



# Executive Summary

# Eres grande México.

Eres grande por tus tradiciones y tu historia, la que se cuenta en los libros y la que se escribe en tus calles todos los días.

Eres grande porque esa es tu naturaleza. Kilómetros de selva, desiertos, bosques y playas y por la diversidad que habita en ellos.

Eres grande por tu gente generosa y solidaria.

Eres grande por tus jóvenes con talento y ganas de emprender. Mexicanos que se preparan y trabajan todos los días para ser mejores.

Eres grande por el arte y la cultura que se respira en cada esquina; desde tus museos hasta tus mercados, en tus pueblos y ciudades.

Eres grande porque eres un país con ingenio e ideas nuevas.

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# Presentation

In Citibanamex, we have vowed to create a positive impact in Mexico's development, not only by providing financial services, but also programs and corporate citizenship actions, through which we want to promote a fair and inclusive sustainable growth that, not only generates an economic value but also, improves the welfare of communities in which we operate and that are consistent with the preservation of the environment.

When we talk about sustainable cities, we talk about one of the biggest challenges of our time **the concentration of the population in metropolitan areas**, that requires the development of infrastructure and services, and also the creation of employment that guarantees the quality of life and development opportunities for its habitants.

Currently 54% of the global population live in cities that consume 80% of the energy and produce 75% of the carbon emissions even though they only represent 3% of our planet's territory. This numbers will be more challenging in the next decades since, as a UN report indicates by 2050, 66% of the global population will live in cities. For our country, the challenge is even bigger as 80% of the population lives in a metropolitan area according to recent INEGI information.

UN's 2030 agenda, sets 17 Sustainable Development Goals (SDG) for the purpose of facing poverty, inequality and climate change, translates into social, technical, political and economic challenges that requires the participation of every sector of the society.

We are convinced that the private sector is obliged to help build those answers through a continuous, and solid compromise of improving sustainable growth harmoniously with the environment. Along with the public sector and national and international NGOs, we can help face the challenges in front us and the achievement of the SDGs.

Our *Sustainable Cities* initiative contributes, in the long term, to the edification of dynamic, healthy and sustainable cities encouraging alliances with the government, civil organizations, private sector and research institutes in order to achieve this goal.

An essential element to move forward on this propose is having complete and clear information, as well as tools for decision making that provide with a better understanding of the challenges that cities face for the 2030 which could serve as a base for the proposals and public policies.

The fourth edition of the Sustainable Cities Index 2018, that we are presenting, set a precedent on the way cities are seen, as it has an updated analysis of past years and prompts a vision of further progress with the incorporation of the UN's SDG and the 2030 Agenda. For the first time in Mexico, we can evaluate, through 107 indicators, the economic, environmental and social aspects of the metropolitan areas, as well as the progress of advance towards the accomplishment of the goals established by the United Nations and best practices.

This edition includes a traffic light, which we developed with the help of our partner institutions, and constitutes a valuable tool to analyze and compare the results of each SDG and metropolitan area, it is available online for public use. The index results show that there is still a lot to do and that the challenges that we must face are significant.

I appreciate and acknowledge the work of our partner institutions and the people that have contributed in this project, on that couldn't have been made without their collaboration: Special thanks to the Centro de Investigación y Docencia Económica (CIDE), the Centro Mario Molina (CMM) and the Instituto Mexicano para la Competitividad (IMCO), as well as the public institutions that shared information and the experts that helped us with their opinion, knowledge and data.

The 2018 Sustainable Cities Index represents a magnificent example of how the private sector, the academy and the civil organizations can work together with the common purpose of identifying challenges and opportunities in the cities that we live on.

With this intention we also complement our actions as a financial institution and the decision of having the leadership, through more flexible financing options for activities that are able to boost and create eco-friendly solutions, that help mitigate, and in the adaptation, of the climate change, that boost the sustainable development or helps in the reduction or elimination of negative economic impacts.

In Citibanamex we will continue contributing to find solutions that allow us to have more resilient, inclusive, safe and sustainable cities; backing up, with our efforts, the national development agenda.



A handwritten signature in black ink, appearing to read 'Ernesto', written in a cursive style.

**Ernesto Torres Cantú**  
General Director Citibanamex

# Introduction

In September 2015, the United Nations General Assembly approved the 17 Sustainable Development Goals (SDGs), which consider three dimensions of sustainable development, - economic development, social inclusion, and environmental sustainability - each of them based on good governance. The 17 goals, which comprise 169 targets and 231 indicators, will be an important reference for government agendas both national and local in coming years.

In this context, and in line with Citi's sustainability strategy, Citibanamex convened the National Laboratory of Public Policy of the Centro de Investigación y Docencia Económicas (CIDE), the Centro Mario Molina (CMM), and the Instituto Mexicano para la Competitividad (IMCO) to join efforts to create the fourth edition of the Sustainable Cities Index, previous editions of the index have been published since 2013. This edition systematizes the information available on the municipalities and metropolitan areas to obtain a first diagnosis and monitor the attainment of the SDGs in Mexico's metropolitan.<sup>1</sup> This study is not an official United Nations report, even though it has been written based on the set of goals, targets, and indicators as defined by the United Nations in the context of the 2030 Agenda.

In Mexico, the metropolitan areas host the greatest concentration of population and economic activity; in 2017, approximately 57% of the population of Mexico lived in one of the 59 metropolitan areas delimited by the National Population Council (CONAPO).<sup>3</sup> In addition, in 2015 metropolitan areas accounted for approximately 76.4% of the gross domestic product (GDP).<sup>4</sup>

At the same time, in the metropolitan areas of Mexico there are some situations and processes that generate imbalance and chronic problems of poverty, inequality, and vulnerability, as well as impacts on the environment, that limit a great many of the inhabitants' opportunities to lead a dignified life. That is why monitoring the 2030 Agenda from the standpoint of the metropolitan areas is important for understanding how much we, as a society, have progressed in attaining a sustainable human development.

The objective of the fourth edition, a pioneer study of its type, is to contribute to the monitoring of the SDGs with the generation of an index and a traffic light indicator to measure progress towards attaining the SDGs in the metropolitan areas of Mexico. The index and traffic light are based on the methodology developed in the *SDG Index & Dashboard Report 2017*<sup>5</sup>, elaborated by the Sustainable Development Solutions Network and the Bertelsmann Stiftung Foundation to measure the progress of metropolitan areas in compliance with the SDGs.

This executive summary presents the most important methodological aspects and the main results of the 2018 Sustainable Cities Index. The summary is structured in four sections: the main characteristics of the study; the general results of the index and the traffic light; the main results by sustainable development goal; and an analysis identifying clusters of metropolitan areas based on the similarity of results. These sections are followed by the conclusions and two annexes; the first annex briefly describes the methodology used in the generation of the index and traffic light; whereas the second annex presents a complete list of the indicators included in the study.

The full version of this study can be consulted and downloaded at [Inpp.cide.edu/indicede-ciudadessostenibles 2018](http://Inpp.cide.edu/indicede-ciudadessostenibles2018). In the same site the database of the indicators and metadata data sheets can be downloaded and the results can be explored through a tool designed for that purpose.

1 This study analyzes information from the 59 metropolitan areas included in the document *Delimitación de las zonas metropolitanas de México 2010*, published in 2012 by the Ministry of Social Development (SEDESOL), the National Population Council (CONAPO), and the National Institute of Statistics and Geography (INEGI).

2 National Population Council. *Proyecciones de población a nivel municipal 2010-2030*. Mexico City, 2015.

3 Ministry of Social Development, National Population Council, and National Institute of Statistics and Geography, *Delimitación de las zonas metropolitanas de México 2010*, Mexico City, 2012.

4 Authors' estimates based on data from the National Institute of Statistics and Geography and the National Population Council.

5 Sustainable Development Solutions Network and Bertelsmann Stiftung, *SDG Index & Dashboard Report 2017*, Nueva York, 2017.

# What is the Sustainable Cities Index?

The new edition of the Sustainable Cities Index measures the progress of Mexico's metropolitan areas towards attaining the targets included in the SDGs. It is a pioneer effort worldwide since it is one of the first that takes subnational regions as a unit to analyze their situations in regards to the targets of the 2030 Agenda.

The study includes 56 of the 59 metropolitan areas as defined by the National Population Council (Consejo Nacional de Población), the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía), and the Ministry of Social Development (Secretaría de Desarrollo Social) up to 2017.<sup>6</sup> The exceptions are the three metropolitan areas for which less information is available: Acayucan, Tianguistenco, and Teziutlán.

The generation of an index and a traffic light was included as part of the exercise. The index has a scale of zero to 100, where 100 is the best; it is made up of 16 sub-indexes associated with 16 of the 17 SDGs.<sup>7</sup> The traffic light was used to measure the progress of the areas, by indicator and for each of the goals.



The index and the traffic light were created based on the data from 107 social, economic, and environmental indicators selected for their usefulness in measuring progress in any of the SDGs targets of the. The results of the metropolitan areas for each of these indicators are compared with an optimal value, which was based on the target associated with each indicator. For example, for the indicator of the percentage of the population living in extreme poverty, 0% was used as the optimal value. This value is based on Target 1.1 of the SDGs, according to which extreme poverty is to be eradicated worldwide by 2030.

Each indicator is associated with one of the 169 targets of the 2030 Agenda, of which, in turn, are associated with one of the 17 goals. Table 4, in Annex II, includes the indicators included in the study for each goal, as well as the optimal value suggested for each one and the mean for the metropolitan areas.

The results and data for each indicator can be visually depicted by a traffic light, which is available at [Inpp.cide.edu/indicedeciudadessostenibles2018](http://Inpp.cide.edu/indicedeciudadessostenibles2018).

It's important to emphasize that the index and traffic light presented here are rather uncommon. In a conventional study, the metropolitan areas would be compared with one another and a score would be assigned as a result of that process. Accordingly, those areas with the best performances would attain the highest possible scores. In this study, the 2018 Sustainable Cities Index, all the metropolitan areas are scored based on the difference between set of targets or optimal values that should be attained by the year 2030. This is why, in some cases, no metropolitan area gets a good score or is classified in the best categories of the traffic light. In other words, the values are not assigned to the relative position of the metropolitan areas for each goal, but on the difference between their score and a standard.

<sup>6</sup> Ministry of Social Development, National Population Council, and National Institute of Statistics and Geography, *Delimitación de las zonas metropolitanas de México 2010*, Mexico City, 2012.

<sup>7</sup> **Goal 14 - Life below water** was not included in this study due to the lack of information and the impossibility of making comparisons among all the metropolitan areas in the country.

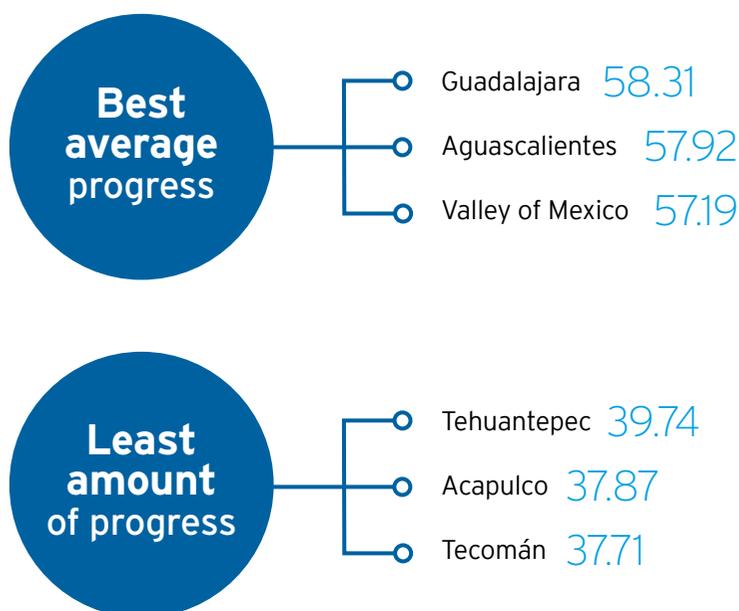
# How much progress have the metropolitan areas made towards the SDGs?

The metropolitan areas of Mexico are still far from meeting the goals set forth in the 2030 Agenda. As the results of this study indicate, no metropolitan area is close to attaining all the targets of the SDGs, and all areas have disadvantages in regards to at least one of the 16 goals analyzed. The following sections present the main results of this study, using the index and the traffic light.

## Results of the index

In order to assess the overall performance of Mexico's metropolitan areas in attaining the SDGs, a general index is calculated based on the average results obtained by each metropolitan area in the 16 sub-indexes associated with the 16 goals included in this study. In other words, the general index, used in this study represents the overall progress of each metropolitan area towards attaining the SDGs.

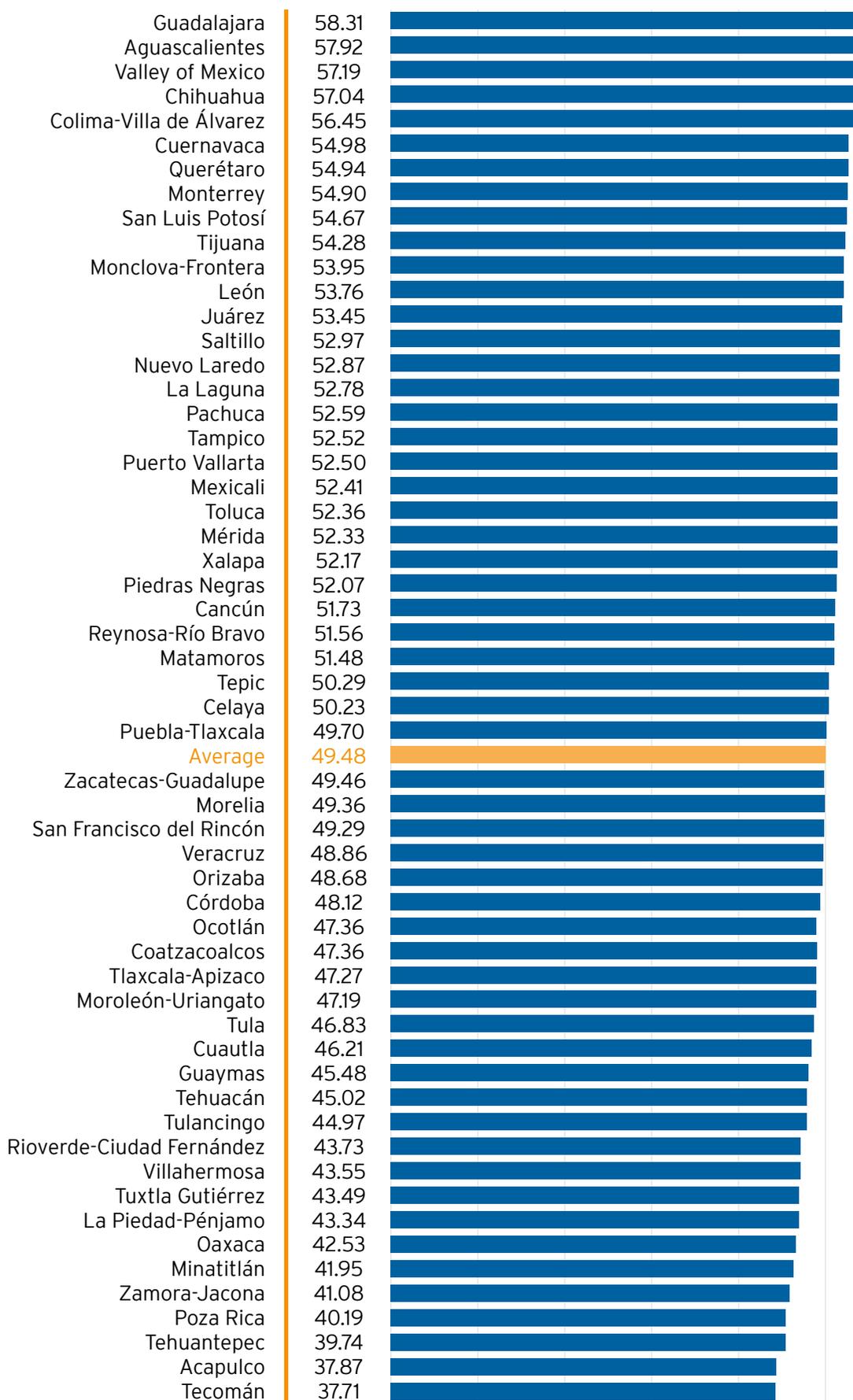
Graph 1 shows the results of the general index by metropolitan area, in descending order. As in the case of the sub-indexes, the general index may have a value from 0 to 100, and the average gains may be expressed as a percentage of an optimum. With a mean of 49.48 said the study reveals that on average the metropolitan areas of Mexico have moved 49.48% along the path towards attaining the SDGs, using as a reference the optimal values for each indicator.<sup>8</sup>



The range of results, i.e. the difference between the best and least favorable general index is 20.6 points.

<sup>8</sup> See the note on methodology in Annex I and the description of indicators by sub-index in Annex II.

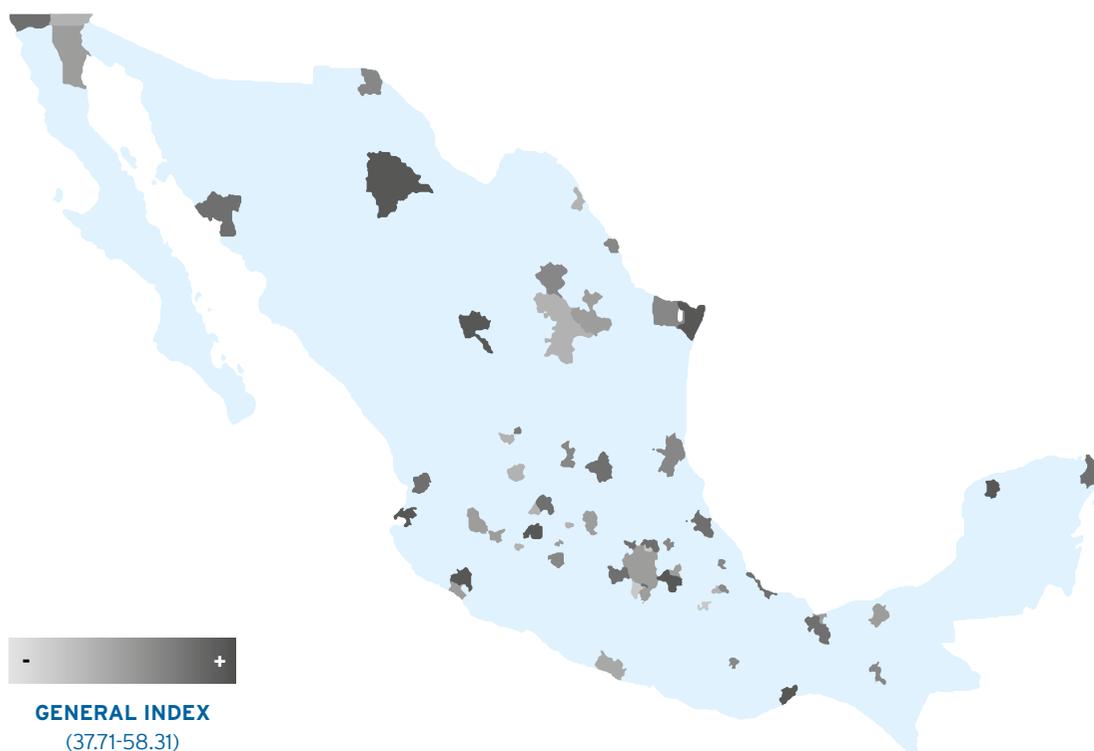
**Graph 1 > Results of the general index by metropolitan area (points).**



Source: Authors' compilation, based on data from several sources (see note on methodology in Annex I and the description of the indicators by sub-index in Annex II).

In geographic terms the metropolitan areas with the best results in the general index are to be found in the central and northern regions of the country; whereas the areas with the lowest average progress are situated in the east and southeast.

**Figure 1 > Map of results of the general index by metropolitan area.**



Source: Authors' compilation, based on data from several sources (see note on methodology in Annex I and the description of the indicators by sub-index in Annex II).

The index represents the most recent performance in three dimensions of sustainable development - economic development, social inclusion, and environmental sustainability - with respect to the full set of targets that should be attained by 2030.<sup>9</sup>

In addition, when consider the average progress of each metropolitan area, one should also take into account of the overall performance by SDG, i.e. the average progress of the areas in each sub-index. On average, the metropolitan areas show the greatest progress in the following: **SDG 17. Partnerships for the goals; SDG 3. Good health and well-being; and SDG 1. No poverty**; where as the least favorable average progress has been associated with **SDG 12. Responsible consumption and production; SDG 15. Life on land; and SDG 10. Reduced inequalities.**

<sup>9</sup> While the general index is a measure of average progress in attaining the SDGs, it is important to note that its construction does not incorporate time as a dimension of the analysis. In other words, making predictions on the performance of metropolitan areas over the next 12 years is beyond the scope of this study.

As in the case of the general index, the ranking of progress by sub-index is represented as a percentage of an optimum value. These values do not imply any judgment as to the seriousness or urgency of some issues over others; rather, they are measures of the progress made by the metropolitan areas towards specific targets. This makes it possible to highlight challenges in sustainable development based on objective and comparable measurements.

Table 1 shows the metropolitan areas that were ranked in the first three places in each sub-index, as well as those that obtained the three least favorable results in each case.

**Table 1 > Main results by sub-index.**

	Goal	Most favorable results	Least favorable results
1	 <b>No poverty</b>	Monclova-Frontera (90.19) Saltillo (87.93) Monterrey (83.27)	Tehuacán (20.27) Poza Rica (22.22) Rioverde-Ciudad Fernández (31.85)
2	 <b>Zero hunger</b>	Chihuahua (72.76) Monclova-Frontera (72.73) San Luis Potosí (70.59)	Acapulco (2.58) Minatitlán (14.22) Tehuacán (17.67)
3	 <b>Good health and well-being</b>	Tula (75.00) Reynosa-Río Bravo (73.50) Mexicali (72.13)	Chihuahua (41.70) San Francisco del Rincón (45.23) Tuxtla Gutiérrez (48.21)
4	 <b>Quality education</b>	Colima-Villa de Álvarez (73.38) Zacatecas-Guadalupe (63.67) Pachuca (58.82)	Zamora-Jacona (7.68) Tehuantepec (19.41) Tuxtla Gutiérrez (21.37)
5	 <b>Gender equality</b>	Colima-Villa de Álvarez (77.36) Valley of Mexico (74.48) Tijuana (72.31)	Tula (37.10) Córdoba (40.77) Piedras Negras (40.95)
6	 <b>Clean water and sanitation</b>	Puerto Vallarta (90.07) Colima-Villa de Álvarez (84.65) Mexicali (81.71)	Ocotlán (22.94) Valley of Mexico (28.95) Toluca (30.42)
7	 <b>Affordable and clean energy</b>	Aguascalientes (72.39) Morelia (68.64) Ocotlán (67.21)	Guaymas (20.91) Cancún (27.03) Minatitlán (27.16)
8	 <b>Decent work and economic growth</b>	Monterrey (73.14) Saltillo (62.48) Querétaro (59.32)	Moroleón-Uriangato (13.13) Rioverde-Ciudad Fernández (23.82) Tulancingo (25.36)
9	 <b>Industry, innovation and infrastructure</b>	Valley of Mexico (72.78) Guadalajara (60.03) San Luis Potosí (54.04)	Moroleón-Uriangato (11.23) Rioverde-Ciudad Fernández (16.58) La Piedad-Pénjamo (17.60)
10	 <b>Reduced inequalities</b>	Nuevo Laredo (74.01) Tampico (57.16) Colima-Villa de Álvarez (54.57)	Minatitlán (8.73) Tula (10.91) Villahermosa (18.82)
11	 <b>Sustainable cities and communities</b>	Valley of Mexico (62.86) Tepic (58.91) Pachuca (58.31)	Poza Rica (21.49) Acapulco (28.54) Minatitlán (28.87)
12	 <b>Responsible consumption and production</b>	Toluca (59.78) Tehuantepec (53.50) Rioverde-Ciudad Fernández (53.14)	Puerto Vallarta (20.19) Veracruz (23.86) Tijuana (24.54)
13	 <b>Climate action</b>	Guadalajara (90.69) León (88.63) Tijuana (88.45)	Tecomán (5.30) Tehuantepec (5.36) Minatitlán (11.89)
15	 <b>Life on land</b>	Cuernavaca (96.37) Orizaba (81.11) Toluca (75)	Reynosa-Río Bravo (0) Tijuana (0) Mexicali (2.33)
16	 <b>Peace, justice and strong institutions</b>	Moroleón-Uriangato (82.74) Ocotlán (75.31) Minatitlán (73.26)	Mexicali (28.34) Acapulco (40.22) Tecomán (41.31)
17	 <b>Partnerships for the goals</b>	Querétaro (84.60) Cancún (82.70) Morelia (80.75)	Tuxtla Gutiérrez (45.79) Ocotlán (46.60) Zamora-Jacona (49.19)

Source: Authors' compilation, with data from various sources (see note on methodology in Annex I and the description of indicators by sub-index in Annex II).

# Results of the traffic light

Regarding the traffic light, for each metropolitan area a traffic indicator in one of five colors was assigned for each goal; the final color for the traffic light in each goal is based on the number of times that a color occurs for the indicators within the goal. In those cases in which two or three traffic light colors of the traffic light was repeated the same number of times, the color corresponding to the least favorable result was the one assigned. For example, due to the performance of Aguascalientes in **Goal 1. No poverty**, its indicators were associated with the following colors of the traffic light: green (shortcoming with respect to access to social security), red (economically active population below the line of well-being), orange (population with income below the line for minimal well-being), dark green (extreme poverty), and green (moderate poverty). Given that in this case the color most often repeated is green, green was assigned to Aguascalientes for **Goal 1. No poverty**.

The traffic light shows a color, representing the, or level of progress, for most of the indicators within each goal in each metropolitan area. It also helps to highlight those cases in which major challenges need to be addressed. Figure 2 shows the results of the traffic light by goal and metropolitan area.

**Figure 2 > Traffic light by Goal and metropolitan area\*.**

\*Numbers in horizontal position indicate the average score reached by the metropolitan areas in every Goal. Numbers in vertical position present the general index by metropolitan area on their progress in attaining the SDG. Color in the center shows the results of the traffic light by Goal in every metropolitan area.



Metropolitan Area	General index	1 NO POVERTY	2 ZERO HUNGER
	Subindex by SDG >	61.10	49.26
Acapulco	37.87	Yellow	Red
Aguascalientes	57.92	Green	Yellow
Cancún	51.73	Green	Yellow
Celaya	50.23	Yellow	Yellow
Chihuahua	57.04	Green	Green
Coahuila de Zaragoza	47.36	Yellow	Orange
Colima-Villa de Álvarez	56.45	Yellow	Yellow
Córdoba	48.12	Yellow	Yellow
Cuautla	46.21	Orange	Yellow
Cuernavaca	54.98	Yellow	Yellow
Guadalajara	58.31	Green	Yellow
Guaymas	45.48	Green	Orange
Juárez	53.45	Green	Yellow
La Laguna	52.78	Green	Yellow
La Piedad-Pénjamo	43.34	Yellow	Orange
León	53.76	Yellow	Orange
Matamoros	51.48	Green	Yellow
Mérida	52.33	Green	Yellow
Mexicali	52.41	Green	Yellow
Minatitlán	41.95	Orange	Orange
Monclova-Frontera	53.95	Green	Green
Monterrey	54.90	Green	Yellow
Morelia	49.36	Yellow	Orange
Moroleón-Uriangato	47.19	Orange	Yellow
Nuevo Laredo	52.87	Yellow	Yellow
Oaxaca	42.53	Yellow	Yellow
Ocotlán	47.36	Yellow	Yellow
Orizaba	48.68	Yellow	Yellow
Pachuca	52.59	Yellow	Yellow
Piedras Negras	52.07	Green	Yellow
Poza Rica	40.19	Orange	Orange
Puebla-Tlaxcala	49.70	Orange	Yellow
Puerto Vallarta	52.50	Green	Yellow
Querétaro	54.94	Green	Yellow
Reynosa-Río Bravo	51.56	Green	Yellow
Rioverde-Ciudad Fernández	43.73	Orange	Yellow
Saltillo	52.97	Green	Yellow
San Francisco del Rincón	49.29	Yellow	Orange
San Luis Potosí	54.67	Yellow	Green
Tampico	52.52	Yellow	Yellow
Tecomán	37.71	Yellow	Orange
Tehuacán	45.02	Red	Orange
Tehuantepec	39.74	Yellow	Yellow
Tepic	50.29	Green	Yellow
Tijuana	54.28	Yellow	Yellow
Tlaxcala-Apizaco	47.27	Yellow	Yellow
Toluca	52.36	Yellow	Yellow
Tula	46.83	Yellow	Yellow
Tulancingo	44.97	Orange	Yellow
Tuxtla Gutiérrez	43.49	Orange	Yellow
Valley of Mexico	57.19	Yellow	Yellow
Veracruz	48.86	Yellow	Yellow
Villahermosa	43.55	Green	Orange
Xalapa	52.17	Yellow	Yellow
Zacatecas-Guadalupe	49.46	Yellow	Yellow
Zamora-Jacona	41.08	Orange	Orange

Source: Authors' compilation, based on data from various sources (see note on methodology in Annex I and the description of the indicators by sub-index in Annex II).



61.98 42.96 59.13 56.48 45.02 43.70 38.33 34.09 45.76 37.93 51.88 34.89 59.09 70.12



For some goals the results reveal that most of the metropolitan areas are lagging in several important areas. This is the case of the goals for which a larger number of metropolitan areas are in the red and orange categories. The goals with in red and orange, are:

Most common results		Goal	Number of metropolitan áreas with the most common results	
<div style="background-color: #e69d00; padding: 10px; text-align: center; color: white; writing-mode: vertical-rl; transform: rotate(180deg);">Target far off</div> <div style="background-color: #c00000; padding: 10px; text-align: center; color: white; writing-mode: vertical-rl; transform: rotate(180deg);">Target very far off</div>		<b>SDG 10. Reduced inequalities</b>		51
		<b>SDG 15. Life on land</b>		49
		<b>SDG 12. Responsible consumption and production</b>		46
		<b>SDG 11. Sustainable cities and communities</b>		42
		<b>SDG 9. Industry, innovation and infrastructure</b>		38
		<b>SDG 8. Decent work and economic growth</b>		28
		<b>SDG 16. Peace, justice and strong institutions</b>		26
		<b>SDG 6. Clean water and sanitation</b>		22

In another group of goals, the metropolitan areas tend to concentrate in the yellow the traffic light, since their indicators are mostly fair. The goals in this group and the corresponding number of metropolitan areas for which they are yellow are:

Most common results	Goal	Number of metropolitan áreas with the most common results
Fair progress	SDG 3. Good health and well-being	 44
	SDG 2. Zero hunger	 40
	SDG 7. Affordable and clean energy	 33
	SDG 5. Gender equality	 32
	SDG 4. Quality education	 29
	SDG 1. No poverty	 27

Finally, it should be noted that a larger number of metropolitan areas were in the dark green and green categories in respect of two goals. These are:

Most common results	Goal	Number of metropolitan áreas with the most common results
Target Attained	SDG 17. Partnerships for the goals	 33
Good progress	SDG 13. Climate action	 26

# What progress has been achieved, goal by goal?

The progress of the Mexican metropolitan areas in attaining every Goal was measured by the estimation of 16 subindexes, one for each Goal. These subindexes have a range of 0 to 100 points, where 100 is the best. These subindexes were calculated according to indicators associated with each Goal.



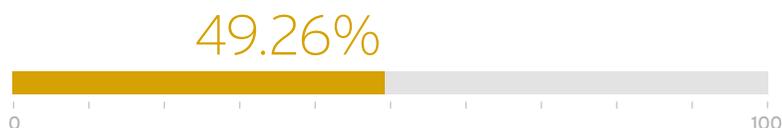
SDG 1. No poverty



In Goal 1, the metropolitan areas obtained a mean score of 61.06 out of 100, i.e. they have achieved 61.06% towards reaching the goals proposed by the United Nations regarding poverty by the year 2030. One of the greatest gains in relation to this goal has had to do with extreme poverty, since the average percentage of the population living in extreme poverty was 4.84% in 2015. Nonetheless, major challenges remain in fighting poverty, such as the fact that on average, 21.88% of the persons of working age do not have enough income to meet their basic needs.



### SDG 2. Zero hunger



The metropolitan areas of Mexico are still far from eradicating hunger in its population, since they only have reached an average score of 49.62 in Goal 2. On average, two of every 10 inhabitants do not have access to sufficient and adequate food. The problem is so serious that only three of the 59 metropolitan areas studied were in the categories of good progress or target achieved in the traffic light for this goal. In the area with the best performance, 11.87% suffered hunger; in contrast, in the area with the least favorable results, 42.44% suffered hunger.



### SDG 3. Good health and well-being

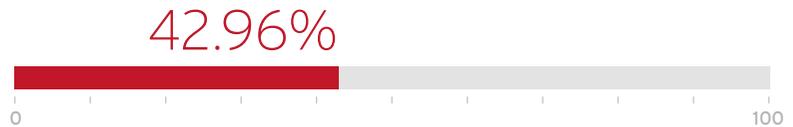


On average, Mexico's metropolitan areas obtained a score of 61.98 out of 100 for Goal 3. One of the greatest strengths in relation to this SDG is that households in urban areas have values close to optimal in the indicator of exposure to high concentrations of PM2.5 in interior spaces. This is because only a small proportion of households use firewood or charcoal to cook, and thus the number of people exposed to the contaminants that these fuels generate in interior spaces inferior to those in rural areas. Two factors that contribute to this outcome are the greater average incomes of the urban population as compared to rural communities and, therefore, the accessibility to infrastructure, and a greater supply of fuels with lower in situ emissions, such as liquefied petroleum gas, natural gas, and electricity.

There have also been major gains in the number of deaths due to traffic accidents, for which the rates are below 1.77 deaths per 100,000 people in 18 metropolitan areas. Nonetheless, in other extremely important aspects there are major lags, such as in health care services coverage. In the metropolitan areas, on average 18.27% of the population does not have access to such services. In addition, the numbers of specialized physicians and beds per 10,000 people are, on average, only 9.17 and 0.30 respectively. It should also be noted that the average life expectancy in the metropolitan areas is 74 years, i.e. 6 months less than the average for the countries of the Organization for Economic Cooperation and Development (OECD).



#### SDG 4. Quality education



Mexico's metropolitan areas are still very far from achieving the targets of Goal 4, for which, on average, they scored 42.96 out of 100. Major challenges persist in education in relation to guaranteeing this right for the entire population and reducing the unequal results among the different metropolitan areas. Up until 2015 no area had reached total coverage of the population ages 3 to 14 years in the school system, nor had any achieved total literacy in the population ages 15 and over. Moreover, the results in the indicator for quality graduate-level programs and quality universities vary considerably due to the high concentration of opportunities for getting a quality higher education in Mexico's large cities. It should also be noted that there is a difference of more than three years of schooling between the area with the best result for this indicator, Tepic, and the one with the worst, Tecomán.





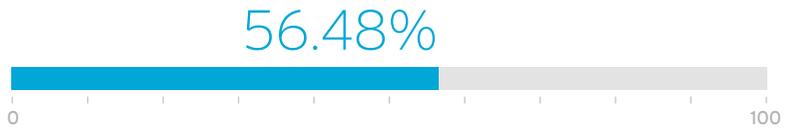
**SDG 5.** Gender equality



As for Goal 5, the metropolitan areas attained a mean score of 59.13 out of 100. Women continue to be subject to discrimination, violence, and exclusion, in addition to facing situations that limit their professional development, such as adolescent pregnancy, and greater dedication than men to non-remunerated work. From 2015 to 2017 the rate of femicides dropped in 18 metropolitan areas, whereas it increased in 31 metropolitan areas. In 16 metropolitan areas more than 5% of females ages 12 to 17 years are married or living in consensual union; and in 13 areas the birth rate for adolescent mothers is over 100 newborns per 1,000 females ages 15 to 19 years. In addition, in all the metropolitan areas studied women dedicate more time than men to domestic work and unpaid care. This difference the sexes is related to the prevailing labor and wage inequity, as well as a more limited presence of women as principals in positions of political and economic leadership.



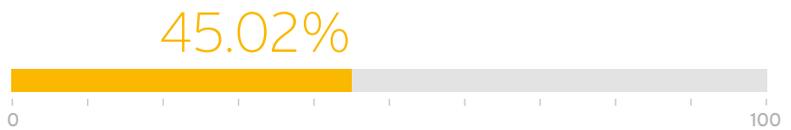
### SDG 6. Clean water and sanitation



The metropolitan areas achieved a mean score of 56.48 out of 100 for Goal 6. In Mexico one finds highly diverse situations with respect to water supply, although the country in general has low water supply. On average, the metropolitan areas analyzed have enough supply to support a population increase of up to 46.44%. Nonetheless, nine areas no longer have any supply. Although access to piped water in the metropolitan areas of Mexico is greater than 95% on average, the losses in distribution can amount to more than 50%. In addition that just over half of all users pay for water based on their consumption (micro-measurement). Moreover, water quality is fair, and on average the metropolitan areas treat only 47.33% of their wastewater. Finally, 12 metropolitan areas depend in large measure on the diversion of water from other watersheds, with all the social, environmental, and economic consequences that may entail in the medium and long term.

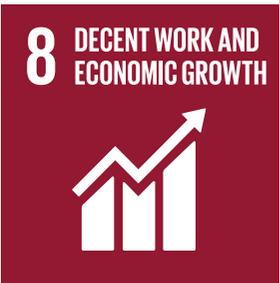


### SDG 7. Affordable and clean energy

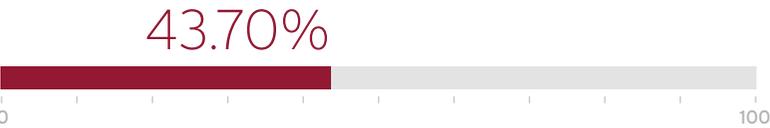


The metropolitan areas of Mexico present a not-very-favorable performance for Goal 7 on obtaining an average score of 45.02 on a scale of 0 to 100. There are very pronounced strengths and weaknesses in relation to this goal: even though, on average, more than 99% of inhabited private dwellings have electricity, a major effort is still required to promote and tap clean energies. As an example, on average only 4.25% of housing units use solar energy.





**SDG 8.** Decent work and economic growth



The metropolitan areas of Mexico show a fair performance in Goal 8 by obtaining a mean score of 43.70 on a scale of 0 to 100. There are major differences in the results of the indicators for this goal among different regions of Mexico due to the disparities among their economies. Therefore, only four metropolitan areas were classified in the category of good progress on this goal. The Gross Domestic Product (GDP) per capita is more than six times bigger in the metropolitan area with the highest value in this indicator than in the metropolitan area with the smallest value. In addition, the number of economic sectors in the metropolitan area with the greatest economic diversification comes to 918, while this number drops to 366 in the metropolitan area with the least economic diversification. In the area of labor there are also major challenges; one example is that the overall rate of formal labor was only 48.14% of the working population in 2016, which do not have social security for their job.



**SDG 9.** Industry, innovation and infrastructure



Mexico's metropolitan areas show a poor performance on Goal 9, on obtaining an average score of 38.33 on a scale of 0 to 100. Three aspects of the sub-index stand out for their poor performance: 1) in the indicator on dwellings with a computer, 91% of the metropolitan areas are far or very far from the optimal value proposed for this indicator and none are near to achieving the goal; 2) in number of airlines, 88% of the areas are far, or very far, from the optimal value; 3) and in research centers, only the Valley of Mexico was rated with very good performance, reflecting the huge gaps in research between this metropolitan area and the rest of the country. The metropolitan areas showed a better result in the degree of sophistication of their economies, since 47% were evaluated with good performance in the Economic Complexity Index.

## 10 REDUCED INEQUALITIES



### SDG 10. Reduced inequalities

34.09%



The metropolitan areas of Mexico have performed poorly with respect to Goal 10, since they obtained an average score of 34.09 out of 100; the lowest obtained for any sub-index in this study. In Mexico, a major problem of economic inequality persists among regions and within the metropolitan areas as well. The metropolitan area with the most unfavorable Gini<sup>10</sup> index is Villahermosa, with a value of 0.485. In addition, the distribution of salaries is also a problem in Mexico. The most unfavorable area in this regard is Minatitlán, with an index of 0.447.



## 11 SUSTAINABLE CITIES AND COMMUNITIES



### SDG 11. Ciudades y comunidades sostenibles

45.76%



The metropolitan areas scored, on average, 45.76 on a scale of 0 to 100 in the sub-index for Goal 11. The indicators with the best results were concentrated mainly in aspects related to infrastructure in the metropolitan areas: the provision of basic public services, people having access to adequate spaces in their homes, and the existence of a mass transport system of transportation. For example, nearly 66% of the metropolitan areas have a mass transport system operating or under construction. In contrast, the indicators with the least favorable results were concentrated in air quality and square meters of green areas per inhabitant. As for the second of these indicators, only two of the 59 metropolitan areas had more than five square meters of green space per capita.

<sup>10</sup> Gini index measure economic inequality between inhabitants of certain place. This index has a scale of 0 to 1; whereas 0 means total equality or the same income for all the people, 1 means that only a single person concentrates all the income.



**SDG 12.** Responsible consumption and production

37.93%



The metropolitan areas of Mexico, with a mean score of 37.93 out of 100, face a major challenge in relation to Goal 12. Regarding production, the number of organizations that have made commitments through environmental or dignified working conditions certifications continues to be very low. For example, the average number of companies certified as “clean” in the metropolitan areas is only 2.01 per 1,000 firms. As for responsible consumption, one of the lagging aspects the most is the separation and recycling of waste; on average, only 39.74% of metropolitan households separate their waste.



**SDG 13.** Climate action

51.88%



The metropolitan areas show fair performance in relation to Goal 13, with an average score of 51.88 out of 100. They face challenges in relation to two indicators. First, institutional progress in developing actions to fight climate change are insufficient: in 14 metropolitan areas no municipality has a municipal climate action program. And in only in one area have all the municipalities drawn up - or are in the process of drawing up - such an instrument. Also, 24 metropolitan areas do not have municipal or metropolitan planning agencies; and only seven areas have such an institution in all the municipalities.

## 15 LIFE ON LAND



### SDG 15. Life on land

34.89%



The metropolitan areas have a low level of performance for Goal 15, on obtaining an average score of 34.89 out of 100. According to the first indicator of the sub-index, protecting ecosystems important for biodiversity, 40 metropolitan areas are below the average percentage per area of ecosystems designated for protection according to the National System of Protected Natural Areas. Moreover, only 10 metropolitan areas include parts of states that already have a state biodiversity strategy, and only nine metropolitan areas have state biodiversity commissions.<sup>11</sup>



<sup>11</sup> These indicators took state information as a reference since the government's actions on biodiversity in Mexico have been focused in the national and state spheres.



**SDG 16.** Peace, justice and strong institutions



Mexico's metropolitan areas had a fair performance for Goal 16, on obtaining an average score of 59.09 on a scale of 0 to 100. Nonetheless, the metropolitan areas have considerable problems in the indicators for homicides and attacks on journalists, as well as a major lag in the index for municipal budget information. The mean number of homicides in 2016 was 23.34 per 100,000 inhabitants; so, this means that achieving the optimum of 3.6 per 100,000 by 2030 represents a major challenge. In addition, on average there were 4.75 attacks on journalists per metropolitan area in 2015. Actions must be taken to eradicate this problem. The metropolitan areas obtained an average score of 30.81 in the municipal budget index for 2014, which implies shortcomings in the quality of the information shared with its citizens.



**SDG 17.** Partnerships for the goals



The metropolitan areas of Mexico obtained a sound performance on Goal 17, with an average score of 70.12 out of 100. This average score is the highest obtained by any sub-index in this study; nonetheless, the issues included in this goal vary widely and there are still a great many aspects for which indicators have not been established or that are not easy to measure on a subnational basis. The metropolitan areas face major challenges in two of the four indicators associated with this goal: households with Internet and financial dependence. In the first case, none of the metropolitan areas was situated in the dark green or green categories of the traffic light. Indeed, 86% of the areas are still far or very far from succeeding in universal access to the Internet for all households. In the case of financial dependence, only 55% of the areas have seen good progress or have already attained the optimal value proposed for this indicator.



## Identifying similarities and differences: Cluster analysis

This year, the Index includes a cluster analysis<sup>12</sup>, a technique used to group the metropolitan areas based on their progress in attaining the 16 SDGs analyzed. The affinity propagation algorithm was used for the cluster analysis<sup>13</sup>; it makes it possible to identify metropolitan areas that operate as centroids i.e. that are connected with other areas with a similar performance. Such a similarity is established based on the proximity between the value of the sub-indexes by goal for the centroid area and the values attained by other areas, for which the centroid acts as a representative element and a node joining them in a single cluster.

The 56 metropolitan areas analyzed were grouped in nine clusters, as illustrated in Figure 3. The number of clusters was defined automatically based on the results of the affinity propagation method. Profiles were identified for each cluster taking into account the strengths and weaknesses of their performance by sub-index, determining, at the same time, comparative advantages and disadvantages with respect to the other clusters. The comparative advantages were defined as those aspects for which one cluster has better results than the others, whereas the comparative disadvantages correspond to obtaining less favorable results than the other clusters.

Cluster analysis facilitates comparisons among metropolitan areas to identify similar gains and challenges. Based on this information, decision-makers and public policy analysts will be able to identify problems common to two or more metropolitan areas and, in some cases, seek common solutions applicable to similar contexts.

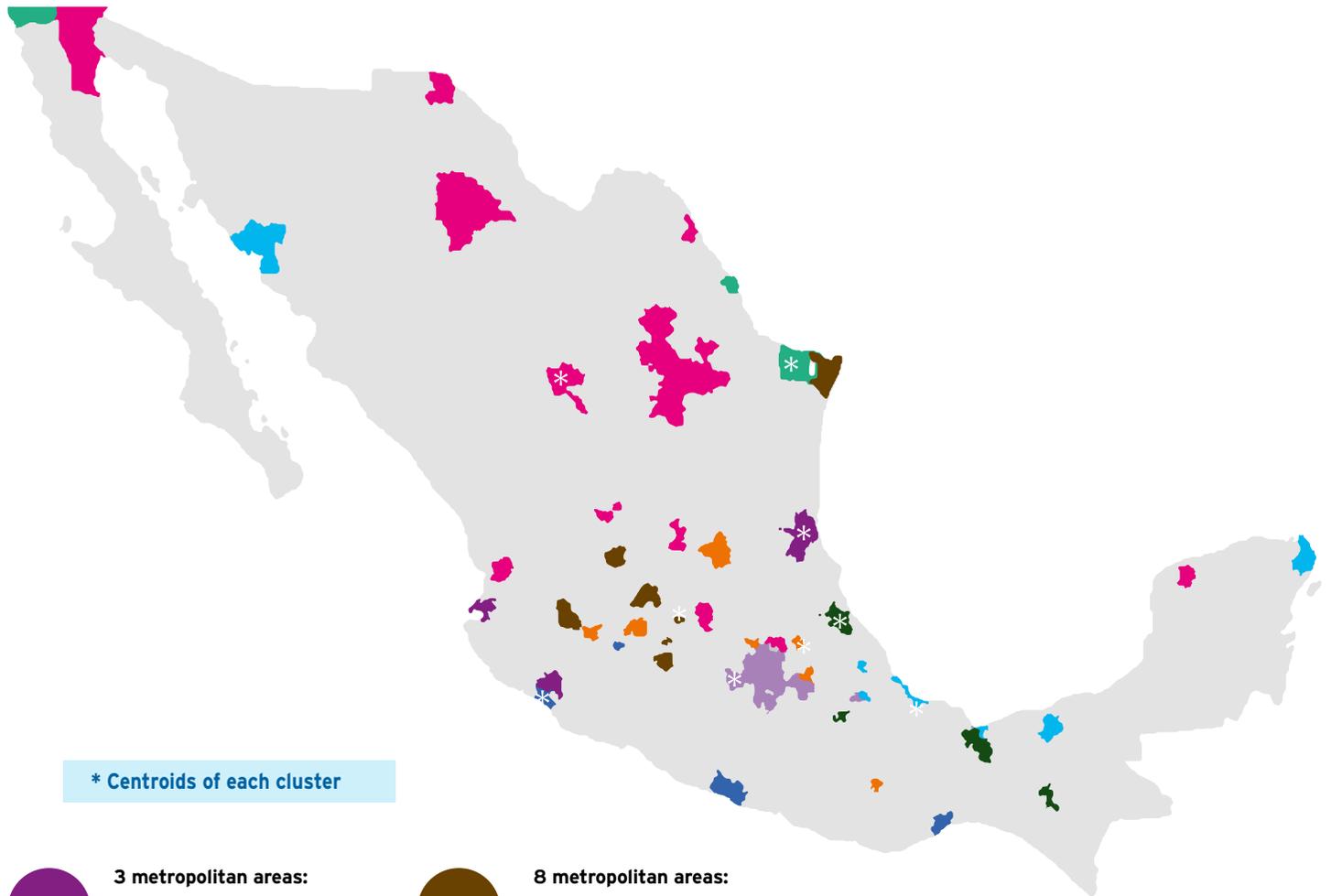
Accordingly, cluster analysis supplements this study, providing information to propose solutions tailored to present-day problems and designing mechanisms to tackle future challenges by identifying the shared challenges looking to 2030.

Table 3 presents the metropolitan areas that make up each cluster, by average performance and by the SDGs for which they have comparative advantages and disadvantages.

<sup>12</sup> The analysis was developed in Scikit-learn software, using Python as the programming language.

<sup>13</sup> The affinity propagation algorithm (AP) executes “message passing” between all pairs of available data, based on the similarities between them. The original data base is subdivided into various samples to identify which of the observations - in this case, which metropolitan areas - are representative of the sample, i.e. are centroids. The process is repeated n times until a convergence is found, such that at the end of the process the sample is grouped in clusters thanks to the process of maximizing the similarity between the node and the rest of the members of the set. It was decided to use affinity propagation (AP) for two main reasons: (a) unlike other algorithms for cluster analysis, AP does not require the number of clusters to be determined beforehand; and (b) it does not require the prior selection of points to serve as nodes to begin the analysis; instead, each data point is considered a potential centroid.

Figure 3 > Geographic distribution of metropolitan areas by cluster



\* Centroids of each cluster

**A** **3 metropolitan areas:**  
Tampico \*  
Colima-Villa de Álvarez  
Puerto Vallarta

**B** **14 metropolitan areas:**  
Saltillo \*  
La Laguna  
Zacatecas-Guadalupe  
Tepic  
Pachuca  
Piedras Negras  
Querétaro  
Mérida  
Monterrey  
Juárez  
Mexicali  
San Luis Potosí  
Monclova-Frontera  
Chihuahua

**C** **3 metropolitan areas:**  
Reynosa-Río Bravo \*  
Nuevo Laredo  
Tijuana

**D** **8 metropolitan areas:**  
Celaya \*  
León  
San Francisco del Rincón  
Morelia  
Moroleón-Uriangato  
Matamoros  
Aguascalientes  
Guadalajara

**E** **6 metropolitan areas:**  
Toluca \*  
Cauhtla  
Cuernavaca  
Puebla-Tlaxcala  
Orizaba  
Valley of Mexico

**F** **7 metropolitan areas:**  
Veracruz \*  
Villahermosa  
Guaymas  
Coatzacoalcos  
Cancún  
Córdoba  
Xalapa

**G** **7 metropolitan areas:**  
Tulancingo \*  
La Piedad-Pénjamo  
Oaxaca  
Tula  
Tlaxcala-Apizaco  
Rioverde-Ciudad Fernández  
Ocotlán

**H** **4 metropolitan areas:**  
Poza Rica \*  
Minatitlán  
Tehuacán  
Tuxtla Gutiérrez

**I** **4 metropolitan areas:**  
Tecomán \*  
Acapulco  
Zamora-Jacona  
Tehuantepec

Source: Authors' compilation, based on data from various sources (see note on methodology in Annex I and the description of indicators by sub-index in Annex II).

Cluster	Metropolitan areas	General index mean (ranking position)	Comparative advantages	Comparative disadvantages
A	3 metropolitan areas: Tampico* Colima-Villa de Álvarez Puerto Vallarta	53.82 (1)	   	 
B	14 metropolitan areas: Saltillo* La Laguna Zacatecas-Guadalupe Tepic Pachuca Piedras Negras Querétaro Mérida Monterrey Juárez Mexicali San Luis Potosí Monclova-Frontera Chihuahua	53.13 (2)	   	
C	3 metropolitan areas: Reynosa-Río Bravo* Nuevo Laredo Tijuana	52.9 (3)	   	  
D	8 metropolitan areas: Celaya* León San Francisco del Rincón Morelia Moroleón-Uriangato Matamoros Aguascalientes Guadalajara	52.19 (4)	  	
E	6 metropolitan areas: Toluca* Cuautla Cuernavaca Puebla-Tlaxcala Orizaba Valley of Mexico	51.52 (5)		 

Cluster	Metropolitan areas	General index mean (ranking position)	Comparative advantages	Comparative disadvantages
F	7 metropolitan areas: Veracruz* Villahermosa Guaymas Coatzacoalcos Cancún Córdoba Xalapa	48.18 (6)	17 PARTNERSHIPS FOR THE GOALS	2 ZERO HUNGER 7 AFFORDABLE AND CLEAN ENERGY 11 SUSTAINABLE CITIES AND COMMUNITIES 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
G	7 metropolitan areas: Tulancingo* La Piedad-Pénjamo Oaxaca Tula Tlaxcala-Apizaco Rioverde-Ciudad Fernández Ocotlán	45.14 (7)		6 CLEAN WATER AND SANITATION 8 DECENT WORK AND ECONOMIC GROWTH 9 INDUSTRY INNOVATION AND INFRASTRUCTURE 10 REDUCED INEQUALITIES 15 LIFE ON LAND
H	4 metropolitan areas: Poza Rica* Minatitlán Tehuacán Tuxtla Gutiérrez	42.66 (8)	15 LIFE ON LAND 16 PEACE, JUSTICE AND STRONG INSTITUTIONS	1 NO POVERTY 2 ZERO HUNGER 9 INDUSTRY INNOVATION AND INFRASTRUCTURE 10 REDUCED INEQUALITIES 13 CLIMATE ACTION
I	4 metropolitan areas: Tecomán* Acapulco Zamora-Jacona Tehuantepec	39.10 (9)	3 GOOD HEALTH AND WELL-BEING	2 ZERO HUNGER 4 QUALITY EDUCATION 9 INDUSTRY INNOVATION AND INFRASTRUCTURE 13 CLIMATE ACTION 15 LIFE ON LAND

\* Metropolitan area representative of each cluster.

Source: Authors' compilation, based on affinity programming algorithm (see the note on methodology in Annex I and the description of the indicators by sub-index in Annex II).



The 2018 Sustainable Cities Index, in its fourth edition, is an initial effort to measure how the metropolitan areas of Mexico have advanced towards the targets established by the United Nations in the SDGs. To do so, this project developed an index and a traffic light as tools for measuring progress in each dimension of development.

# Conclusions

The results reveal that Mexico's metropolitan areas still have a long way to go to carry out the commitments established in the 2030 Agenda. The greatest challenges are with respect to the following goals:



In the general index by metropolitan area, the average score is 49.48 points out of 100. Meaning that the metropolitan areas have already progressed 49.48% towards achieving the SDGs. The spread in the results for all the metropolitan areas is 20.6 points: The area with the best result is, Guadalajara, with a score of 58.31, while the area with the lowest is, Tecomán which, scored 37.71. No metropolitan area had good results across all the goals.

It should also be noted that development presents asymmetries among different geographic regions. Whereas the metropolitan areas situated in northern and central Mexico obtained the best results, those in the east and southeast lagged furthest behind with respect to the targets established in the SDGs.

The index also highlights the large number of areas of opportunity for generating information in the municipalities and metropolitan areas. The main challenges include the following:

- 1**

The failure to measure indicators or systematize information on several aspects related to the SDG targets by municipality and metropolitan area.
- 2**

The need to improve the timing with which such information is published; doing so could help improve the design of evidence-based public policies.
- 3**

The lack of georeferencing and systematization of information, to determine more accurately the extent to which the SDGs have been attained in the cities.



It should be noted that the information used corresponds to the entire geographic area of the municipalities that conform the metropolitan areas; and this is because Mexico's cities have spatial boundaries that not necessarily match the political-administrative boundaries of the municipalities, and which recognize their broader impact.

The 2018 Sustainable Cities Index lays a basis for monitoring the situation in Mexico's metropolitan areas with respect to the SDGs and for focusing the attention of society and the government on the greatest challenges. Given that the metropolitan areas extend beyond the political boundaries of a single municipality, or even a single state, and are spaces that host interactions among persons from the territorial demarcations that constitute them, the three levels of government - federal, state, and municipal - should coordinate to attain the commitments established in the SDGs.

Moreover, not all aspects covered by the indicators in this study pertain to the scope of action of the municipal government. In large measure the public policy issues analyzed are within the scope of the authority of the state and federal governments. Accordingly, the 2018 Sustainable Cities Index should not be used to evaluate the performance of the municipal governments, but to analyze the situation in each metropolitan area with respect to the targets of the 2030 Agenda.

Significantly, the Index also makes it possible to identify gains and challenges shared by the metropolitan areas when it comes to achieving the targets of the 2030 Agenda. Cluster analysis is a useful tool for decision-makers and public policy analysts to help identify problems common to two or more metropolitan areas. Based on this assessment, one might also seek to put in place public policies designed to resolve a single problem in several metropolitan areas with similar contexts.

Using the index and traffic light together provides a very easy way to identify the comparative advantages in each metropolitan area. For example, the metropolitan areas with comparative advantages in certain indicators and SDGs may serve as models for those that have opportunities in the same areas. Thus, one could seek out better practices in those metropolitan areas with the best results on specific public policy issues.

Finally, it should be recalled that the information used in this study is not exhaustive and that the systematization and analysis of information can be improved above. Accordingly, any comments or suggestions from readers for improving future editions of the Sustainable Cities Index are most welcome.

## I. Methodology

The methodology used in this study was designed for the purpose of measuring the progress of Mexico's metropolitan areas towards attaining the SDGs. This methodology is based mainly on the SDG Index & Dashboards Report<sup>14</sup>, which was drawn up in 2016 and 2017 for the same purpose; yet it takes as the units of analysis all countries worldwide.<sup>15</sup>

In this study the results of the metropolitan areas are presented using an index and traffic light, which were constructed based on the most recent information available on 107 social, economic, and environmental indicators. To measure the progress of each metropolitan area towards attaining the SDGs, each of these indicators was associated with one of the targets of the SDGs and optimal values were established to be attained by the year 2030 for each indicator.

The index has a scale of 0 to 100 and is made up of 16 sub-indexes associated with the 16 SDGs examined.<sup>17</sup> The traffic light was used to measure the degree of progress of the areas by indicator and for each of the SDGs. The traffic light scale has five colors: red, target very far off; orange, target far off; yellow, fair progress; green, good progress; and dark green, target attained.

The index and traffic light include the results for 56 of the 59 metropolitan areas that had been delimited in Mexico as of 2017.<sup>17</sup> Three metropolitan areas have been omitted because no information was found for a large number of the indicators. These are Acayucan, Tianguistenco, and Teziutlán.<sup>18</sup>

The information processed comes from official sources, private organizations, and civil society organizations recognized for their specialization in the matter. Most of the indicators were constructed based on data from the municipalities that conform the metropolitan areas, thus the results should be interpreted bearing in mind, as the unit of analysis, the entire geographic area occupied by these municipalities, not just the urban part of the metropolitan areas.

Calculating the index required standardizing the values of the indicators on a scale of 0 to 100, where a score closer to 100 represents being closer to the optimum proposed for each indicator. The scores of the sub-indexes by target for each metropolitan area were calculated by aggregating the standardized values of the indicators, which was done using means. First the mean was calculated for the indicators pertaining to the same target; and subsequently this operation was repeated for the values of targets pertaining to the same goal. To calculate the general index, we took the mean of the values obtained in the 16 sub-indexes.

In the case of the traffic light, first the results of each indicator were associated with one of the five colors mentioned above. To determine the traffic lights by goal, the results were aggregated using the mode, i.e. the color for each goal was defined based on the color that appeared the most times in the associated indicators. If there was more than one mode, the color representing less favorable progress was used.

<sup>14</sup> Sustainable Development Solutions Network and Bertelsmann Stiftung, *SDG Index & Dashboard Report 2017*, New York, 2017.

<sup>15</sup> This study, with some adjustments, drew on two fundamental aspects of the methodology of the Index & Dashboard Report 2017: (1) the formula for standardizing the indicators' values; and (2) the aggregation of the results of the indicators and goals by means.

<sup>16</sup> **Goal 14 - Life below water** was not included in this study due to the lack of information and the impossibility of making comparisons among metropolitan areas.

<sup>17</sup> Ministry of Social Development, National Population Council, and National Institute of Statistics and Geography, *Delimitación de las zonas metropolitanas de México 2010*, Mexico City, 2012.

<sup>18</sup> It should also be noted that this study was performed prior to the publication of the *Delimitación de las zonas metropolitanas de México 2015*, in which 74 metropolitan areas were identified. Accordingly, the recently-identified metropolitan areas will be included in the next edition of this report.

## II. Indicators included in the study

**Table 4 > Indicators included in the study \***

\* Consult Annex II of the extended version of this study for a more detailed description of the optimum value for each indicator.

Goal	Indicator	Definition	Optimum <sup>19</sup>
 1 NO POVERTY	Population in extreme poverty	Percentage of population with an income below the line of minimum well-being and that has at least three unmet social needs.	2.42
	Population with income below the line of minimum well-being	Percentage of population whose income is below the line of minimum well-being.	0
	Population in moderate poverty	Percentage of population in multidimensional poverty not included in the population in extreme multidimensional poverty. Persons affected by multidimensional poverty are those whose incomes are below the line of well-being and who have at least one unmet social need.	17.29
	Economically active population below the line of well-being	Percentage of the economically active population whose income is below the line of well-being.	2.60
	Lack of access to social security	Percentage of the population that does not have social security.	26.32
 2 ZERO HUNGER	Lack of access to food	Percentage of the population with moderate or severe food insecurity.	0
 3 GOOD HEALTH AND WELL-BEING	Maternal mortality	Number of maternal deaths per 100,000 live births in the same year.	3.6
	Infant mortality	Number of deaths of children under 1 year per 1,000 live births, in the metropolitan area in the reference year .	2.49

19 The optimum was defined based on the following criteria, in order of priority:

1. Target defined in the SDGs, so long as less than 50% of the metropolitan areas have already attained it.
2. Value indicated by the official laws and regulations in force.
3. Mean of the values of the three areas with the best results in the indicator and year in question (this criterion was only applied in the event that the indicator in question had been generated exclusively to make comparisons among the metropolitan areas of the country, with a methodology for that purpose).
4. Optimum proposed by some international organization with expertise in the issue.
5. Optimum proposed by some national agency with expertise in the issue.
6. Values from scientific articles published in refereed and recognized journals.
7. Mean value of the group of countries - the Organization for Economic Cooperation and Development (OECD), Latin America (LA), or the 10 countries worldwide with the most favorable results on the issue - with the best performance for the indicator in question.

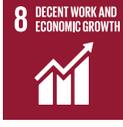
8. In the cases for which information is available for all urban municipalities of Mexico, one of the following two options was chosen: The first option, which was used when the distribution of available data was normal, entailed defining as optimal the value situated at a distance of one standard deviation from the mean for all the data. The second option, applied when the distribution of available data was not normal, was to use as the optimum the value better than 90% of the data in the distribution.

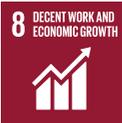
9. Mean value of the three best values for the metropolitan areas in the entire historical series.

10. Value proposed by experts on the issue by means of a score previously designed to construct an index referring to a certain aspect of the SDGs.

Goal	Indicator	Definition	Optimum <sup>19</sup>
<b>3</b> GOOD HEALTH AND WELL-BEING 	Mortality due to intestinal infections	Number of deaths caused by intestinal infections per 100,000 population.	0.48
	Suicide rate	Number of suicides per 100,000 population.	0.86
	Mortality due to diabetes and hypertensive diseases	Number of deaths caused by diabetes and hypertensive diseases per 10,000 population.	2.7
	Injuries in traffic-related accidents	Number of persons injured in traffic accidents per 100,000 population.	28.56
	Specialized physicians	Number of specialized physicians per 10,000 population.	29.39
	Physicians and nurses	Number of physicians and nurses per 10,000 population.	50.77
	Lack of access to health services	Percentage of population with no access to health services.	0
	Hospital beds	Number of registered beds per 10,000 population.	0.81
	Life expectancy at birth	Average life expectancy of individuals who make up a hypothetical cohort of births, subject at all ages to the risks of mortality for the period under study.	80.52
	Exposure to high concentrations of PM <sub>2.5</sub> in interiors	Rate of persons per 100,000 who use firewood to cook and are exposed to high concentrations of PM <sub>2.5</sub> .	1,648
	Deaths in traffic accidents per 100,000 population	Number of deaths caused by traffic accidents per 100,000 population.	1.77
<b>4</b> QUALITY EDUCATION 	Population ages 3 to 14 attending school	Percentage of persons ages 3 to 14 years who attend school.	100
	Average schooling of the population 15 and over	Average number of years of schooling of the population 15 years and over.	11.78
	Educational coverage of the population 18 to 25 years of age	Percentage of persons ages 18 to 25 years who are in school.	52
	Quality universities	Universities in the top 300 for Latin America.	22.33
	Quality graduate programs	Number of graduate programs certified by the National Council on Science and Technology (CONACYT).	241
	Females who study	Percentage of females of school age (from 6 to 18 years) who attend school.	97

Goal	Indicator	Definition	Optimum <sup>19</sup>
 4 QUALITY EDUCATION	Quality schools	Percentage of schools with good or excellent performance in the PLANEA test.	42
	Academic performance	Percentage of primary, secondary, and preparatory students scoring good or excellent in math in the PLANEA test.	51
	Literacy	Percentage of the population 15 years and over who can read and write, in relation to the total population in this age group.	100
	Centers devoted to basic education	Number of centers for basic education and educational support per 1,000 inhabitants ages 0 to 14 years. This includes centers of basic education, multiple attention centers, centers for the support of special education, educational administrative centers, and education support centers.	15.69
	Number of teachers	Number of basic and special education teachers per 1,000 inhabitants ages 0 to 14 years.	66.66
 5 GENDER EQUALITY	Child, early, or forced marriage	Percentage of females ages 12 to 17 years married or living in consensual union with respect to the total number of females in that age group.	0
	Women in the municipal administration	Percentage of women who are principals in an area of the municipal administration with respect to the total number of principals.	37
	Wage equity	Ratio of the average income for men to the average income for women.	0.01
	Labor equity	Ratio between the population of women employed and the population of men employed.	1
	Unpaid work done by men and women	Difference in the average number of hours men and women engage in unpaid work.	21.99
	Adolescent fertility rate	Number of births per 1,000 females ages 15 to 19 years.	59.04
 6 CLEAN WATER AND SANITATION	Femicides	Number of femicides per 100,000 women.	0
	Water supply	Index of 0 to 1, where 1 is best, in relation to the current water supply to cover the future needs of the population that will live in the watershed and the aquifer.	0.80
	Population with access to piped water	Percentage of occupants in private housing with access to piped water in the home.	100
	Quality of surface water	Index with a scale of 1 to 5, where 5 is best, that scores the quality of surface water.	4.66
	Physical efficiency	Percentage of the volume of water that is consumed by the users in relation to the total volume of water injected to the network in a given period of time (losses).	85.75

Goal	Indicator	Definition	Optimum <sup>19</sup>
 6 CLEAN WATER AND SANITATION	Water from another watershed	Percentage of the water that is imported from another watershed with respect to the water needed for the requirements of the population in the receiving watershed.	0
	Percentage of wastewater treated	Percentage of volume of wastewater treated with respect to the estimated volume captured by the public sewerage network.	80
	Intake valves with micro-measurement	Percentage of intake valves with a meter that quantifies the individual volumes of consumption per user.	90
 7 AFFORDABLE AND CLEAN ENERGY	Housing units with access to electricity	Percentage of inhabited private housing units with electricity.	100
	Residential electricity consumption	Average annual consumption of electricity per housing unit, in kilowatt-hours per year.	Dynamic
	Electricity consumption in the municipal public services	Average annual consumption of public lighting and pumping of urban water per capita, measured in kilowatt-hours per year.	Composite
	Cost of electricity	Cost of generating electricity measured in dollars per megawatt-hour.	37.19
	Housing units that tap solar energy	Percentage of housing units that have photovoltaic panels or solar heaters.	16
	Electric intensity	Amount of electricity needed by the productive sector to generate a unit of the local GDP baseline 2013, measured in watt-hours per unit of GDP.	2.5
	Per capita fuel consumption	Consumption of diesel and gasoline per inhabitant per year, measured in liters per inhabitant per year.	Composite
 8 DECENT WORK AND ECONOMIC GROWTH	Very long work days	Percentage of the employed population that works more than 48 hours.	14
	Economic diversification	Number of economic sectors present in the metropolitan area.	900
	Per capita GDP	Ratio of the sum for each of the municipalities that make up the metropolitan area to its total population.	275,352
	Employed in the formal sector	Percentage of the employed population working in the formal sector.	73
	Firms with more than 10 employees	Number of firms with more than 10 employees, per every 10 firms.	0.82
	Opening a business	Score from 0 to 1, where more is worse, on the ease of opening a business, based on the mean of the percentile classifications of each economy in procedures, time, cost, minimal paid-in capital requirements, and reforms.	0.029

Goal	Indicator	Definition	Optimum <sup>19</sup>
 <p>8 DECENT WORK AND ECONOMIC GROWTH</p>	Average monthly salary for full-time workers	Average in current Mexican pesos of the salary of the population that works full-time.	8301
	Unemployment	Percentage of the economically active population that is unemployed.	0.6
	Access to financial services	Number of branches and correspondent institutions per 10,000 adults.	10.74
	Use of financial services	Number of debit and credit cards per adult.	2.69
 <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	Progress in highway grid	Percentage of kilometers of the highway grid that correspond to the main federal trunk road and network of state feeder roads.	99
	Access to cell phone	Percentage of inhabited private dwellings that have cell phone service.	100
	Homes with computer	Percentage of inhabited private dwellings that have at least one computer.	100
	Economic complexity index	Index that measures the economic development of a place based on how diversified and complex its export basket is. In this index the higher the value the better.	1.84
	Distribution mode of transport	Score from 0 to 8, where 8 is the best, according to the distribution of work trips by mode of transport (public, car, motorcycle, bicycle, or foot), to determine whether sustainable modes predominate.	8
	Airlines	Number of airlines that operate in the airports of each metropolitan area.	27
	Research centers	Number of research centers established in the metropolitan area.	45.67
 <p>10 REDUCED INEQUALITIES</p>	Gini coefficient	Measure of concentration of income that runs from 0 to 1, in which 0 represents complete equality and 1 represents absolute inequality.	0.256
	Wage inequality	Measure of concentration of wages, from 0 to 1, where 0 means complete equality and 1 absolute inequality. It's a Gini coefficient for wages.	0.26
 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Lack of quality housing and living space	Percentage of population with unmet needs due to quality housing and living space.	0
	Lack of access to basic housing services	Percentage of the population with lack of access to basic housing services.	0
	Budget for non-motorized transport	Percentage of federal funds for mobility earmarked to non-motorized transport.	39.82
	Mass transit system	Score given to each metropolitan area based on the existence or lack of a mass transit system, from 0 to 3, where 3 is best (0=does not exist, 1=project approved, 2=under construction, 3=ready).	3

Goal	Indicator	Definition	Optimum <sup>19</sup>
 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Population from lower strata with access to public transport	Percentage of population from low socio-spatial strata who have access to public transport near home.	75
	Urbanized land with environmental value	Percentage of land that in 2000 was registered as land with environmental value and that in 2015 was registered with a transformation to urban land use (does not include agricultural land).	0
	Vertical housing	Percentage of housing units situated in buildings with three or more floors, with respect to the total number of housing units in use.	66
	Intraurban housing	Percentage of housing units situated in the U1 and U2 <sup>20</sup> urban containment perimeters as a percentage of all housing units in use.	91
	Commute times	Percentage of persons who get to school or work in less than 30 minutes.	91
	Urban sprawl	Average annual rate of growth of the urban area (2010-2014).	-0.02
	Adequate urban solid waste disposal	Percentage of housing units that dispose of their solid waste through a public collection service, container, or public dump.	98.21
	Air quality	Air quality with respect to the limits of concentration for contaminants PM <sub>2.5</sub> , PM <sub>10</sub> , and ozone in outdoor spaces. The scale is from 0 to 100, where 100 is best.	100
	Air quality management programs	Score from 0 to 300, where 300 is best, based on the existence of a compulsory vehicle verification program, atmospheric environmental contingency program, and programs to improve air quality (ProAire).	300
	Density of urban green areas	Percentage of the urban territory that a city devotes to green areas.	10
	Pedestrian access to green areas	Percentage of population with a green area within 350 meters.	100
Green areas per capita	Total urban green areas available, measured in square meters per inhabitant.	15	
 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	"Clean"-certified firms	Number of firms certified as clean per 1,000 firms.	10.57
	Socially responsible firms	Number of firms certified as socially responsible per 10,000 firms.	201
	Firms certified with ISO-9000 and ISO-14000	Number of ISO-9000 and ISO-14000 certified firms per 1,000 firms.	94.71

<sup>22</sup> To determine the area encompassed by the U1 and U2 urban containment perimeters, see *Modelo Geoestadístico para la Actualización de los Perímetros de Contención Urbana 2015*, published by the Ministry of Agrarian, Territorial, and Urban Development and the National Housing Commission (n.d.).

Goal	Indicator	Definition	Optimum <sup>19</sup>
	Regulatory framework for comprehensive urban solid waste management	Index that scores whether the municipal legal instruments related to urban solid waste management incorporate the 13 principles stipulated in the General Law for Prevention and Comprehensive Waste Management (LGPGIR). It gives a score from 0 to 15, where 15 is the best.	15
	Urban solid waste generated per person	Amount of urban solid waste generated per person collected by the public service, measured in kilograms per person per year.	40.2
	Giving away or selling recyclable waste	Percentage of households that separate their waste to give it away or sell it.	67
	Percentage of households that separate their waste	Percentage of households that separate their waste at least into organic and inorganic before discarding it.	82.7
	Resilience to natural disasters	Index from 0 to 100, where 100 is best, that measures municipal resilience to natural disasters.	97
	Population affected by natural events	Number of persons affected by hydrometeorological and geological events per 100,000 population.	0
	Climate action programs	Percentage of municipalities that have Municipal or Regional Climate Action Programs (PACMUN), already in place or with some progress in its design.	51
	Planning institutes	Percentage of municipalities that have Municipal or Metropolitan Planning Institutes.	100
	Protection of ecosystems important for biodiversity	Percentage of ecosystems important for biodiversity included in the national system of protected areas.	77.9
	State Biodiversity Strategies	Percentage progress in implementing the State Biodiversity Strategy.	100
	Homicide rate	Number of homicides per 100,000 population.	3.6
	Attacks on journalists	Number of attacks on journalists.	0
	Vehicle theft	Number of vehicles reported stolen per 1,000 vehicles registered.	0.016
	Municipal budget information index	Index from 0 to 100, where 100 is best, that measures the quality of budget information published by the municipal governments.	100
	Financial dependence	Percentage of municipal revenues from federal transfer payments.	22.24
	Municipal debt	The level of indebtedness (measured as balance of financial obligations in thousands of pesos) of each metropolitan area as a percentage of its total revenue.	4.85
	Households with Internet	Percentage of households that have Internet.	100
	Availability of information	Percentage of indicators for which information is available with respect to all the indicators included in this study.	100

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