized, semi-automatic access through the Mexico City Transportation Card.</p> <p>In early 2016, the second Massive Bike Parking Area will open at the La Raza Modal Transfer Center, with features similar to the first. Around the same time, 16.1 new kilometers of bike lanes will have been built, which are in addition to the 28.6 km constructed at the beginning of the current administration, to total 44.7 km, giving Mexico City a grand total of 124 km of bike lanes.</p>
Transversal policy	
<p><b>Culture and use of the bicycle: <i>Muévete en Bici</i></b></p> <p>The route expanded from 48 to 55 km, and an average of 55,000 people participate every week. The Night Ride on <i>Día de muertos</i>, a traditional holiday in Mexico, had record-breaking participation, with 95,000 people enjoying public space on bicycle, rollerblades or by foot.</p> <p>The Biciescuela CDMX (bike school) trained 21,721 people during summer 2015.</p> <p>This action led to the city ranking No. 3 in terms of the longest recreational bike routes.</p>	<p><b>Climate Change Observatory of the Natural History Museum</b></p> <p>330 projections with information on the effects and consequences of Climate Change.</p>

6

## Medium-term vision for CDMX, 2025

**The medium-term vision aims to provide wellbeing to citizens, through sustainable economic development, establishing local priorities based on the needs identified for CDMX, and by establishing shared responsibility between the government and society.**

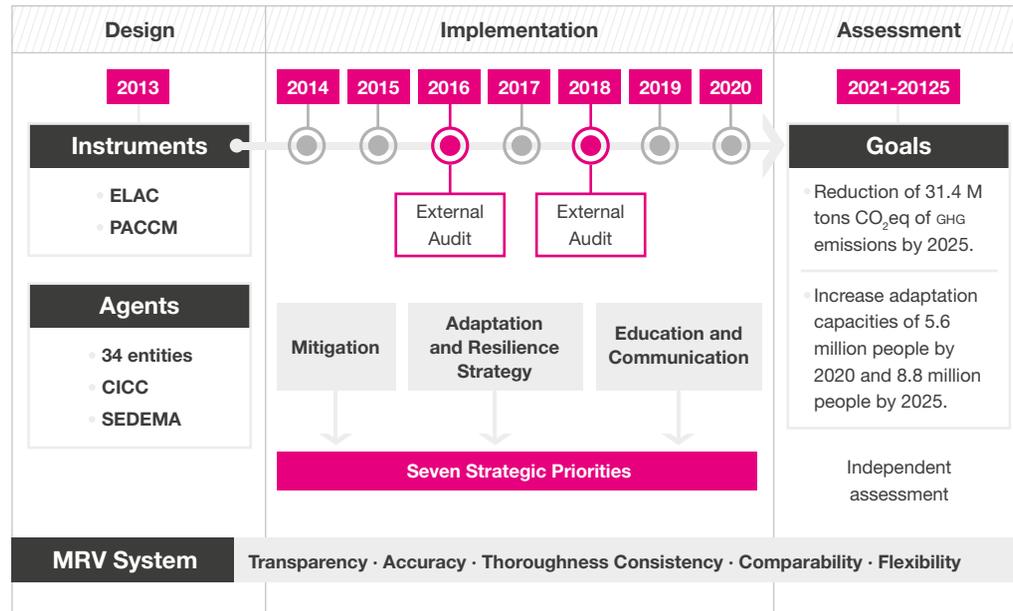
**The development and execution of the medium-term vision for CDMX 2025 (scheme 6) will adopt and integrate the objectives and goals of the climate change policy instruments in the city, such as ELAC and PACCM 2014-2020.**

The main objective of the 2025 vision for CDMX is to improve the quality of life and sustainable, low-carbon development in the city. It includes a total of 102 actions until October 2015, distributed across seven strategic, interrelated priorities, with synergic effects between mitigation and adaptation. The goals include: reducing 31.4 MtonCO<sub>2</sub> eq in accumulated GHG and particle emissions by 2025, increasing the adaptation capacities for 8.8 million people by 2025 and creating the Resilience Strategy.

**SCHEME 6**

**Medium-term vision for CDMX 2025**

Source: Original compilation, 2015.



The principal criteria for selecting the mitigation actions were the direct reduction of emissions, while for adaptation the criteria were: economic, social and natural capital protection amid adverse effects.

As shown in scheme 7, there are five priorities focused on direct measures for mitigation and adaptation, and they are connected to all of the city’s productive sectors, while the two transversal priorities correspond to research and development, and to education and communication. In each strategic priority, specific actions were proposed to increase the cost-effectiveness relationship and to be attractive to possible financing and to other entities<sup>32</sup>, while considering a synergic effect among all of them.

The seven strategic priorities for PACCM 2014-2020 will be incorporated into the 2025 Vision for the city.

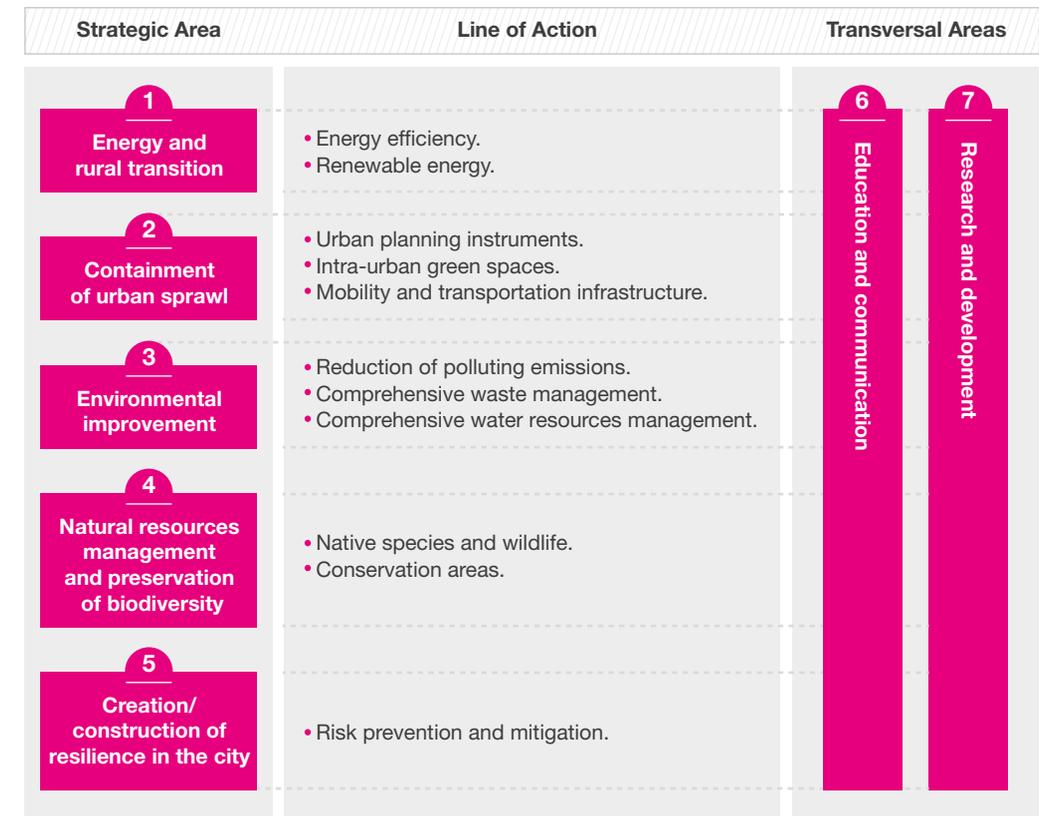
Therefore, concrete actions that can be measured, reported, and verified have been assigned to the actions. Thus, the actions of mitigation, adaptation and transversal policies have defined objectives and goals, are linked with domestic and local policy instruments, as well as elements to enter the PACCM Monitoring System (Monitoring, Reporting and Verification — MRV).

<sup>32</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June 2014.

**SCHEME 7**

**Strategic priorities and lines of action for 2025**

Source: PACCM 2014-2020, 2015.



## Mitigation actions for 2025

The specific goal for mitigation for 2025 is to reduce GHG and particle emissions by 31.4 million tCO<sub>2</sub>eq compared to the base year of 2012 — the expected GHG and particle emissions projection for 2025 is 36.6<sup>33</sup> Mton CO<sub>2</sub>eq— in a conservative approach. The specific actions to reach the goal include:

**TABLE 5**  
Mitigation actions derived from the priority of energy and rural transition for 2025

Source: SEDEMA, 2015.

Area: Energy and rural transition			
Actions	Modernization and energy efficiency actions in the Public Transportation System	Objective	Reduce energy consumption of the Collective Transportation System, and consequently, its emissions.
	Modification of the systems and habits of energy consumption in institutional buildings		Implement strategies that are systematically applied to the activities of the Mexico City government to improve the environmental performance of its institutions.
	Renew and modernize public lighting of the primary routes of Mexico City		Reduce GHG and particle emissions.
	Replace lamps for more efficient devices in the Cuajimalpa Borough		Replace 1,400 old lamps with lamps that have ceramic-metallic additives for better energy savings, which will also reduce energy costs.
		Mitigation goal (tons of CO <sub>2</sub> eq) for 2025	542,447
			3,456
			364,380
			3,320

<sup>33</sup> Idem

**TABLE 6**  
Mitigation actions derived from the environmental improvement priority for 2025

Area: Environmental improvements			
Actions	Use of organic waste and tree/plant trimmings for composting	Objective	Reduce GHG and particle emissions by updating the technology used for treating organic solid waste and tree/plant trimmings, from sanitary landfill to composting site.
	Recovery of separated waste at selection plants		Recover separated waste at the city's selection plants. Mitigation is in response to the material recovery processes that reduce the impacts on raw materials-based production and transportation.
	Recovery of waste in the Mercado de Trueque (recycling-exchange market)		Recover materials from the Mercado de Trueque (recycling-exchange market) program of Mexico City. Mitigation is in response to the material recovery processes that reduce the impacts on production and transportation, based on raw materials.
	Expansion of Metro lines A, 4, 9, and 12 of the Collective Transportation System, totalling more than 40 kilometers		Expand the Metro lines so that Mexico City residents can move more quickly, safely, and save time, as a strategy to make the city a space for personal development and social integration.
	Implementation of Intermodal mobility schemes in strategic zones of the city: Expansion of the bike-sharing system ECOBICI.		Optimize transportation and reduce GHG and particle emissions.
		Mitigation goal, tons of CO <sub>2</sub> eq by 2025	11,961,178
			10,127,151
			5,347
			2,295,607
			21,030



Actions	Objective	Mitigation goal, tons of CO <sub>2</sub> eq by 2025
Implementation of new lines of the Metrobús	Reduce GHG and particle emissions and pollutants created by public transportation.	1,731,868
Estimate of emissions prevented by updating the <i>Hoy no circula</i> program ( <i>No-Drive days</i> ) <sup>34</sup>	Perform an estimate of emissions reduced by the application of the <i>Hoy No Circula</i> program to determine its effectiveness in terms of pollutant reduction.	3,770,361
Strengthen the <i>Vehículos Ostensiblemente Contaminantes</i> Program (Clearly Polluting Vehicles) with new equipment and technology.	Reduce emissions by suspending vehicles sanctioned by operation of the <i>Vehículos Contaminantes (Polluting Vehicles)</i> program, with support by renewed Environmental Patrols.	37,030

Source: SEDEMA, 2015.

These total actions would accumulate 30,863,175 ton CO<sub>2</sub>eq and would represent the mitigation of 31.4 Mton CO<sub>2</sub>eq.

To achieve total reduction, they will be complemented by actions in the area of research and development. To include new actions for mitigation to achieve the goal, action inclusion criteria will be applied for the 2020-2025 period.

<sup>34</sup> Based on recent changes in the *Hoy No Circula* program, the calculation methods are being redefined, so proposed benefits are expected as of 2019.

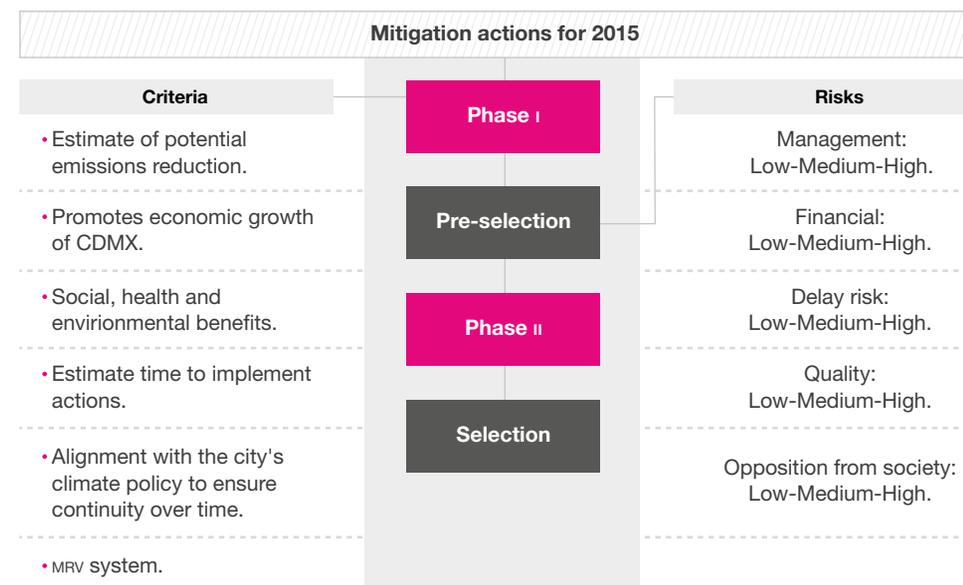
## Action inclusion criteria, 2020-2025

The mitigation actions for the 2020-2025 period will be increased viability of implementation and benefits for CDMX. With a portfolio of potential actions, those that comply with Phase I criteria will be selected, and following that, Phase II will be applied. This last, the different risks associated to implementation of the actions will be assessed, with the aim of ensuring the goals can be achieved and executed.

### SCHEME 8

#### Selection of mitigation actions for the 2020-2025 period, CDMX

Source: Original compilation with information from LCCDP, 2015.



The proposed criteria for selection of the actions are based on the methodology of *The Low Carbon City Development Program Guidebook*<sup>35</sup> (LCCDP), which considers low carbon growth for cities, a long-term vision and a plan to attract future financiers or donors. The following table includes the selection criteria for each phase.

<sup>35</sup> The World Bank & DNV KEMA Energy & Sustainability. The Low Carbon City Development Program (LCCDP) Guidebook. A systems approach to low carbon development in cities. 2014. This method has been adopted for Rio de Janeiro and Colombia.

## Adaptation actions for 2025

Accelerated urban growth, the geophysical context and the increase of climate change effects have made major impacts at the economic, social and environmental levels for CDMX. Amid this situation, the city's vulnerability will increase, so it is necessary to implement adaptation efforts and measures.

It is essential to reduce vulnerability, increase resilience in the social sector, in the productive systems and strategic infrastructure of the city, and preserve ecosystems in a sustainable manner<sup>36</sup>. Adaptation includes risk management, the guidelines of which include: reducing, preventing and controlling — by hierarchy — the potential for occurrence of impacts on a population. In this way, and by following an institutional framework, actions must be implemented to reduce the negative impacts caused by natural and human phenomena. The specific actions for 2025 in adaptation matters are shown in table 7.

The adaptation goal for 2025 is for 8.8 million people to be resilient to the effects of climate change, by creating the Resilience Strategy for the City.

<sup>36</sup> Federal Official Gazette. National Climate Change Strategy. 2013.

TABLE 7 · Adaptation actions for CDMX, 2025

Area: Containment of urban sprawl			
Actions	Creation of a land planning program for the city that incorporates environmental and urban policies	Objective	Unify urban land planning and conservation planning into a single territory, creating standardized legislative and land planning instruments.
		Goal for 2025	Creation and implementation of Land Legislation for the city.
Area: Sustainable management of natural resources and conservation of biodiversity			
Actions	Creation of the Law for the Protection, Conservation and Sustainable Use of Biodiversity of the Federal District	Objective	Create the Law for the Protection, Conservation and Sustainable Use of Biodiversity of the Federal District, as there are no local laws that provide cross-institutional collaborative agreements for biodiversity while incorporating gender equality.
	Support for projects of rural development and soil and water conservation in agricultural land		Support for <i>ejidos</i> (shared land) communities and small landowners of the Federal District (Mexico City) in projects and practices for the benefit of primary production, so that resources management (soil and water) is sustainable, taking into account a gender equality focus. At the same time, incorporate alternative tourism and clean technologies in economic and productive activities of the rural sector.
	Surface area incorporated into sustainable use		Offer incentives for sustainable agricultural production that contributes toward carbon capture in conservation land.
			Implementation of soil and water conservation projects for agricultural production.
			Reduction of erosion and soil degradation. Increase of catchment capacity and availability of water to have a larger surface area of cultivation, and therefore absorb carbon dioxide to improve air quality.



Actions	Objective	Goal for 2025
Rainwater catchment projects for irrigation	Use appropriate water harvesting techniques to maximize rainwater use and reduce the demand created by agricultural systems of the Federal District on the Mexico City Water System.	Increased efficiency of water used in agriculture.
Prevention, fight and control of forest fires	Implement the <i>Integral Program for Prevention and Fight of Forest Fires for Conservation Land of the Federal District</i> , which includes the stages of combat, physical prevention and cultural awareness.	Reduce and control forest fires in the city.
Program for access to commercial fires, energy efficiency and renewable energy to improve women's health	Implement an energy efficiency and renewable energy access program to improve the health of women and children; reduce GHG and particle and BC emissions; and prevent the destruction of ecosystems. This action has impacts on the categories of mitigation and adaptation.	Reduce emissions and their impacts on health in marginalized areas.
Green roof tops ( <i>Azoteas verdes</i> )	Improve the environment of Mexico City by promoting, rehabilitating and maintaining green areas.	Conserve the city's green areas and increase the surface area per habitant of 9 m <sup>2</sup> , to reach the standard set by the World Health Organization.
<b>Area: Creation of city's resilience</b>		
Monitoring and prevention of diseases transmitted by vectors, integrating information.	Contribute toward improving the health of the population by developing timely, consensus-approved monitoring, prevention and control strategies of vector-transmitted diseases.	Prevention of vector-transmitted diseases.

Actions	Objective	Goal for 2025
Creation of the City's Resilience Strategy	Maintain essential functions and increase the capacity for rapid and efficient recovery following disaster situations.	8.8 million people with increased resilience to the effects of climate change.
Prevention program for diseases caused by disasters	Prevent and provide prompt, effective attention to the population affected by extreme natural events to mitigate or reduce damages to the health of the population.	Prevent diseases caused by disasters.

Source: SEDEMA, 2015.

## Vision for Mexico City's Resilience Strategy and Climate Change Scenarios

The presence of various natural or human-made threats has caused risky situations. Urban sprawl has caused a variety of problems, such as: the exacerbated use of resources including water, the use of conservation land, mobility problems, increased pollutants, a lack of attention in services (mainly health-related), among others. The city sustains an itinerant population originating in the Mexico City Metropolitan Area (comprised of Mexico City's 16 boroughs, 59 municipalities in the surrounding State Mexico, and 1 in Hidalgo State), with an

approximate total of 20 million inhabitants as of 2010<sup>37</sup>.

These figures convey the large number of people who are exposed to a variety of threats, so the governments of different states comprising the Megalopolis (Hidalgo, the State of Mexico, Mexico City, Morelos, Tlaxcala and Puebla) have begun to consider shared threats, with measures ranging from prevention to prompt recovery.

<sup>37</sup> INEGI. 2011b. Census on population and housing, 2010. Available at: [www.inegi.org.mx/](http://www.inegi.org.mx/) Viewed most recently in: September 2015.

Resilience has become an essential factor of action and has started to have a presence in planning and legal frameworks.

## Resilience Strategy for Mexico City

In 2013, CDMX was chosen to form part of the 100 Resilient Cities<sup>38</sup> (100RC), promoted by the Rockefeller Foundation, the goal of which is for cities to be prepared for the social, economic and physical challenges of the 21st Century. The city has also been chosen to participate in the Alliance for Risk Sensitive Investment (AR!SE), sponsored by the United Nations International Strategy for Disaster Relief (UNISDR), which boosted collaboration of the private sector in the creation of urban resilience so as to improve and measure its performance in the face of natural disasters. Activities of the AR!SE initiative have been integrated for the development of an urban resilience strategy, in conjunction with the 100RC initiative.

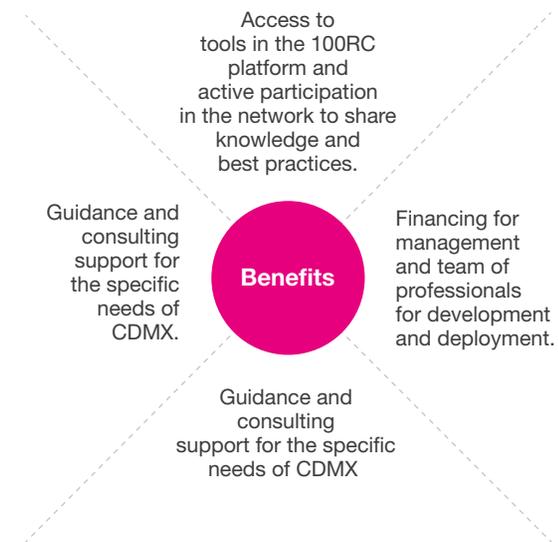
<sup>38</sup> 100 Resilient Cities, 2015. Preliminary Resilience Assessment. Rockefeller Priority, Mexico City.

In 2014, an agreement was signed with the Rockefeller Foundation through SEDEMA to develop the Resilience Strategy for Mexico City, supported in the General Law on Civil Protection, as part of the strategic frameworks of PACCM and the Local Climate Action Strategy: Mexico City 2014-2020 (ELAC, by its Spanish abbreviation), specifically area #5, *Creation of Resilience*.

The principal objectives of the Strategy are to maintain the essential functions and increase the ability to recover quickly and effectively from a disaster situation, with a comprehensive risk management vision. The benefits for CDMX are illustrated in the following scheme.

### SCHEME 9

#### Benefits of belonging to the 100RC network



Source: Original compilation with information from the third government state of the capital report: Resilience Strategy, 2015.

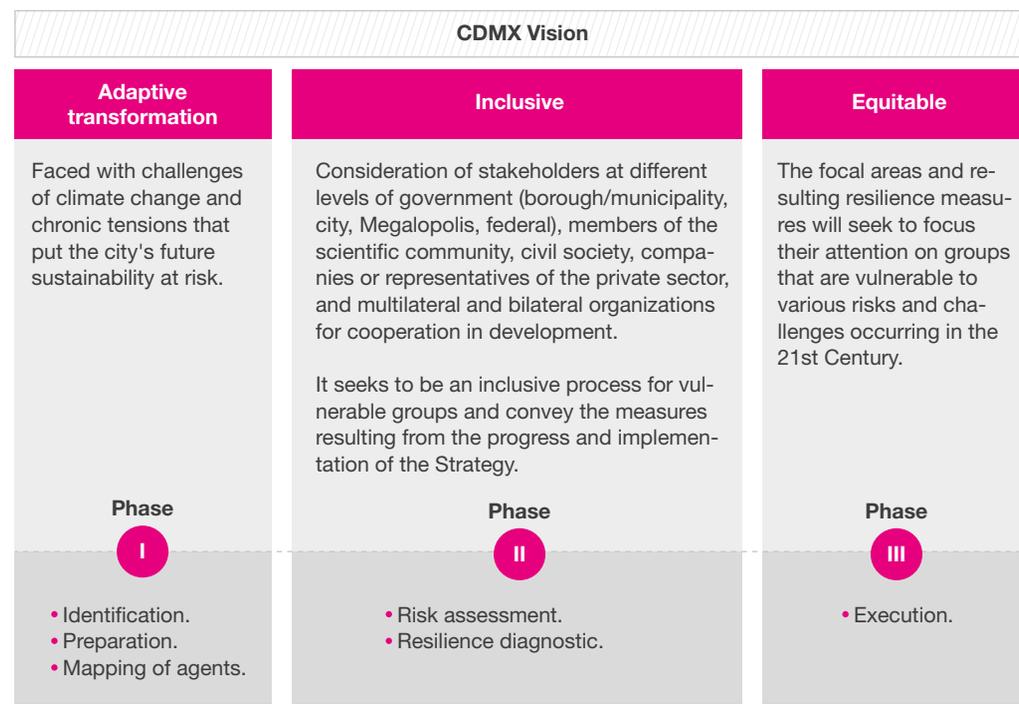
The Strategy has a Committee in charge of reviewing and analyzing the activities and documents related to the creation, arguments, actions and execution, creating through a consensus of members, the design of the Strategy to submit it to the full consideration of the Inter-Institutional Commission on Climate Change of the Federal District (CICODF, by its Spanish abbreviation), which will determine its approval and guidance for implementation. The Committee will be comprised of: the Mexico City Mayor, the Civil Protection Ministry, various Mexico City ministries, and members of the scientific and private sector community, federal institutions and international organizations.

The vision of the Resilience Strategy for CDMX is characterized by three elements that give it a sense aligned with local government goals:

- 1 Adaptive transformation
- 2 Inclusive
- 3 Equality

**SCHEME 10**  
**Design of the Resilience Strategy**

Source: Original preparation with information from the Preliminary Resilience Assessment CDMX, 2015.



The methodology for its preparation is divided into three phases:

I. Integration of agents and programs of various sectors to establish a focus for the city in the Resilience Strategy, based on the mapping of stakeholders, the inventory of actions, analysis of resilience perceptions, and on the selection of focal areas, to be developed in the following phases.

II. Work on the focal areas and creation of the city's resilience diagnostic, assessment of risks and opportunities, identification of priorities and

resilience tools, and the identification of incentives and specific barriers linked to the implementation of the strategy.

III. Implementation of the actions established in the design of the Resilience Strategy.

Currently, phase I has been completed and phase II is underway, which includes the integration of the elements of the AR!SE initiative; it is also in the process of identifying the activities for the focal areas. Upon conclusion of phase II, the monitoring indicators of the Resilience Strategy will be designed. Phase III will commence in 2016 and will include implementation of actions deemed priority during phase II.

Creation of the CDMX Strategy marks an opportunity to have a long-term transversal vision in the city, which helps the government, the private sector and civil society to understand and address the chronic tensions and acute impacts in a comprehensive manner across multiple levels.

In this sense, the 2025 Vision for Mexico City has been considered, with aims to reduce vulnerability amid different threats, especially climate-related phenomena.

## Vision of Focal Areas

The six focal areas of priority attention will work to create long-term urban resilience. These areas were selected through an advisory process, with consideration of one feature shared among all of them — their transversality, via the following aspects:



### Focal area 1

#### A resilient future for the Megalopolis

<p>The premise of this area is focused on knowing <b>how to create resilience at the megalopolis level under a framework of shared responsibility among different entities, levels of government and stakeholders in society</b>, as their functioning depends, to a great extent, on the dynamic relationship of exchanges between the population and systems.</p>	
<p><b>2025 Vision</b></p> <p>The relevant stakeholders had raised awareness to the incorporation of a Megalopolis-level vision for the creation of resilience; projects through CAME are being implemented and financing resources are mobilizing toward a Megalopolis-level resilience agenda that includes issues of water, mobility, air quality, green infrastructure and health.</p>	<p><b>2040 Vision</b></p> <p>The institutions that form part of the megalopolis operate under a framework of shared responsibility in terms of resilience, promoting integrated mobility, coordinated land planning, sustainable and resilience management of water and natural resources, good regional air quality, and regional social inclusion.</p>

### Focal area 2

#### Urban planning and resilient land

<p>This focal area focuses on specifying how to <b>create resilience through urban and land planning amid the main chronic tensions and acute impacts the city faces</b>, both present and future. Population growth has led to conservation land occupation, which could accelerate the degradation of natural services.</p>	
<p><b>2025 Vision</b></p> <p>High-impact development plans and pilot projects have been created, which incorporate transversal elements of urban resilience, focused on reducing vulnerability, while promoting the vision for a fair, inclusive and adaptive city.</p>	<p><b>2040 Vision</b></p> <p>CDMX is implementing the urban development plans under a resilience approach, consolidating urban equipment networks, green areas and public spaces that promote the sustainable use of water, natural resources and the use of integrated mobility systems.</p>

### Focal area 3

#### Creating a resilient future for the Mexico City Valley basin

<p>The problem at the Mexico City Valley basin-level is due mainly to the degradation of water resources, which leads us to ask <b>how we can promote an agenda and actions on different levels in a transverse manner to increase water resilience in the face of strategic risks</b>. Therefore, the sustainable use of water becomes a resilience measure, primarily to prevent drought and aquifer degradation.</p>	
<p><b>2025 Vision</b></p> <p>The relevant stakeholders in the comprehensive management of water resources have become sensitized on the vulnerability to different risks and trends in the region, such as prolonged drought, degradation of aquifers and regional water sources, by developing a water security strategy and resilience actions which include coordinated participation of multiple sectors and levels of government.</p>	<p><b>2040 Vision</b></p> <p>The Mexico City Valley basin's water resources are managed from a perspective of green growth, water security and resilience in a cooperative governance framework, creating synergies among stakeholders in the government, the private sector, the scientific community and civil society, while promoting innovation and adaptive transformation in the face of different risks and socio-environmental trends.</p>

### Focal area 4

#### Resilient urban equipment

<p>The city has strategic assets that require protection from different threats, such as earthquakes and floods, so it is necessary to know <b>how to create resilience through risk management and the adaptation of strategic urban equipment in the face of present and future risks of the city</b>. The initial diagnostic identified the <i>Central de Abasto</i> (CDMX's main wholesale market) as a pilot zone for the study, since the food it supplies to CDMX is essential in the creation of resilience.</p>	
<p><b>2025 Vision</b></p> <p>The Central de Abasto has the ability to ensure continuity of operations in food supply in the face of any risk situation.</p>	<p><b>2040 Vision</b></p> <p>CDMX's strategic infrastructure has operating plans focused on prevention, mitigation and recovery from risks, and development is underway of infrastructure projects with multiple benefits, which include contributions in bioclimatic aspects, water catchment and retention, energy efficiency, waste reduction and improvements to public space.</p>

### Focal area 5

Resilient economy	
The private sector has capacities to reduce the risk of disasters, as it plays an important role in the country's economy, so understanding on <b>how collaboration and partnership between the private and public sectors can increase CDMX resilience is required.</b>	
2025 Vision	Achievements have been made in terms of partnerships between public and private institutions that promote projects aimed at adaptive, equal and inclusive transformation in CDMX.
2040 Vision	CDMX has increased its competitiveness by implementing areas of resilience in a transversal manner.

### Focal area 6

Resilient sustainable mobility	
The impacts mobility problems have had on CDMX have directly affected the quality of life and health of its residents, causing environmental damages. This focal area seeks to understand <b>and its metropolitan area toward sustainability and resilience,</b> and the young population has become an objective participant of the plans on improving the city's transportation. <b>how to transform the future of mobility in CDMX</b>	
2025 Vision	Implementation has occurred of projects, measurements and use of data that discourage the use of cars and shed light on the co-benefits of increased active, safe, quality and efficient mobility.
2040 Vision	CDMX residents have improved their quality of life through the adaptive transformation of urban road infrastructure, which includes an integrated local and metropolitan mobility system, with public spaces that give priority to pedestrians, sustainable mobility and minimize the risks toward these groups.

The Mexico City Resilience Strategy will also include information on climate change in the analysis of capacities for small and medium enterprises (SMEs) in the face of climate impacts. Furthermore, the Strategy will include scenarios of impacts caused by extreme events, such as: drought, floods and heat waves.

## Future scenarios resulting from climate change

Climate change scenarios indicate alterations that could affect<sup>39</sup>:

**Agricultural cycles due to changes in seasonal variation and rain.**

**Creation of new habitats for the development of disease vectors or pests.**

**Changes in biomass and biological biodiversity.**

**Water resource scarcity.**

For CDMX, escalated projections were made by the Virtual Climate Change Center of Mexico City (CVCCM, by its Spanish abbreviation). The result refers to monthly temperature and precipitation values for diverse scenarios of GHG and particle emissions from IPCC, being the most conservative scenario.

Projections for variation indicate average temperature increases in a range of up to 0.5°C to 1.25°C for the coldest months. The hottest months could increase in temperature by 1.25°C to 1.50°C in the short term and up to 2.25°C in the long term (table 8).

**TABLE 8**  
Temperature projections for Mexico City under scenario A2

Coldest months of the year	
December January February	<b>Short term (2030)</b>
	+0.5-1.25°C Major increases toward the SW, minor in the NE.
	<b>Medium term (2050)</b>
	1.25-2°C Major increases toward the SW, minor in the NE.
Hottest months of the year	
April May June	<b>Short term (2030)</b>
	+1-1.5°C
	<b>Medium term (2050)</b>
	Up to 2.25°C Greater increases in the N than in the S.

Source: Virtual Climate Change Center of Mexico City, 2012.

<sup>39</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June 2014.

**TABLE 9**  
Precipitation projections for Mexico City

Source: Virtual Climate Change Center of Mexico City, 2012.

	Driest months of the year		Wettest months of the year	
	Short term (2030)	Medium term (2050)	Short term (2030)	Medium term (2050)
December	-30-40%	50-75% decrease	June-July	5-10% decrease
January	Minimum	Slight increase		10% decrease
February	Minimum	25% increase	August	Imperceptible decrease
				Imperceptible increase

## Transversal policy actions for 2025

<sup>40</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June 2014.

The transversal policy includes actions in the categories of education and communication, and research and development. The first category seeks to integrate a prepared and informed society on the effects of climate change, modifies the changes in habits that could reduce individual emissions, and minimizes the

risks of diseases and disasters, among others<sup>40</sup>. The second category proposes to promote climate change research among decision makers, and their actions contribute toward the goal of reducing GHG and particle emissions.

**TABLE 10**  
Transversal policy actions for 2025

Source: SEDEMA, 2015.

Actions	Objective	Goal for 2025
Low-emissions schools	Promote measures to obtain low-emissions schools and propose a reduction of energy consumption, change lighting, temperature control in air conditioning systems, use of school transportation, recycling, minimize water consumption, reforestation and use of solar heaters.	Reduce GHG and particle emissions and expand environmental education.



Actions	Objective	Goal for 2025
Culture and use of bike-sharing program ECOBICI	Install bike-sharing program ECOBICI in the city and promote a culture for public bikes.	Install the ECOBICI program in the city and increase the number of users in 16 boroughs.
Climate Change Observatory of the Natural History Museum	Disseminate the causes and consequences of climate change.	Increase the number of participants to spread awareness on climate change.
Use of fuels with fewer pollutants for public vehicles and buses	Increase the number of public transportation routes that use fuels with fewer pollutants than diesel.	Reduction of GHG and particle emissions by 263,915 ton CO <sub>2</sub> eq.
Strategic installation of taxi bases in the city	Increase the number of units. A taxi from a taxi company reduces its journey by 25%.	Reduction of GHG and particle emissions by 273,847 ton CO <sub>2</sub> eq.
Introduction of vehicles and engines with advanced control technologies in government fleets	Have a government fleet with technology that has fewer emissions.	Reduction of GHG and particle emissions by 95,273 tons CO <sub>2</sub> eq.
Borough Climate Action Programs	The Law on Mitigation and Adaptation to Climate Change and Sustainable Development for the Federal District, published on June 16, 2011, in the Official Gazette, as well as its Regulations published on October 19, 2012, provide that each Political Borough ( <i>delegaciones</i> ) must create its own Borough Program on Climate Action, for which the Mexico City Environment Ministry (SEDEMA) has the obligation to advise and approve.	Implement the actions mentioned in the Climate Action Programs in the city's 16 boroughs.



The contribution of transversal policy actions in the reduction of GHG and particle emissions would total 633,035 tons CO<sub>2</sub>eq and account for 0.2 %, toward achieving the global mitigation goal for 2025.

## Financing of climate change actions

The existence of appropriate financing mechanisms is essential for the success of actions for the 2025 vision. The Climate Change Environmental Fund will be used for the actions' implementation. **The Fund's objective is to finance compliance of Mexico City Government policies in matters of mitigation, adaptation, creation of resilience, communication and education on climate change, as well as being part of the Public Environmental Fund**<sup>41</sup>. It is used to develop programs, for natural capital preservation projects, education and awareness programs, studies and research, the creation of risk atlases, implementation of the PACCM, development of inventory, information systems and other actions meant to comply with the city's climate policies. The fund is comprised of resources that are allocated in the annual spending budget, Clean Development Mechanisms (CDM) projects, donations, and other international resources.

Consideration has also been given to allocating at least 10 % of CDMX's annual budget toward the implementation of actions identified in the Resilience Strategy.

<sup>41</sup> Mario Molina Center for Strategic Studies in Energy and the Environment, A.C., 2014-2020 Mexico City Climate Action Program. June. 2014.

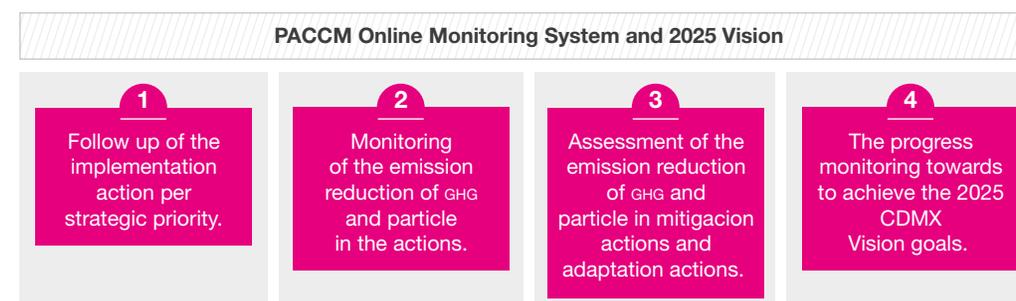
## PACCM Online Monitoring System (SSPACCM, by its Spanish abbreviation), for 2025 actions

Since 2015, the SSPACCM has offered guarantees for the stakeholders to comply with the objectives and goals of the 2014-2020 PACCM and the CDMX Vision for 2025. The implementation of actions are monitored and their progress is reported to obtain verifiable results, to assess and compare CDMX performance toward low-carbon growth with other cities and help to comply with federal government promises in mitigation and adaptation matters.

The management of information and documentation are key elements to demonstrate successful implementation of the actions. The SSPACCM is supported in the following principles: consistency, transparency, accuracy, thoroughness and comparability, which are essential for accountability, reporting and verification of GHG and particle emissions.

### SCHEME 11 Function of the SSPACCM and medium-term vision for CDMX 2025

Source: Original compilation, 2015.

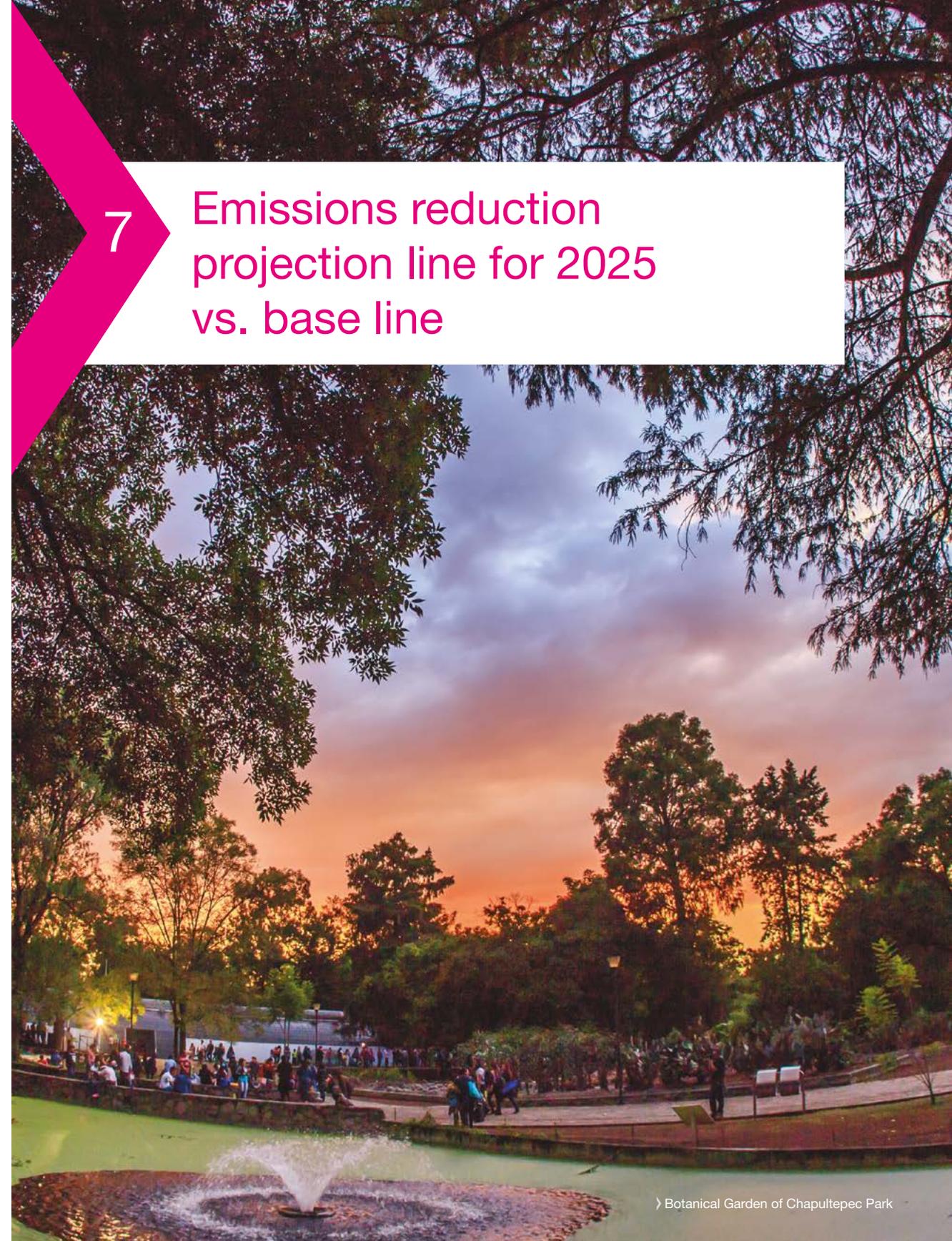


The information is precise, with specific procedures for collecting and storing data. One key element for success of the Monitoring, Reporting and Verification (MRV) system is to establish institutional mechanisms, roles and responsibilities in the system management. Each action has assigned those responsible and collaborators. The vision includes two independent evaluations for 2016 and 2018. The basic functions of the MRV system of the medium-term vision for CDMX for 2025 are shown in scheme 11.

Governance is an important element for an efficient SSPACCM system, which has a direct impact in the implementation of the vision, and involves responsibility and authority to achieve the objectives. The entity that generates the progress reports on actions is SEDEMA, with the support of an information technology tool.

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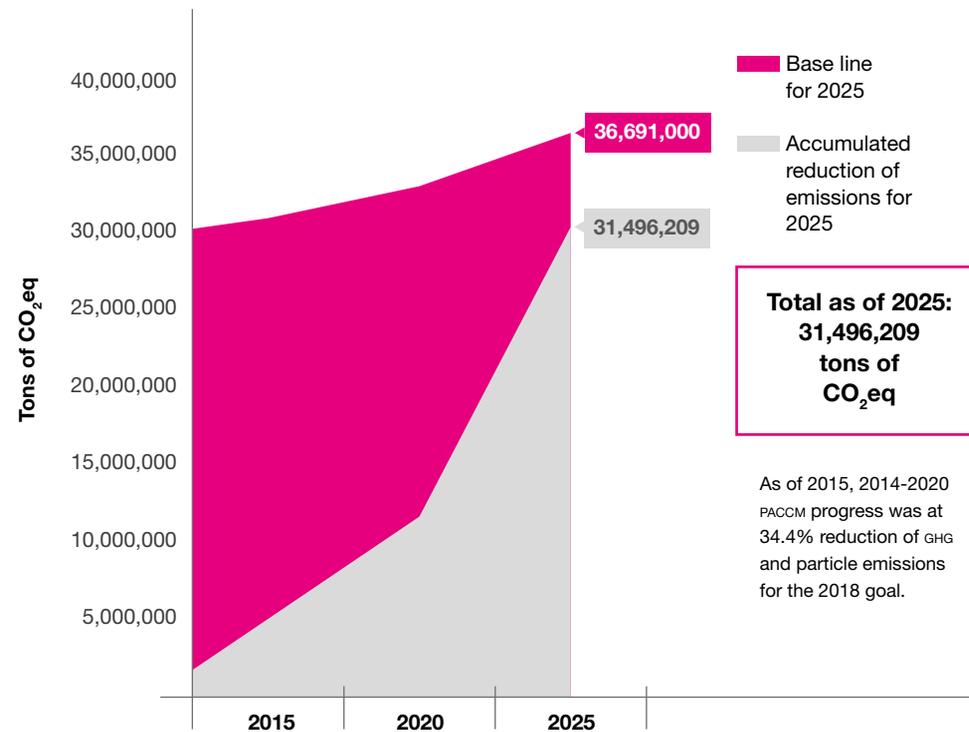
## Emissions reduction projection line for 2025 vs. base line



The following graph shows the accumulated reduction of GHG and particle emissions for 2025, based on the performance of actions projected for 2025, to achieve the goal of 31.4 Mton CO<sub>2</sub>eq and the projected base line reference for 2025.

**GRAPH 6**

Accumulated reduction of emissions for 2025 and base line



Source: Original compilation with information from PACCM 2014-2020 and SEDEMA, 2015.

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## Monitoring indicators for the 2025 Vision for CDMX



To comply the objectives of the 2025 Vision for CDMX, the following indicators are presented. They consider the complexity of the city's situation in the categories of mitigation, adaptation and the transversal areas. The indicators must meet the following criteria<sup>42</sup>:

- Availability of information.
- Consistent and comparable over time.
- Easy to understand.
- Transparent.
- Compared to or used as a point of reference with other cities.

Below are the indicators recommended by literature on economic and social development, the structure of energy and efficiency of use, consumption patterns, environmental development and population health for the 2025 Vision.

**TABLE 11**  
Indicators on low-carbon urban development

Economic development and social progress	
<b>Related to</b> <ul style="list-style-type: none"> <li>Economic amount.</li> <li>Structure and development growth.</li> <li>Urbanization.</li> <li>Civilization level.</li> </ul>	<b>Indicator</b> <ul style="list-style-type: none"> <li>GDP.</li> <li>% GDP growth rate.</li> <li>% proportion of tertiary industry of GDP.</li> <li>% urbanization rate.</li> <li>Housing availability.</li> <li>Job creation.</li> </ul>
Energy structure and efficiency of use	
<ul style="list-style-type: none"> <li>Urban energy structure.</li> <li>Energy use.</li> <li>Economic growth and carbon emissions.</li> </ul>	<ul style="list-style-type: none"> <li>% of renewable energy.</li> <li>Carbon emissions.</li> <li>Co-efficient of elasticity of energy consumption.</li> <li>Energy or CO<sub>2</sub> per capita.</li> </ul>
Consumption patterns	
<ul style="list-style-type: none"> <li>Population's lifestyle consumption patterns.</li> <li>Impact of carbon emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Number of public transportation vehicles for 10,000 people/vehicle.</li> <li>Carbon emissions per capita.</li> <li>Energy or CO<sub>2</sub> per person/kilometer traveled.</li> <li>Urban density.</li> </ul>
Environmental development	
<ul style="list-style-type: none"> <li>Status of carbon sinks.</li> <li>Investment for environmental protection.</li> </ul>	<ul style="list-style-type: none"> <li>Public green areas per capita/m<sup>2</sup>.</li> <li>% forest surface area.</li> <li>% rate of green area surface in buildings.</li> <li>% of investment for environmental protection compared with GDP.</li> </ul>



<sup>42</sup> DFID.UCL. Future Proofing Cities, Risks and opportunities for inclusive urban growth in developing countries. UKAID.2012.

<sup>43</sup> World Health Organization. Monitoring & Evaluation indicators for Integrated Vector Management. France. 2012.



Land use and waste management	
<b>Related to</b> <ul style="list-style-type: none"> <li>Agricultural surface area.</li> <li>Recycling.</li> <li>Waste.</li> <li>Soil conservation.</li> </ul>	<b>Indicator</b> <ul style="list-style-type: none"> <li>Area of action of green spaces and farmland.</li> <li>Waste created per inhabitant.</li> <li>Recycling rate.</li> <li>Emission and catchment of CO<sub>2</sub> by land use and change of land use.</li> <li>Number of forest fires and hectares of affected surface area.</li> <li>Hectares of surface area incorporated into sustainable forest management and hectares of reforested surface area.</li> <li>Change in annual temperature in degrees Celsius.</li> <li>Change in annual precipitation in millimeters per year.</li> </ul>
Health of the population	
<ul style="list-style-type: none"> <li>Control of vector-transmitted diseases<sup>43</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Development and implementation of a strategic plan for integrated vector management.</li> <li>Number and % of people trained in integrated vector management.</li> <li>Number and % of sites that monitor vectors.</li> </ul>

Source: Original compilation with information from Evaluation of a Low Carbon City: method and application, A low carbon development guide for local government actions in China.

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# Commitments of Mexico City with the international community



## SCHEME 12 Commitments of Mexico City in the framework of COP 21

Source: Original compilation with information from electronic sources<sup>44,45</sup>, and the Third Government Report of Mexico City, 2015.

Mayors	Clean Buses: C40	Post-2015	Dialogue toward COP 21
<ul style="list-style-type: none"> <li>The city entered the 2015 Mayors Compact — cooperation to present commitments toward mitigation and adaptation (Mexico City Government).</li> <li>The Latin American Cities Declaration on the Compact of Mayors was announced, with the goal of accelerating the transition toward low carbon and creating a more resilient economy and making emissions reduction a reality in cities. CDMX will unveil its vision during COP 21.</li> </ul>	<ul style="list-style-type: none"> <li>Mexico City also joined the C40 Declaration on Clean Buses, which endorses the commitment of member cities to reduce greenhouse gas emissions and improve air quality.</li> </ul>	<ul style="list-style-type: none"> <li>Participation in world consensus for the adoption of the <i>Agenda for Sustainable Development Objectives Post-2015</i>, and the adoption of a world climate agreement adopted during COP 21.</li> <li>6<sup>th</sup> Biennial C40 Cities Summit in Mexico City.</li> </ul>	<ul style="list-style-type: none"> <li>The CDMX government participated in the colloquium <i>Modern Slavery and Climate Change: The Commitment of the Cities</i>, organized by the United Nations Sustainable Development Solutions Network and the Pontifical Academy of Sciences.</li> <li>The declaration calls on the United Nations Organization (UNO) to adopt an urban objective in the Sustainable Development Goals (SDG) and address the challenges of cities and empower urban stakeholders. The SDGs will be presented in COP 21.</li> </ul>

<sup>44</sup> Bloomberg. Available at: [<http://www.bloomberg.com/latam/2015/03/27/el-foro-latinoamericano-de-alcaldes-c40-es-un-ejemplo-de-la-iniciativa-de-alcaldes-de-america-latina-para-frenar-el-cambio-climatico/>]. Last viewed: August 2015.

<sup>45</sup> Mayors. Available at: [<http://www.alcaldesdemexico.com/notas-principales/vaticano-organiza-primer-coloquio-sobre-cambio-climatico/>]. Last viewed: August 2015.



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