

# SUMMARY



# CLIMATE

# ACTION PLAN

FOR MEDELLÍN 2020-2050



Alcaldía de Medellín

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## Summary

# Climate Action Plan for Medellín 2020-2050

## Plan de Acción Climática Medellín 2020-2050 (Síntesis)

Translated by Peter Selman and Tiziana Laudato

The Municipality of Medellín was advised in the preparation of this document by the C40 Cities Climate Leadership Network and supported by the UK Government.

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Maintaining a healthy planet is our society's greatest challenge and is fundamental to all forms of life. In this respect, the sustainable development agenda is more relevant than ever. We need to reconsider our consumption practices in the face of the environmental and climate crisis. Gone are the ghosts and fallacies of some denialists who have questioned global warming and the negative effects of our lifestyles.

The younger generation is increasingly aware of the effects of our habits. Today, eco-citizens are interested in getting around by bicycle or planting a native tree with their family to celebrate a special event. They know that adopting more sustainable daily habits is no small matter; the future depends on collective and individual efforts to care for our common home.

Some experts say that the climate crisis will be the next pandemic. The negative effects of climate on society and biodiversity are indisputable, so now is the time for redress! It is not an easy task, but if we are to do the right thing, we must be fearless in the face of change. In Medellín, with our characteristic resilience and innovation, we have been strengthening our commitment to the planet. We have joined the C40 Network of Leading Cities in Climate Change, we have a team of technicians and experts to build the Climate Action Plan (CAP), we have allocated a physical headquarters equipped as a Centre for Climate Management, and we have made all the resources of the Secretariat of the Environment available to these initiatives. These are some of the contributions that

have made us a regional reference and a decisive actor for environmental protection in Latin America.

Today Medellín is on track to a fair and green recovery following the COVID-19 health crisis and following the Paris Agreement, it has more decisively joined the global efforts to keep the average temperature increase below 1.5°C. Our city commits to significantly reducing greenhouse gas emissions by 2030 and to being carbon neutral by 2050. It strives to be resilient to the impacts of the climate crisis and to ensure an equitable distribution of the benefits resulting from the local agenda.

Our CAP charts the course for climate transition in the coming years. This document compiles the city's actions and good practices and proposes new strategies and a disruptive approach that includes the participation of academia, the public sector, the private sector, community-based organisations, organised civil society, and all stakeholders. The CAP is an invitation based on which to address the transition towards a more sustainable city and, in this sense, it poses challenges that we will have to deal with collectively.

Today we commit, on behalf of Medellín and the global community, to implement our ambitious but necessary Climate Action Plan.

  
**DANIEL QUINTERO CALLE**  
Mayor of Medellín



# PRESENTATION

The evidence on climate change is becoming indisputable and the looming crisis with impacts on biodiversity, livelihoods, infrastructure and eco-economic growth is becoming increasingly perceptible. This phenomenon represents growing challenges for humanity. Overcoming them requires the joint efforts of all the peoples and nations of the world. The Paris Agreement, built and adopted after the XXI United Nations Conference on climate change in 2015, represents the most ambitious global commitment in the fight against climate change and brings together the efforts of 195 countries, including Colombia.

The most ambitious global commitments that the signatories made seek to limit the temperature increase to 1.5°C above pre-industrial levels by the end of the century, increase adaptive capacity to the adverse effects of climate change and promote climate resilience. The agreement recognizes the role of cities in energy consumption and the generation of Greenhouse Gas (GHG) emissions, and the high vulnerability of urban settlements to the negative effects of climate change, hence it is an invitation to mobilize local governments.

Aware of the challenges, Medellín acknowledges the need to manage the

climate transition and joins the efforts of subnational governments to mitigate climate change, build resilience and reduce vulnerability to climate impacts. With the support of the C40 Cities Climate Leadership Group, it has drawn up a roadmap aiming to build a carbon neutral city by 2050 and with the capacity to cope with the impacts of rising temperatures and changing precipitation.

**The Climate Action Plan of Medellín - CAP** outlines the path to be taken from now on to progressively reduce GHG emissions to achieve neutrality and the increase of adaptation capacities under a low carbon development perspective. This contributes towards achieving the recently announced Nationally Determined Contribution (NDC) submitted by Colombia to the United Nations Framework Convention on Climate Change and the Long Term Strategy.

This document summarizes the planning exercise that the Municipality of Medellín has developed. It presents an overview of the baseline of emissions generation, the climate risk assessment, the Plan's programmatic commitment and its interaction with the Municipal Development 'Medellín Futuro' (Medellín of the Future) Plan 2020-2023.

# 1.

## OVERVIEW AND OBJECTIVES FOR MEDELLÍN'S CLIMATE ACTION PLAN

The Climate Action Plan for the Municipality of Medellín is structured based on the guidelines and good practices defined by C40 Cities. Consequently, the development of its actions are focused on achieving objectives related to three areas of climate change management (Figure 1.)

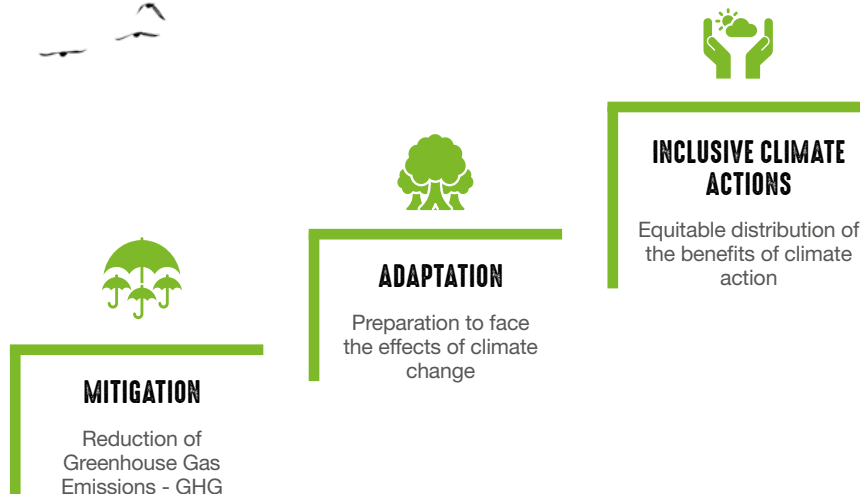
To build a program proposal that responds to the broader needs of climate change management, the CAP is supported by a robust baseline for GHG emissions, vulnerability and risk to climate hazards, inclusion needs for gap closure, and the regulatory and institutional context.

As a municipal strategy, considering the goal of limiting the average temperature increase to 1.5°C, the CAP sets Medellín the target of achieving a balance of zero net emissions in 2050, making it a carbon

neutral city. This requires progressive progress determined by two intermediate targets, 5 % and 20 % reduction of GHG emissions in 2023 and 2030, compared to the baseline identified in 2015 (Figure 2). This, in other words, implies a reduction of 37 % respect to the baseline scenario in 2030.

From another perspective, the CAP takes up the city's planning and land use agendas to define its goals in terms of adaptation objectives and global benefits of climate change management, in terms of short and medium term inclusion. In this regard, it is tied to the objectives and goals determined in the Agenda of Sustainable Development Goals (SDGs) Medellín 2030, the Land Management Plan (LMP) and the Municipal Development Plan 2020-2023 Medellín Futuro.

The Climate Action Plan for the Municipality of Medellín is structured based on the guidelines and good practices defined by C40 Cities



**FIGURE 1.**

Strategic fronts of CAP Medellín

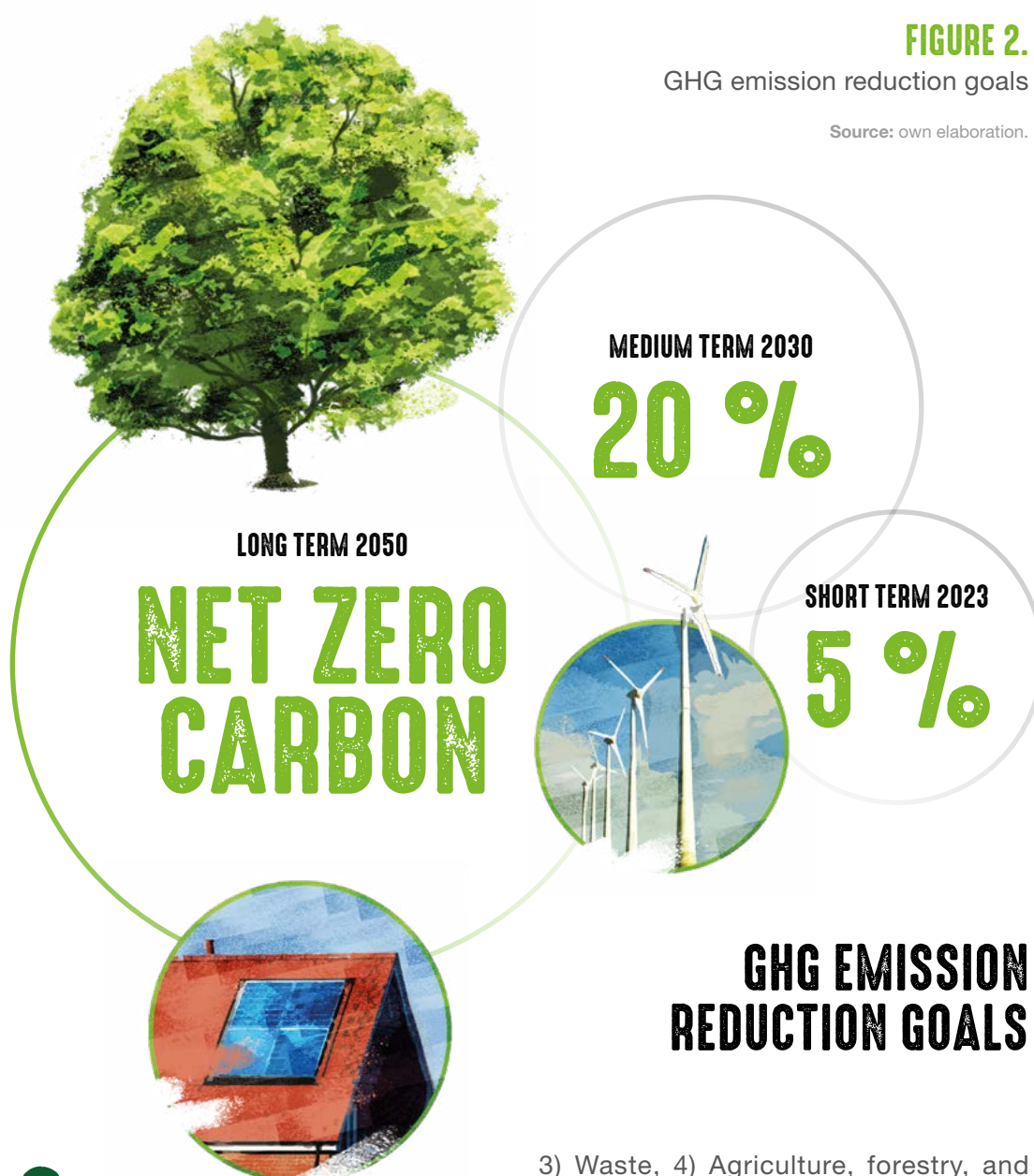
Source: C40 Cities, 2018.

**FIGURE 2.**

GHG emission reduction goals

Source: own elaboration.

SUMMARY



## 2.

### GREENHOUSE GAS INVENTORY

Medellin built its first Greenhouse Gas Inventory - GHG BASIC+ with 2015 as the base year, as a fundamental approach for building a baseline for decision making aimed at creating a carbon neutral city by 2050.

This inventory covers five sectors: 1) Stationary energy, 2) Transportation,

3) Waste, 4) Agriculture, forestry, and other land use (AFOLU) and 5) Industrial processes and product use (IPPU).

It should be clarified that, although the BASIC + Inventory was built, it was the BASIC Inventory that includes the stationary energy, transport and waste sectors ultimately used for climate planning to reduce GHG emissions. The Table 1 and Figure 3 consolidated results of each sector are presented, for each of the scopes analysed, and the inventories are differentiated by BASIC and BASIC+. The total GHG emissions for Medellín for 2015 were 4,731,406 tonCO<sub>2</sub>e (BASIC+) and 3,562,796 tonCO<sub>2</sub>e (BASIC).





**TABLE 1.**

Overall total results broken down by sector and by scope

Source: C40 Cities and Mayor's Office of Medellín 2019.

**SECTOR EMISSIONS – TCO<sub>2</sub>e**

**STATIONARY ENERGY**

**TRANSPORT**

**WASTE**

**IPPU**

**AFOLU**

**TOTAL**

	SCOPE 1	SCOPE 2	SCOPE 3	BASIC	BASIC +
STATIONARY ENERGY	● 623 246	● 711 908	● 141 741	1 335 154	1 476 895
TRANSPORT	● 1 470 258	● 12 425	● 53 279	1 482 683	1 535 963
WASTE	● 114 896		● 630 063	744 959	744 959
IPPU	● 171 739				171 739
AFOLU	● 801 851				801 851
<b>TOTAL</b>	<b>3 181 990</b>	<b>724 333</b>	<b>825 083</b>	<b>3 562 796</b>	<b>4 731 406</b>

Note: The BASIC inventory corresponds to the accounting for the Stationary Energy, Transport and Waste sectors. For the BASIC+ inventory, the IPPU and AFOLU sectors are also counted.

● Corresponds to that counted in the BASIC physical inventory

Whereas ● + ● corresponds to what was counted in the inventory BASIC +.

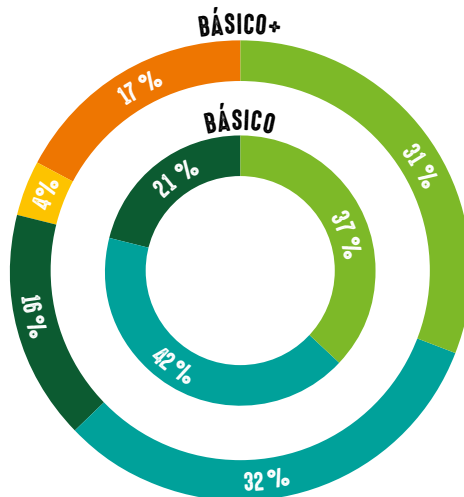
**FIGURE 3.**

Inventory results BASIC and BASIC by sector

**3.**

Source: C40 Cities and Mayor's Office of Medellín 2019.

- IPPU ●
- AFOLU ●
- Stationary energy ●
- Transportation ●
- Waste ●

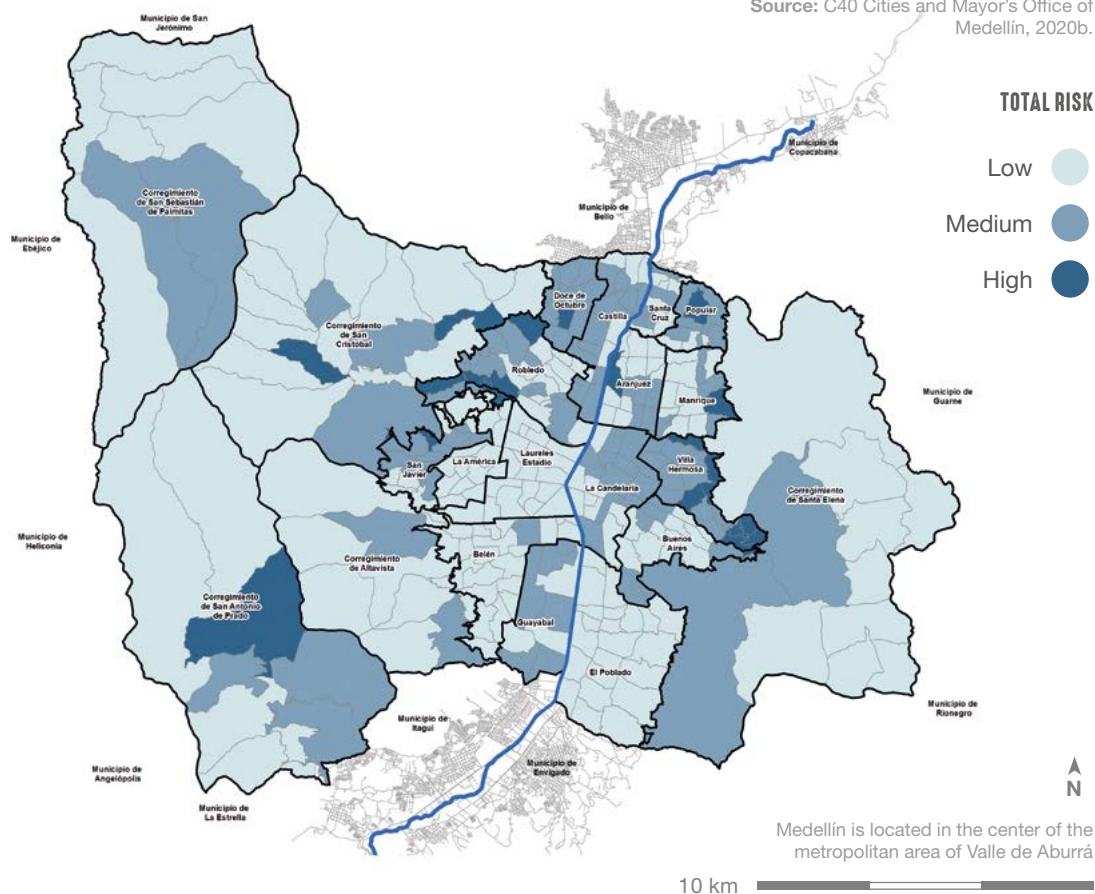


**CLIMATE RISK ANALYSIS FOR MEDELLÍN**

The climate risk assessment enables understanding of the expected effects after the materialization of climate hazards. This allows inferring their evaluation, mapping, distribution and impact analysis on the most vulnerable communities and the critical infrastructure of the municipality. For Medellín, a risk assessment was carried out for floods, torrential rains, landslides, vegetation fires and the urban heat island effect (map page 9), in terms of the effects of increased rainfall intensity and increased average and maximum temperatures.

## Map climate risk for Medellín

Source: C40 Cities and Mayor's Office of Medellín, 2020b.



## SUMMARY

The climate risk assessment took as a reference different indicators associated with the physical exposure of the population and infrastructure, quality life, income, access to basic services, age distribution and quality urban, among others.

The aggregation of these indicators and different sources of information made it possible to establish an index that, in turn, facilitated a territorial reading based on the weaknesses and capacities of

neighborhoods and villages to respond to the potential effects of climate change.

The risk analysis enabled identification of the geographic areas most susceptible to being affected by climate change. In short, there is greater vulnerability and risk in informal settlements or recently occupied settlements, located on the rural urban fringe, where increased precipitation represents a threat leading to torrential rains and landslides. Similarly, in these areas there is greater susceptibility to the occurrence of vegetation cover fires resulting from increased temperatures.

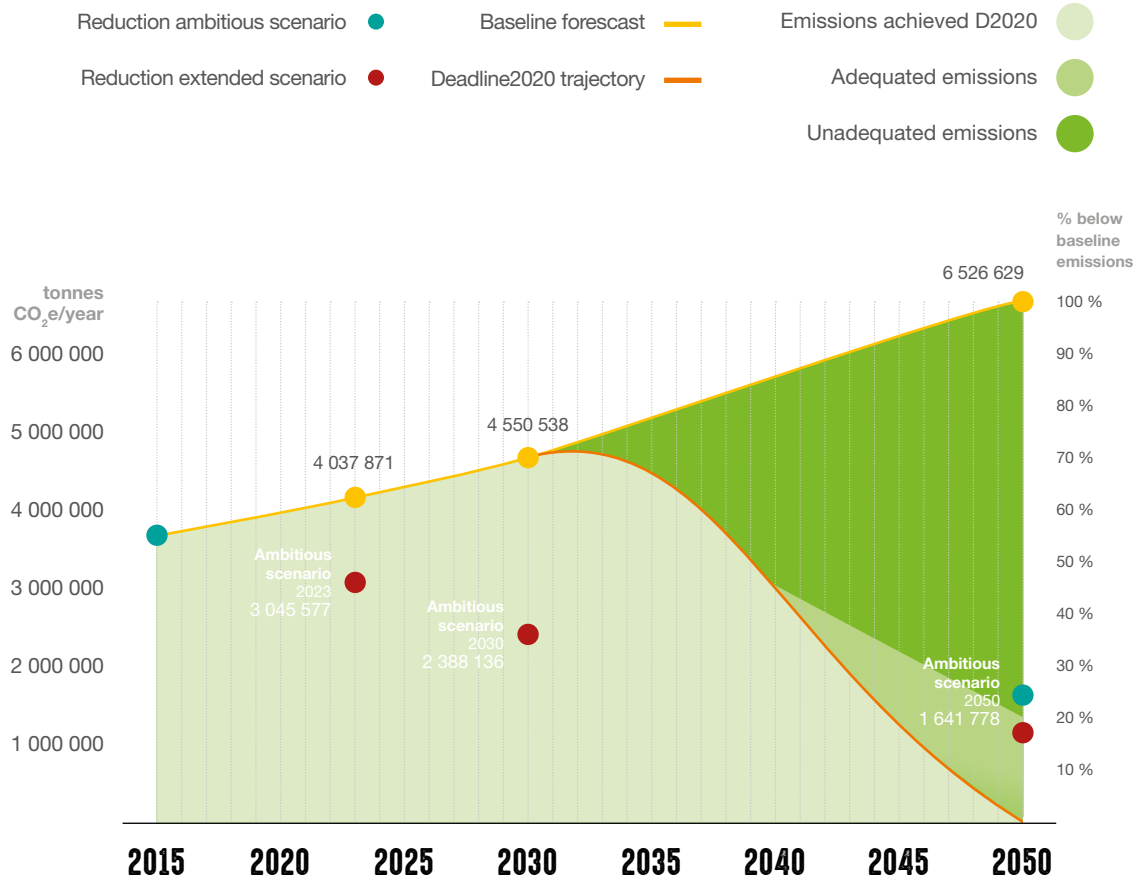
Regarding the intensification of the Urban Heat Island Effect, taking as a reference the surface temperature, there is a tendency to generate hot spots in highly dense areas without sufficient public space, particularly in Commune 5 -Castilla and the industrial areas of Commune 15 -Guayabal.



**FIGURE 4.**

GHG Emissions Reduction Pathway - Ambitious Scenario

Source: C40 Cities and City of Medellín 2020.



# 4.

## GREENHOUSE GAS EMISSIONS REDUCTION SCENARIO

To achieve the goals described above, the emissions trend must be identified and sectoral goals defined, broken down into different items. This was possible thanks to the model integrated to the Pathways tool under which three scenarios were developed. The summary of the ambitious scenario created based on the municipal context is presented.

## ACHIEVING CARBON NEUTRALITY. AMBITIOUS SCENARIO

This scenario presents the trend for the development of ambitious but attainable actions to achieve carbon neutrality by 2050. The proposed targets will achieve the reduction goal in the short and medium term according to the target trajectory (see Figure 4). However, it presents a gap of 1,641,778 tonCO<sub>2</sub>e to achieve neutrality (25 % compared to 6.5 million tonCO<sub>2</sub>e). This will involve the development of regulatory and financial measures to overcome existing constraints.



# 5.

## FRAMEWORK FOR ACTION ON REDUCING EMISSIONS AND ADAPTING TO CLIMATE CHANGE

The acceleration and implementation of the Plan in Medellín is based on defining actions that respond to the challenges and opportunities in terms of mitigation, adaptation, governance and social inclusion, identified through the different assessment processes considered for the Baseline. The Plan also proposes a program approach based on top-down interaction between institutions, norms and sectoral instruments. This means goals and actions are defined that respond to policy guidelines at global, national, departmental and metropolitan levels.

The actions that define the route for the implementation of the Plan focus on the reduction of emissions in each sector accounted for through the Greenhouse Gas



Title: Ayacucho Tram, Medellín. Collage digital photographic retrieved from Luis Urrea/123RF.COM  
Date: may 2021  
Author: Guillermo Torres Carreño

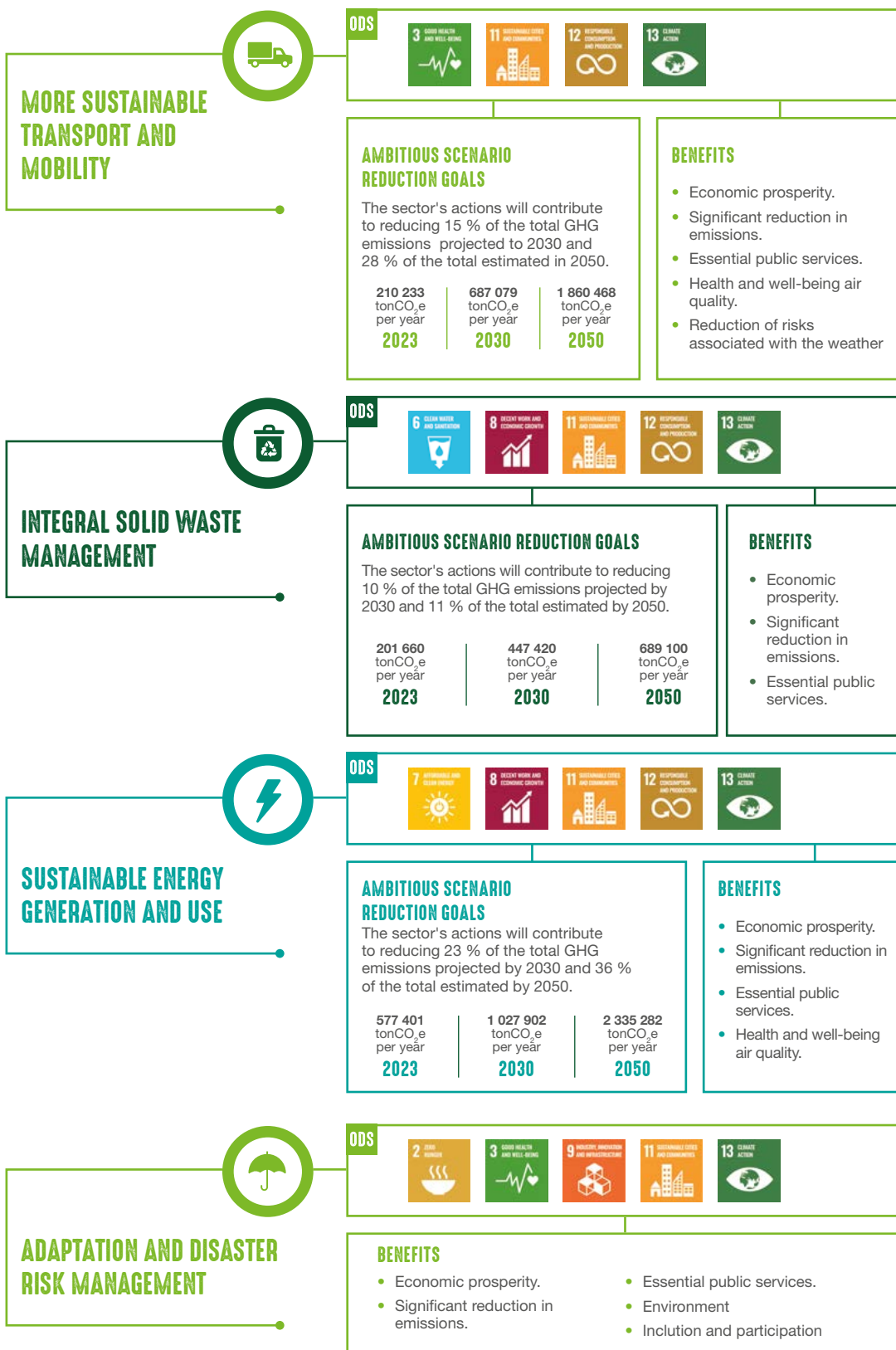
Inventory; the preparation of the city to face the effects of the temperature increase, a greater number of extreme precipitation events and the occurrence of more intense climate variability phenomena; and the attention to the needs of inclusion, which generate an unequal distribution of the impacts of climate change.

The methodological process led to the need to implement the Plan through actions responding to the needs identified around seven Strategic Sectors (see Figure 5)



FIGURA 5. Strategic Sectors

Source: own elaboration.





## ECOSYSTEMS AND RURAL DEVELOPMENT



### BENEFITS

- Health and well-being air quality
- Reduction of risks associated with the weather
- Environment
- Inclusion and participation



## URBAN PLANNING



### BENEFITS

- Significant reduction in emissions.
- Essential public services.
- Environment
- Reduction of risks associated with the weather



## SOCIO-CULTURAL PROCESSES FOR CLIMATE CHANGE MANAGEMENT



### BENEFITS

- Significant reduction in emissions.
- Essential public services.
- Environment
- Reduction of risks associated with the weather

The technical and political prioritization exercise for the Plan's actions enabled the selection of twenty-eight (28) mitigation and adaptation actions in the seven proposed sectors, also complying with criteria of feasibility and generation of co-benefits in air quality, employment, generation of green areas and public services. Furthermore, five (5) additional actions were included in the final list, classified as cross-cutting, whose impact on GHG emissions and risk reduction is not directly measurable, but are important catalysts within the Socio-Cultural Processes sector for climate change management, for a total of thirty-three (33) actions (Table 2).



Title: Sociocultural processes are catalysts of climate action.  
 Collage digital photographic retrieved from 123RF.COM  
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**TABLE 2.**

Selected actions

Source: own elaboration.

**CLIMATE  
ACTION PLAN  
FOR MEDELLÍN  
2020-2050**

# SECTOR

# ACTION



**TRANSPORT  
AND SUSTAINABLE  
MOBILITY**

- Develop safe, comfortable and inclusive physical infrastructure enabling the growth of trips made by men and women through walking and biking.
- Develop resilient infrastructure to reduce the impacts of extreme precipitation events and mitigate the urban heat island effect.
- Reduce the number of trips and distances that fossil fuel vehicles travel due to business and corporate processes.
- Generate transition and renewal of public service vehicles that consume fossil fuels to electric energy-powered vehicles.
- Generate transition and renewal of private vehicles that consume fossil fuels towards electric energy-powered vehicles and low, ultra-low and zero emission technologies.
- Implement demand management mechanisms consistent with academic and technical evidence.
- Optimize the logistic processes of the freight transport sector and encourage the technological renovation of the vehicle fleet.
- Optimize and enhance the coverage of the city's mass and collective public transport system.



**INTEGRAL SOLID  
WASTE MANAGEMENT**

- Promote the transition towards a regional circular economy model through the development of sustainable production and consumption processes enabling the revaluation of solid waste, its commercialization and the reduction of final disposal rates in landfills.
- Develop and implement comprehensive strategies for the treatment and use of organic solid waste and wastewater management.
- Optimize the system of collection and final disposal of ordinary solid waste in the city, maintaining a regional perspective for the administration of the integrated waste management system.
- Implement an inclusive scheme for the use of waste enabling the application of affirmative actions to improve the vulnerable population's socioeconomic conditions.



**SUSTAINABLE  
ENERGY GENERATION  
AND USE**

- Improve the energy performance of industrial processes and production chains in the city.
- Reduce energy consumption in the construction, operation and maintenance of new and existing public, commercial and residential buildings.
- Increase the share of renewable energy sources in the portfolio of utility companies.

# SECTOR

# ACTION

## SUMMARY



**ADAPTATION AND DISASTER RISK MANAGEMENT**

- Formulate and implement the urban drainage plan.
- Develop climate and disaster risk monitoring processes by strengthening the early warning system of Medellín and the Aburrá Valley-SIATA.
- Develop community-based systems for knowledge generation and monitoring of climate change and early disaster warning.
- Implement structural measures for the corrective reduction of disaster risk and adaptation to climate risk at zonal and sectoral level.
- Implement nature-based solutions and bioengineering works for prospective disaster risk reduction and climate risk adaptation.
- Conduct detailed studies, characterization and analysis of scenarios by type of phenomenon, incorporating hydrometeorological variables, and advance the understanding of the variation of hazards in different trajectories of GHG emissions generation.



**ECOSYSTEMS AND RURAL DEVELOPMENT**

- Conserve and increase Medellín's forest cover through protection, restoration and sustainable management actions, for the conservation of biodiversity, carbon absorption, preservation of reservoirs and the sustainability of other ecosystem services.
- Encourage sustainable rural development by promoting good practices and the consolidation of short marketing circuits that enhance Medellín's capacity for self-sufficiency.
- Implement conservation and ecosystem management measures for the sustainability of drinking water supply sources.



**URBAN PLANNING**

- Consolidate the compact city occupation model favouring proximity urbanism.
- Implement actions for the comprehensive improvement of neighborhoods in the different strategic intervention areas defined in the land management plan.
- Improve and increase public space system areas for recreation and meeting.



**SOCIO-CULTURAL PROCESSES FOR CLIMATE CHANGE MANAGEMENT**

- Manage research, innovation and development processes for projects to tackle climate change and variability in Medellín.
- Implement communication and dissemination strategies to ensure access to information for the management of climate change for different audiences.
- Develop inter-institutional, inter-sectoral, business and international cooperation mechanisms to implement the measures and actions established in the CAP to address climate change and variability.
- To implement training processes and programs for the generation and management of knowledge, appropriation and development of proposals to face climate variability change in Medellín aimed at all audiences.
- Promote training and knowledge generation and management processes, focused on community initiatives and active citizenship
- Develop financing mechanisms and instruments for the implementation of CAP measures.





**CLIMATE  
ACTION PLAN  
FOR MEDELLÍN  
2020-2050**



**Title:** The well-being of future generations it depends on our actions. *Collage* digital photographic retrieved from 123RF.COM

**Date:** may 2021

**Author:** Guillermo Torres Carreño



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SUMMARY

CLIMATE

ACTION PLAN

FOR MEDELLÍN 2020-2050



Climate change is a global issue with local effects and global cities, which are home to 55 % of the world's population and responsible for 70 % of carbon dioxide emissions, have a key role to play in its mitigation.

The **Medellín 2020-2050 Climate Action Plan** is our city's guiding axis for climate-related decision making. With all the actions it includes, the Plan is designed to be implemented swiftly and to be inclusive, to make the city carbon neutral by 2050, and to promote a green and fair recovery from the COVID-19 pandemic.

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