""CDMX: How we are Building more Resilient and Healthy Cities"
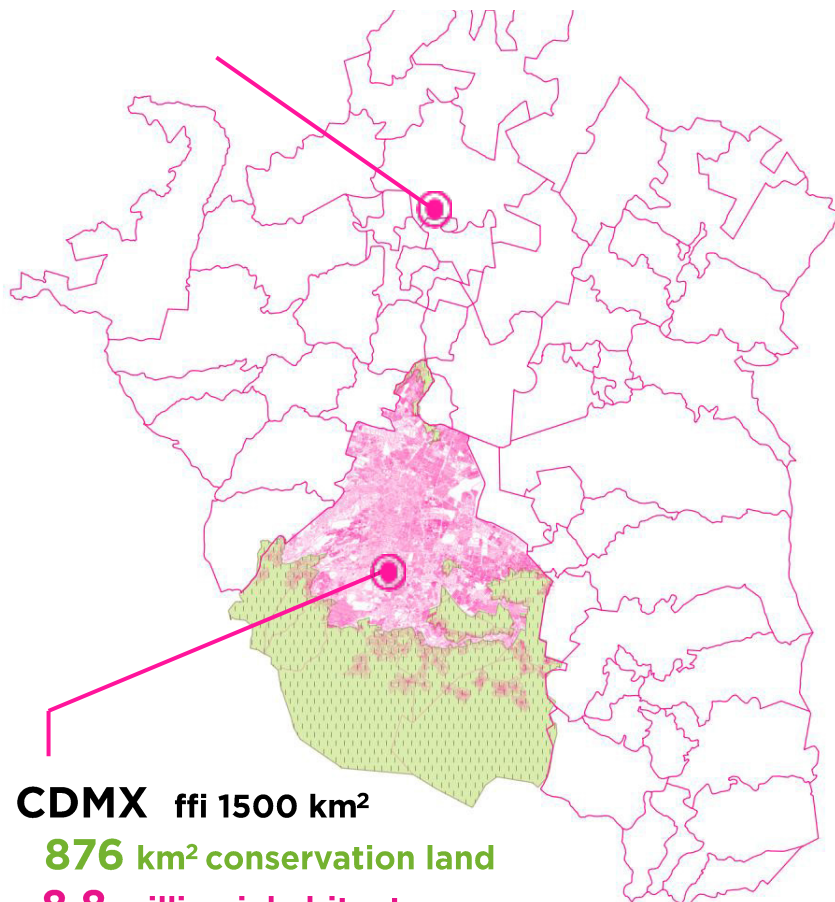
Multi – hazard early warning conference
Cancun, México May 22nd, 2017

MEXICO CITY CONTEXT

State of Mexico

59 municipalities + 6000 km²

12.2 million inhabitants

Metropolitan Area
21 million inhabitants

CDMX ffi 1500 km²

876 km² conservation land

8.8 million inhabitants

5.3 million vehicles

2410 regulated commerce & services

1935 regulated industries

5.8 million household

MCMA fuel consumption **543PJ**

58% Transport

26% Industry

13% Habitational

3% Commerce & Services

Gasoline	7.3	
Diesel	2.0	million m³
L.P.G.	3.7	
Natural Gas	3,436.9	

1PJ= 1x10^15 Joules calories   1 Jolue= 0.2388
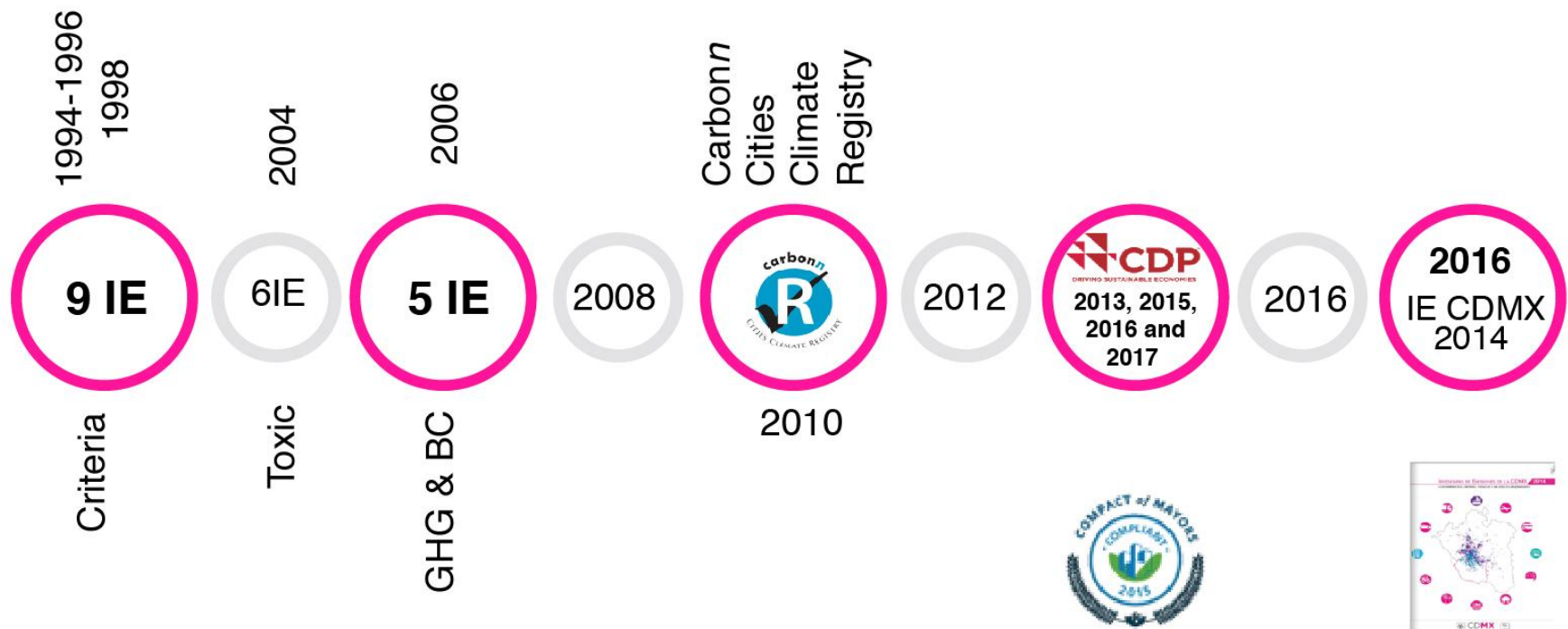
Reference: Mexico City Emissions Inventory 2014.

EMISSIONS INVENTORY

EMISSIONS INVENTORY

Characterization of pollutant emissions and their sources (identification and quantification).

1994-1996 1998 — **9 IE** — Criteria

2004 — 6IE — Toxic

2006 — **5 IE** — GHG & BC

2008

Carbonn Cities Climate Registry — carbonn R CITIES CLIMATE REGISTRY — 2010

2012

CDP DRIVING SUSTAINABLE ECONOMIES 2013, 2015, 2016 and 2017

2016

2016 IE CDMX 2014

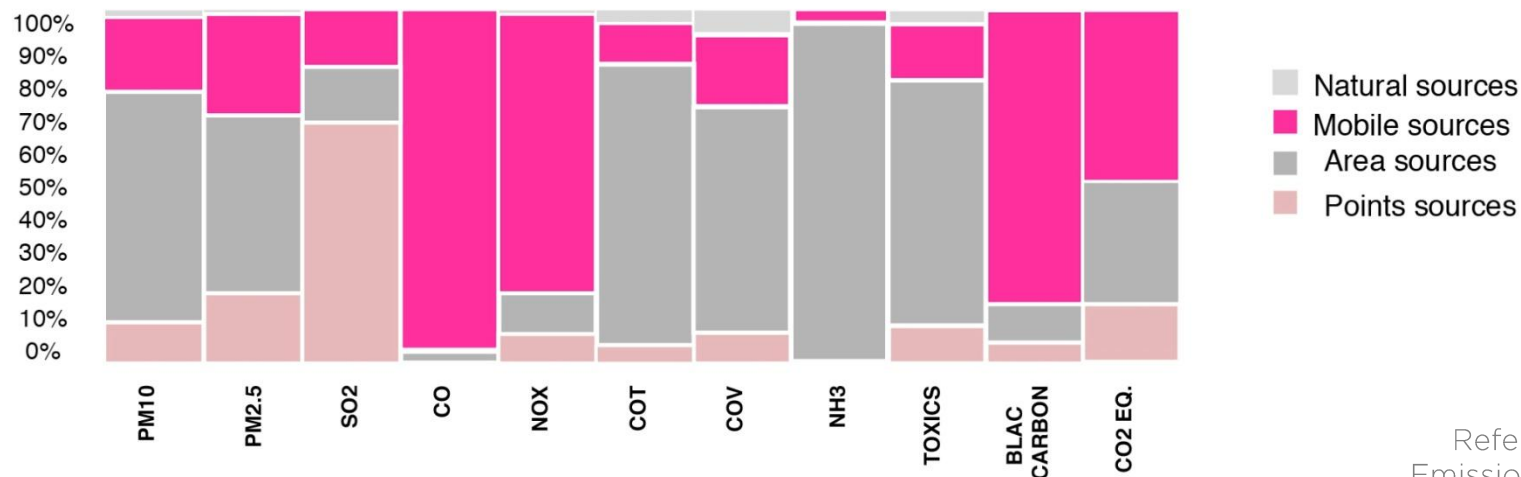- Mexico City was the first of 205 cities to comply with the Compact Mayors with the highest score BASIC+.

CONTRIBUTION OF POLLUTANTS BY SECTOR CRITERIA POLLUTANTS 2014

Emissions inventories of CDMX include criteria pollutants & Compounds GHG & toxics

Source	Annual emissions (t/yr)							
	PM_{10}	$PM_{2.5}$	SO_2	CO	NO_X	TOC	VOC	NH_3
Point	3574	2526	1151	6278	11915	33130	31757	275
Area	20567	6415	267	21128	16227	538361	229219	44442
Mobile	6504	3660	279	668882	108685	76336	72041	1607
Natural	785	172	N/A	N/A	1627	27106	27106	N/A
Total	**31 431**	**12 773**	**1696**	**696 288**	**138 454**	**674 934**	**360 123**	**46 325**
Emissions contribution [%]								
Point	11.4	19.8	67.8	0.9	8.6	4.9	8.8	0.6
Area	65.4	50.2	15.7	3.0	11.7	79.8	63.7	95.9
Mobile	20.7	28.7	16.5	96.1	78.5	11.3	20.0	3.5
Natural	2.5	1.3	N/A	N/A	1.2	4.0	7.5	N/A
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Natural sources
Mobile sources
Area sources
Points sources

PM10 PM2.5 SO2 CO NOX COT COV NH3 TOXICS BLAC CARBON CO2 EQ.

EMISSIONS INVENTORY

MEXICO CITY - FIRST CITY RECOGNIZED WITH THE BASIC + SCORE IN COMPACT OF MAYORS

✓ 95% performance along with Vancouver and Paris
✓ First place in Latin America (CDP Report 2016)

FACTORS THAT AFFECT AIR QUALITY

✚ Large population and high rate of motorization

✚ Big routes and mobility problems

✚ High consumption of fossil fuels

✚ High emissions of criteria pollutants and GHG

HOW HAS CDMX ADDRESSED THIS ISSUES?

✓ Air quality and GHG policy and management

✓ Collaboration with government agencies and in particular with the Health Agency

✓ Monitoring air quality

✓ Scientific Committee for Environmental Improvement

✓ Air quality programs

AIR QUALITY MANAGEMENT IN MEXICO CITY

Tools

Measures and actions to reduce emissions

1. Programs
- Air Quality Program 2011-2020 (PROAIRE)
- Inspection and maintenance twice a year (PVVO)
- Environmental Contingency Program (PCAA)
- Restriction to driving (HNC).

2. Health Standards
- PM, O_3, NO_2, SO_2, CO, Pb

3. Industry regulation

4. Emissions Inventory update (criteria, toxics and greenhouse).

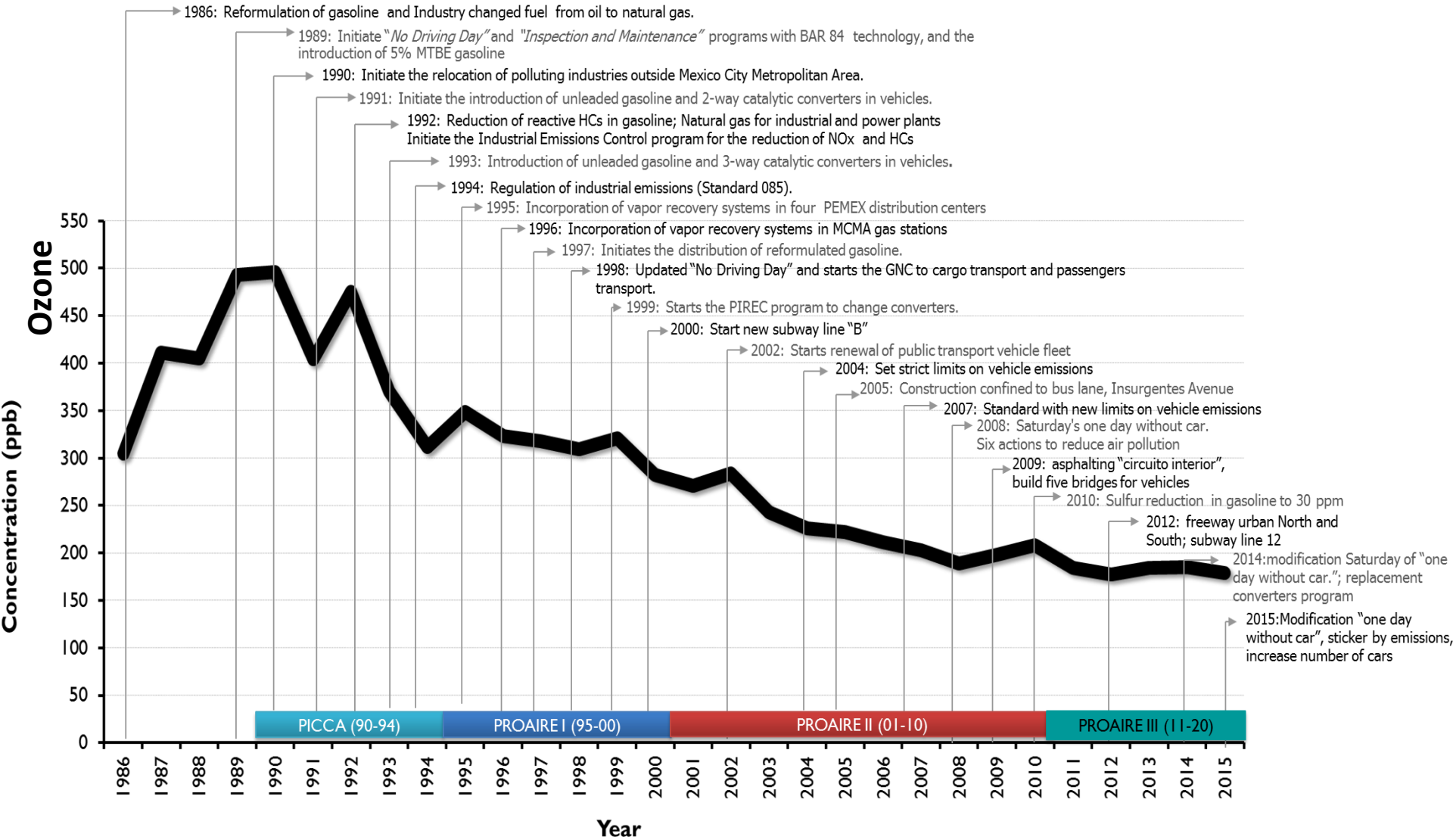### 5. Air quality simulation models

Emissions Sources

Criteria → Toxics → GHG & BC

EFFECTIVENESS evaluation

27 YEARS OF SUCCESSFULPOLICIES - AIR QUALITY

1986: Reformulation of gasoline and Industry changed fuel from oil to natural gas.

1989: Initiate "*No Driving Day*" and "*Inspection and Maintenance*" programs with BAR 84 technology, and the introduction of 5% MTBE gasoline

1990: Initiate the relocation of polluting industries outside Mexico City Metropolitan Area.

1991: Initiate the introduction of unleaded gasoline and 2-way catalytic converters in vehicles.

1992: Reduction of reactive HCs in gasoline; Natural gas for industrial and power plants Initiate the Industrial Emissions Control program for the reduction of NOx and HCs

1993: Introduction of unleaded gasoline and 3-way catalytic converters in vehicles.

1994: Regulation of industrial emissions (Standard 085).

1995: Incorporation of vapor recovery systems in four PEMEX distribution centers

1996: Incorporation of vapor recovery systems in MCMA gas stations

1997: Initiates the distribution of reformulated gasoline.

1998: Updated "No Driving Day" and starts the GNC to cargo transport and passengers transport.

1999: Starts the PIREC program to change converters.

2000: Start new subway line "B"

2002: Starts renewal of public transport vehicle fleet

2004: Set strict limits on vehicle emissions

2005: Construction confined to bus lane, Insurgentes Avenue

2007: Standard with new limits on vehicle emissions

2008: Saturday's one day without car. Six actions to reduce air pollution

2009: asphalting "circuito interior", build five bridges for vehicles

2010: Sulfur reduction in gasoline to 30 ppm

2012: freeway urban North and South; subway line 12

2014:modification Saturday of "one day without car."; replacement converters program

2015:Modification "one day without car", sticker by emissions, increase number of cars

PICCA (90-94)   PROAIRE I (95-00)   PROAIRE II (01-10)   PROAIRE III (11-20)

Reference : SEDEMA, 2017

ATMOSPHERIC MONITORING SYSTEM

Goals: To **evaluate** compliance with **Mexican Standards** and **air quality**

MONITORING STATIONS

45 monitoring stations

- **30 in Mexico City**
- 15 in the State of Mexico

Meteorology and solar radiation network
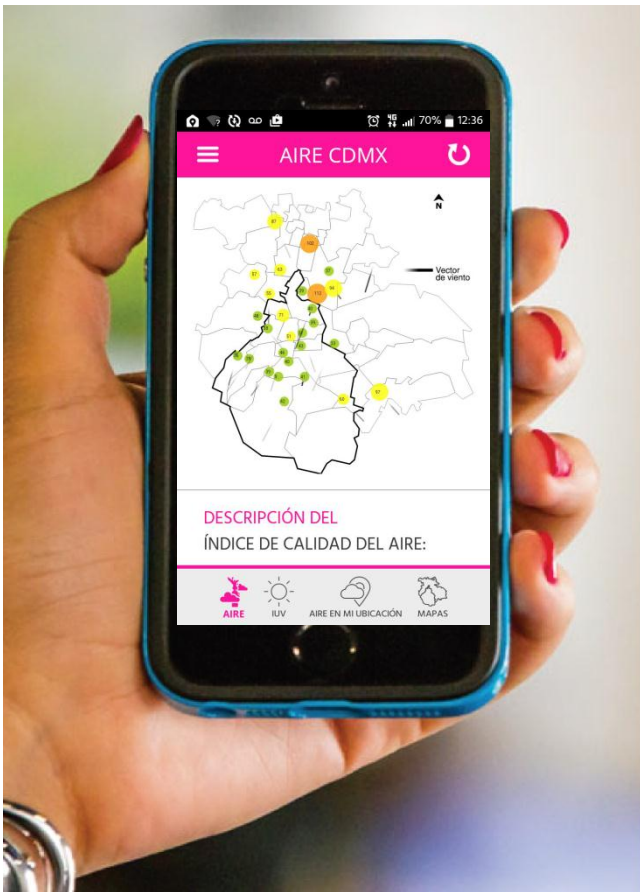
Continous measurement of weather.

Atmospheric Deposit Network

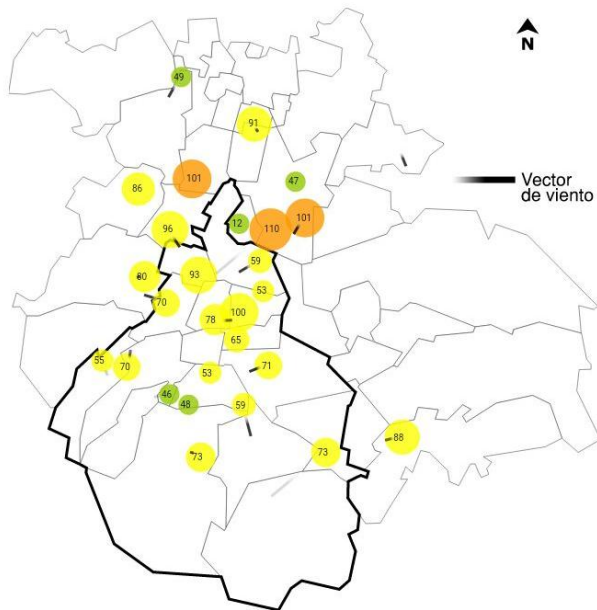Rainwater samples analysis to determine chemical species and to identify the presence of acid rain.

APP AND AIR QUALITY FORECAST

APP AND AIR QUALITY FORECAST

APP AND AIR QUALITY FORECAST

DETAILED INFORMATION FOR EACH POLLUTANT
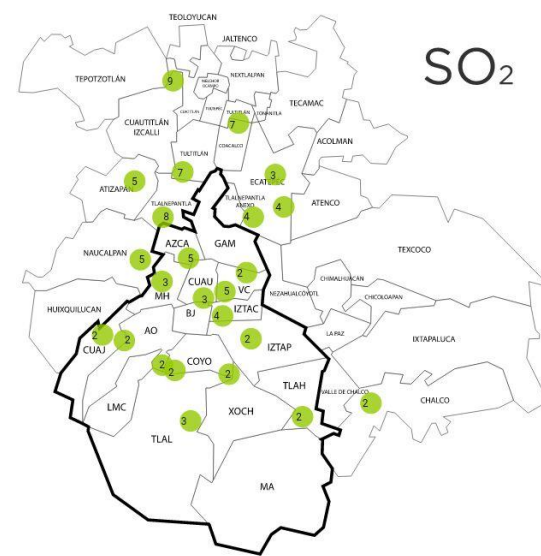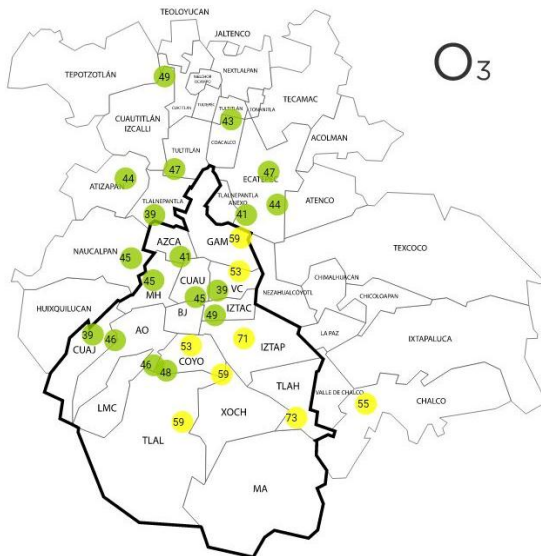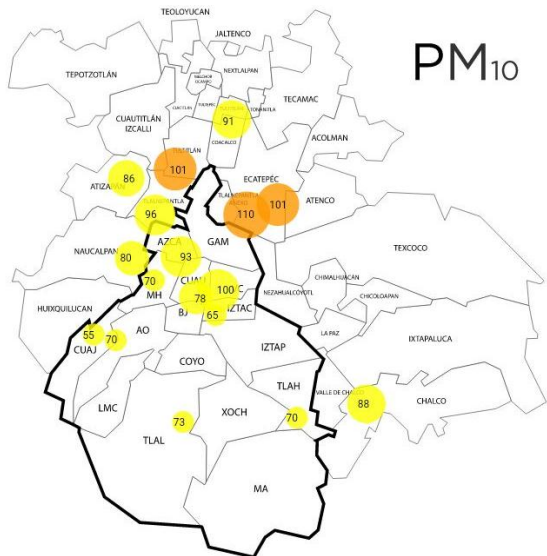
APP AND AIR QUALITY FORECAST

ZONA CONURBADA

Recomendaciones

Comparte tu automóvil. Evita viajes innecesarios.

Cerrar

DESCRIPCIÓN DEL
ÍNDICE DE CALIDAD DEL AIRE:

+ **BUENA**   + **REGULAR**   + **MALA**

ÍNDICE ULTRAVIOLETA

Reporte 12 h   23ºc

RADIACIÓN SOLAR
ULTRAVIOLETA
EN LA CDMX:

MUY ALTA

ÍNDICE
UV
9

Riesgo elevado de daño
en la piel

Mexico City Air Quality Program PROAIRE 2011-2020

PICCA 1990 - 1994
PROAIRE 1995-2000
PROAIRE 2002-2010
PROAIRE 2011-2020
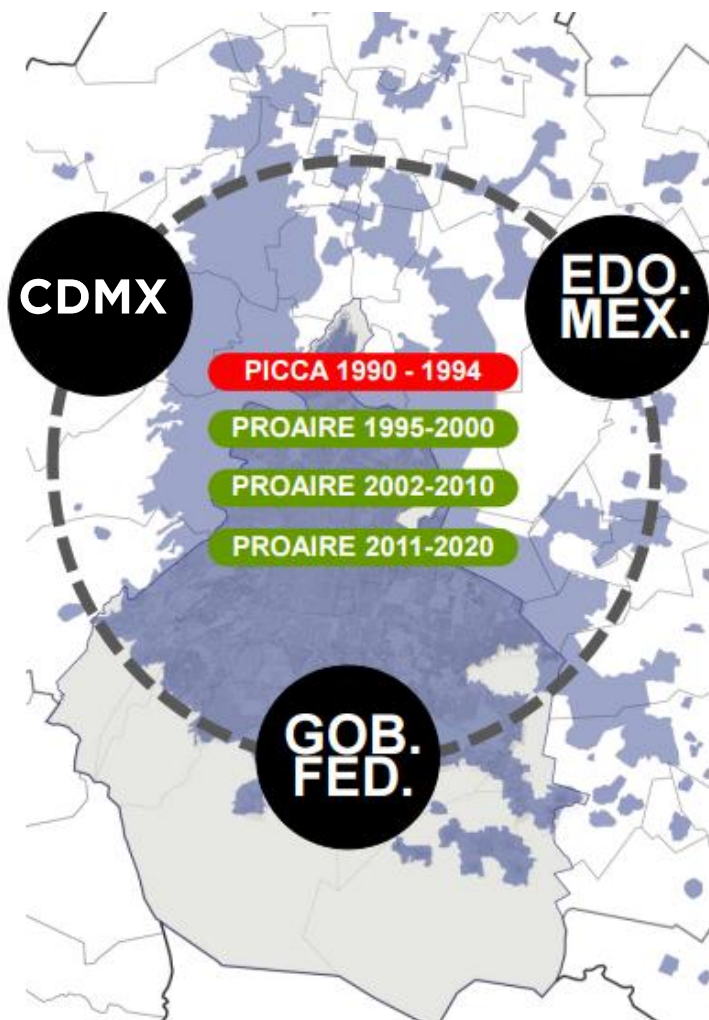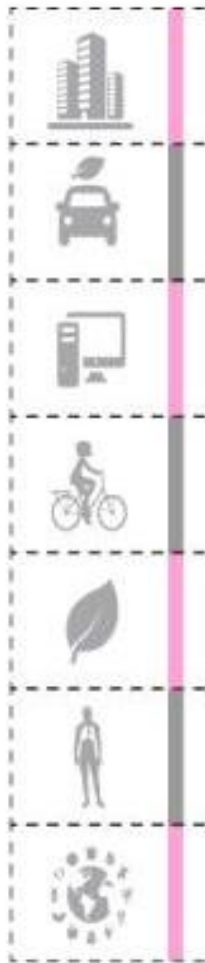
Mexico City Air Quality Program PROAIRE 2011-2020

- **8 Strategies**
- **81 Measures**
- **116 Actions**

Mexico City 96 Local Government Actions

PROAIRE IN MEXICO CITY – LOCAL IMPLEMENTATION

98 actions

- Industry
- Transport
- Compliance & Verification
- Mobility
- Reforestation
- Health
- Climate Change

MEXICO CITY CLIMATE ACTION PROGRAM 2014-2020

MEXICO CITY´S CLIMATE ACTION PROGRAM 2014-2020 (PACCM)

Annual emmision in the Metropolitan Area

20.6 million tons of CO_2

CDMX Emissions Inventory, 2014

56.1 million

Emissions in the Mexican Valley metropolitan Area

MITIGATION GOAL

REDUCE 10 MILL ACCUMULATED TON CO_2 EQ from 2014 to 2020

ADAPTATION GOAL

INCREASE RESILIENCE ON

5.6 MILL

INHABITANTS With vulnerability

MEXICO CITY'S CLIMATE ACTION PROGRAM 2014-2020 (PACCM)

The PACCM has:

7 strategic priorities to tackle climate change

	Urban and Rural Energy Transition.
	Containment of Urban Sprawl.
	Environmental Improvement.
	Sustainable Improvement of Natural Resources and Biodiversity
	Building Resilience.
	Education and Communication.
	Research and Development.

TOTAL **102** actions

4.36 million tons **CO2eq** reduced

by April 2017

65% of progress **2018** goal

ADAPTATION AND RESILIENCE

ADAPTATION AND RESILIENCE

MAIN RISKS

- **EXTREME HYDROMETEOROLOGICAL EVENTS**

FLOODS

LANDSLIDES

5.6 MILLION ❯❯ With some rate of vulnerability

- **HEALTH IMPACTS**

40 THOUSAND ❯❯ Severe flood risk

HEAT WAVES

DEHYDRATATION

3 MILLION ❯❯ Low to high flood risk

CDMX RESILIENCE STRATEGY

PILLAR 01.

FOSTER REGIONAL COORDINATION

CDMX RESILIENCE STRATEGY

PILLAR 02.

PROMOTE WATER RESILIENCE AS A NEW PARADIGM TO MANAGE WATER IN THE MEXICO BASIN

CDMX RESILIENCE STRATEGY

PILLAR 03.

PLAN FOR URBAN AND REGIONAL RESILIENCE

CDMX RESILIENCE STRATEGY

PILLAR 04.

IMPROVE MOBILITY THROUGH AN INTEGRATED, SAFE, AND SUSTAINABLE SYSTEM

CDMX RESILIENCE STRATEGY

PILLAR 05.

DEVELOP INNOVATION AND ADAPTIVE CAPACITY

MULTI-HAZARD SYSTEMS

CENTRE FOR COMMAND, CONTROL, COMPUTATION, COMMUNICATIONS AND CITIZEN CONTACT (C5)

Goal:

Response within 5 minutes of an incident.

Resources:

- 1 main centre (C5)
- 5 regional centres (C2)
- 2 mobile command and control centres
- Telephone centre for emergencies (#911)
- 8,088 cameras

ENVIRONMENTAL EDUCATION

THANK YOU

@tmullergarcia