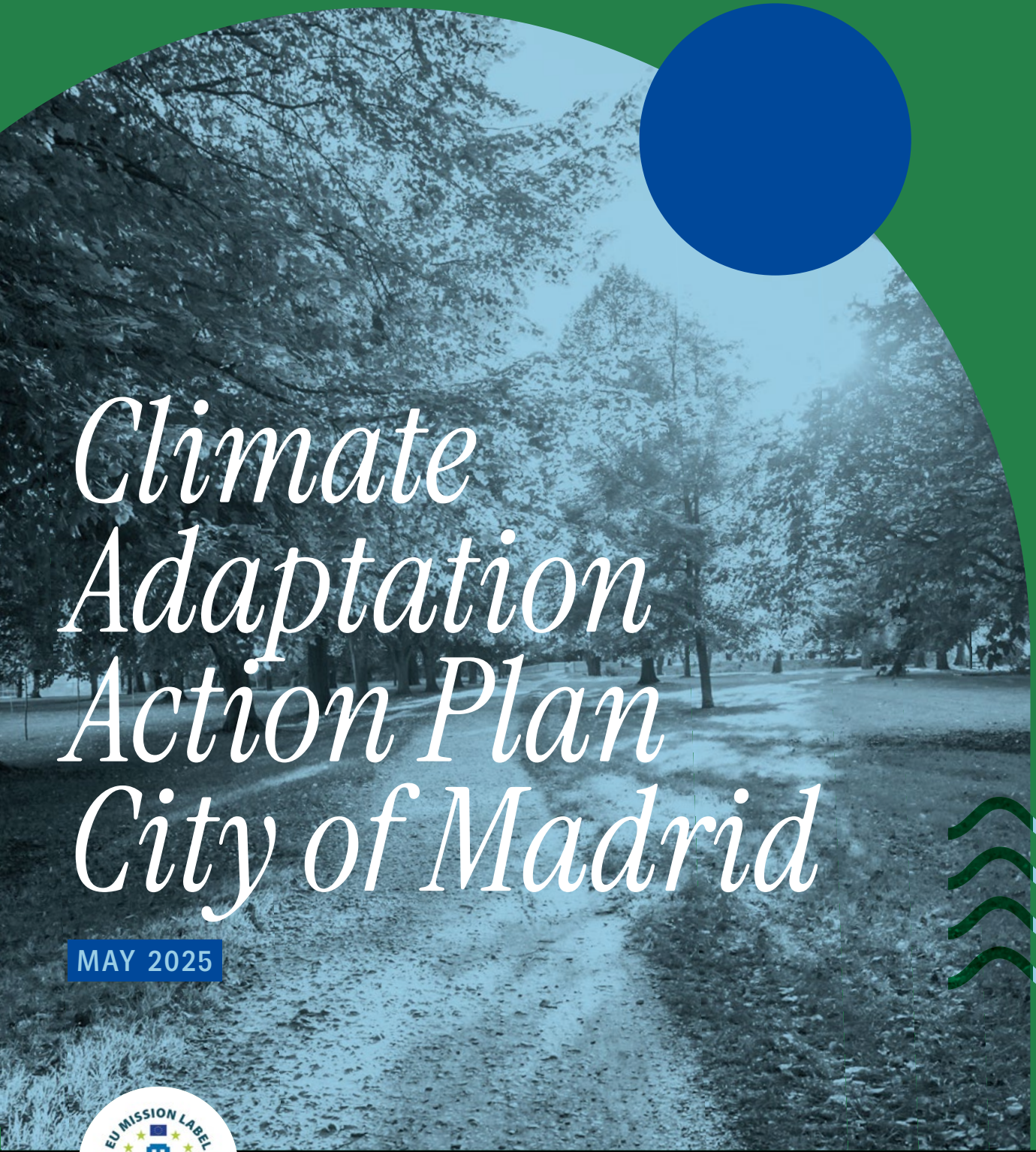
MADRID 360



Climate Adaptation Action Plan City of Madrid

MAY 2025

EU MISSION LABEL CLIMATE-NEUTRAL & SMART CITIES MADRID

MADRID

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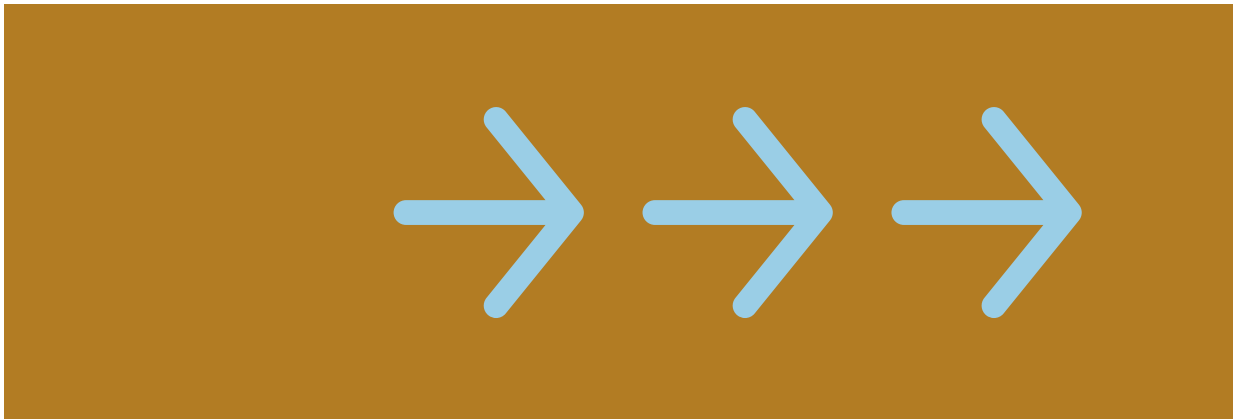


01

INTRODUCTION TO CLIMATE ADAPTATION

1. Introduction to climate adaptation

Reducing greenhouse gas (GHG) emissions must remain a key priority of climate action. However, the consequences of global warming require us to also address the threats and impacts that are already unfolding. The ripple effects of changes to the global climate system extend to local levels, affecting not only the environment but also social and economic systems.

Climate change causes real and immediate risks that affect urban systems, including resource provision, water management, energy demand and the degradation of natural environments. Furthermore, climate change impacts social groups in vulnerable situations and economic activities.

Climate adaptation involves identifying vulnerable areas, assessing climate risks and developing strategies and measures to improve the city's response to these key risks. Madrid began this process in 2014, with **the Energy and Climate Change Plan of the City of Madrid - Horizon 2020.** The plan aimed to provide citizens and authorities with the tools needed to prevent and cope with climate impacts, fulfilling the city's commitments under the European initiative **"Mayors for Adaptation"**, which Madrid joined in 2014. Through the strategic line "Adapting the city to climate change," the city developed the Analysis of Vulnerability to Climate Change in the Municipality of Madrid in 2015. This document has become a cornerstone of the city's adaptation efforts, identifying key vulnerabilities such as heatwaves, reduced rainfall, increased extreme weather events, and the degradation of natural areas. Additionally, from a risk analysis perspective, the Detailed Study of the Urban Climate of Madrid was published in 2016.

In 2017, the **Air Quality and Climate Change Plan for the City of Madrid (Plan A**) was approved as part of the city's ongoing climate policies. Plan A is a local-level initiative aimed at reducing air pollution, combating climate change, and establishing the foundations of an adaptation strategy. The plan includes thirty specific measures, one of which is the Madrid + Natural Plan, focusing on nature-based solutions to promote climate adaptation. These measures cover three scales, including building interventions like the creation of green roofs, neighbourhood projects to rehabilitate public spaces and improve microclimatic conditions, and large-scale infrastructure projects, such as the renaturalization of the Manzanares River, which is already underway.

Building on the progress made with Plan A, the Madrid City Council took another step forward in 2019 by approving **the Madrid 360 Sustainability Strategy.** This strategy outlines objectives, key areas, and initiatives that establish the foundation for reducing emissions and improving the health of citizens.

As a result of this strategy, the Roadmap towards climate neutrality for the city of Madrid was published in 2021. The roadmap aims to guide the city towards achieving climate neutrality by 2050 while increasing its capacity to adapt to climate risks. This Roadmap represents the city's most ambitious commitment to fighting climate change, setting a target to reduce the city's Greenhouse Gas (GHG) emissions by 65% by 2030, compared to 1990 levels. This target exceeds the European Union's Green Deal goal, positioning Madrid at the forefront of the climate challenge and requiring the development of research, experimentation, knowledge and innovation tools. The document also includes the objectives outlined in Article 2: 'Increase the capacity to adapt to the adverse effects of climate change and promote climate resilience'. It aims to complement the concrete actions that Madrid must take to effectively adapt, considering the eight objectives identified in the document. The city is fully commi-

tted to advancing both mitigation and adaptation efforts to move towards a zero-emission city that offers high comfort levels and resilience to climate events.

At the national level, the Climate Change and Energy Transition Law provides the institutional framework for meeting the objectives of the Paris Agreement and reinforces the role of adaptation in the development of these policies. More specifically, the National Plan for Adaptation to Climate Change (PNACC) provides a reference to guide local plans and actions.

Among the international initiatives, it is worth highlighting Madrid's participation in the **"Climate-Neutral and Smart Cities Mission"**. This initiative is a key components of the European Framework Program for Research and Innovation "Horizon Europe"for the period 2021-2027. It aims to support, promote and showcase the transformation of one hundred European cities towards climate neutrality by 2030, turning them into experimentation and innovation hubs for all other cities to follow.

Mission Madrid will lead and accelerate the transition towards climate neutrality in a transformation process that will result in safer, healthier, more sustainable and prosperous cities. In October 2023, the European Comission awarded Madrid, together with other Spanish and European cities, the 'Mission label' recognizing Madrid's Climate City Contract. In it, the city describes its General Vision for Climate Neutrality, a document that is backed by an action and investment plan. This award provides "a boost" to the roadmap led by the Urban Planning, Environment and Mobility Area, as it recognizes the initiatives implemented by Madrid to achieve climate neutrality..

Finally, it is worth noting that Madrid is a member of several international city networks, including **the Covenant of Mayors, Mayors Adapt, C40 International Cities Network, CitiES2030 and the Cities for Climate Network,** among others.

02

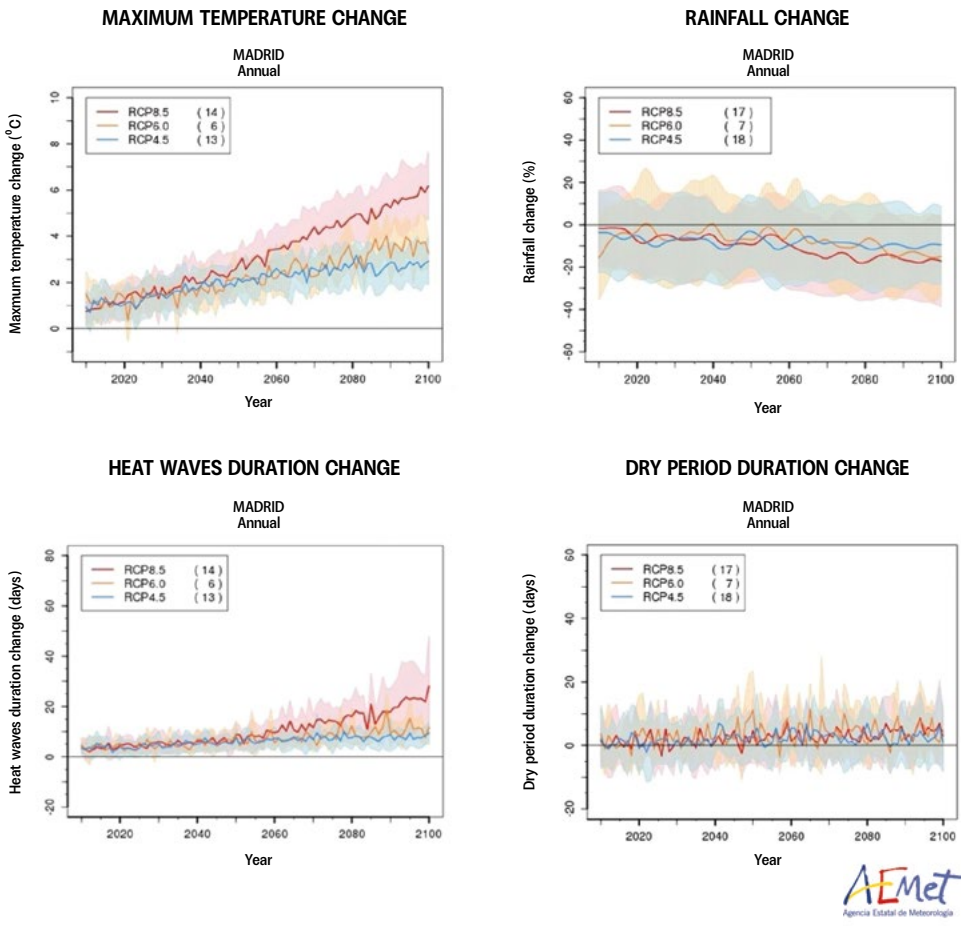
CLIMATE SCENARIOS AND RISK ASSESSMENT

2. Climate scenarios and risk assessment

From the regionalized climate scenarios we can understand how climate will continue to evolve in Madrid. While the city has an influence on certain meteorological variables, its climate is primarily determined by the regional climate. Projections for the region provided by the State Meteorological Agency (AEMET) and the AdapteCCa platform (Adaptation Platform of the Spanish Office of Climate Change) offer insights into the future scenarios the city will face.

In terms of temperatures, the trend shows an increase in maximum temperatures, more warm days, and hotter or torrid nights—those with minimum temperatures above 20°C—as well as longer heat wave episodes. These trends are more pronounced in the representative concentration trajectory (RCP 8.5), with projected increases of more than 5°C in maximum temperatures by the end of this century and more frequent, lengthy and intense heat wave episodes.

As for rainfall, there is a decreasing trend in both the total annual volume and the number of rainy days, while dry periods show an increasing trend.



Graphical results of regionalized climate change projections (temperature and precipitation).
Source: AEMET.

Available on: http://www.aemet.es/en/serviciosclimaticos/cambio_climat/result_graficos

The alteration of climatic conditions shown in the projected scenarios causes a series of key risks. According to the municipal study: *"Analysis of Vulnerability to Climate Change in the municipality of Madrid"*, the city is affected by the following impacts:

→ **Heat waves: These have a direct impact on health, mortality and morbidity, they increase energy demand and water consumption, reduce productivity and affect tourism, among other aspects.**

→ **Droughts: These could lead to drinking water supply restrictions, reduced water quality, impact on the economy, business and tourism, or the degradation of natural areas, etc.**

→ **Extreme weather events: Floods, storms, gales, snowstorms, hailstorms...: these can all lead to damages to infrastructures and buildings, reduction of water quality, an increase in security and emergency incidents, or more frequent transport and mobility incidents.**

→ **Environmental degradation: This can take the form of alteration or modification of ecosystems and loss of biodiversity, as well as an increase in contagious vectors, pests and diseases.**

These impact chains or key risks generate a cascading effect that affects multiple aspects of life and activity in the city, from health and air quality to working conditions and the economy. This also evaluates the most vulnerable areas of Madrid at the district level, highlighting the spatial overlap between climate vulnerability and social and economic vulnerability.

Although the climate of the city of Madrid is regional, like other large metropolises, urban morphology, materials and urban activity create specific climatic conditions at the microscale, leading to phenomena such as the "Urban Heat Island" effect.

The "Detailed Study of the Urban Climate of Madrid", carried out by the urban climate research group of the Autonomous University of Madrid on behalf of the City Council, provides in-depth understanding of the Urban Heat Island effect, which is closely linked to the impact of heat waves. The study integrates trends from regional climate scenarios and creates a map of the heat footprint in the city, identifying the most exposed places, or "hot spots".

The impacts derived from climate change are already a reality in the city of Madrid. They occur in different areas, with differing magnitude and intensity, sometimes as acute events, such as emergencies, or with less perceptible but constant and continuous chronic effects, which gradually deteriorate certain aspects of urban life.

As in the development of mitigation actions, adaptation requires a comprehensive and coordinated response due to the multiplicity of factors involved and the effects resulting from climate change.

Municipal action for the city's adaptation to climate change is carried out across the following areas:

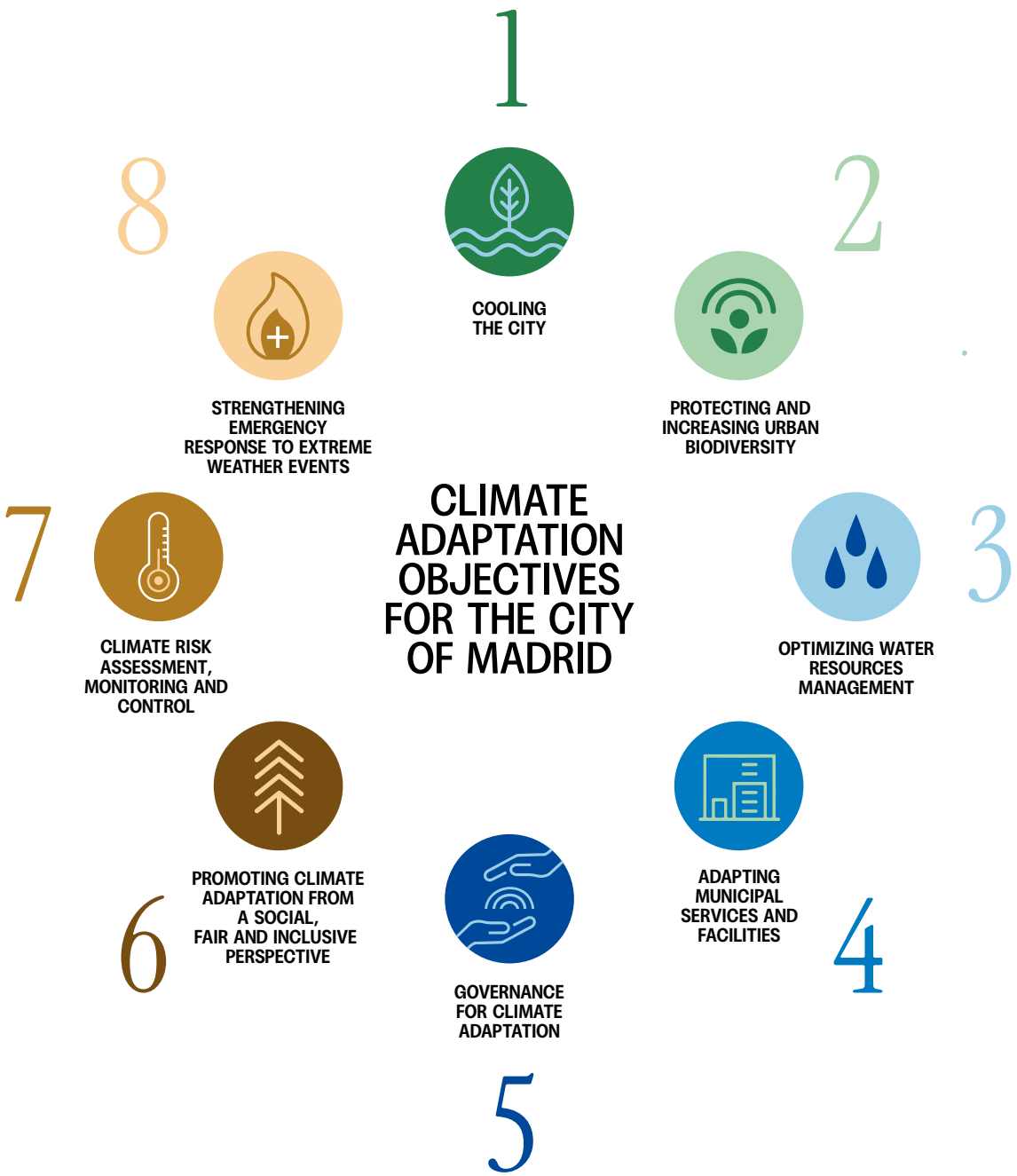
- OBSERVATION AND MONITORING OF CLIMATE VARIABLES AND ASSOCIATED KEY IMPACTS.
- RISK ASSESSMENT IN SECTORS OF ACTIVITY, INFRASTRUCTURE AND POPULATION.
- DEVELOPMENT OF RESPONSE ACTIONS TO IMPACTS; EMERGENCIES AND CHRONIC EFFECTS.
- IMPLEMENTATION OF ADAPTATION MEASURES.
- MONITORING THE CITY'S VULNERABILITY TO CLIMATE CHANGE AND THE MEASURES IMPLEMENTED.
- KNOWLEDGE TRANSFER.

03

CLIMATE ADAPTATION OBJECTIVES FOR THE CITY OF MADRID

3. Climate adaptation objectives for the city of Madrid

From the municipal perspective adaptation to climate change requires a comprehensive and coordinated response between the different Government Areas and other municipal entities. To this end, eight priority objectives have been established which structure the city's climate adaptation strategy with their corresponding goals and lines of work, which are set out below:



OBJECTIVE 1

COOLING THE CITY

GOALS

1 → PROMOTE BIOCLIMATIC DESIGN OF THE CITY (PLANNING, URBAN DEVELOPMENT AND BUILDING).

2 → DEVELOP GREEN AND BLUE INFRASTRUCTURE IN URBAN AREAS, TAKING ADVANTAGE OF VEGETATION AND WATER TO IMPROVE PUBLIC SPACE.

3 → ENCOURAGE THE USE OF ELEMENTS, FURNITURE AND CONSTRUCTION MATERIALS THAT CONTRIBUTE TO THERMAL COMFORT.

LINES OF WORK

- THERMAL STUDIES OF THE CITY.
- PROMOTING THE INTEGRATION OF NATURE OF PUBLIC SPACE THROUGH NATURE-BASED SOLUTIONS: SCHOOL ENVIRONMENTS AND SCHOOLYARDS, GREEN ITINERARIES AND URBAN OASIS.
- USE OF ELEMENTS, FURNITURE, AND MATERIALS THAT HELP REGULATE TEMPERATURE IN THE URBAN ENVIRONMENT, PROVIDING THERMAL COMFORT AND REDUCING THE IMPACT OF HEAT WAVES: PORTABLE FOUNTAINS AND WATER MISTING SYSTEMS.

OBJECTIVE 2

PROTECTING AND INCREASING URBAN BIODIVERSITY

GOALS

ENHANCING URBAN NATURE TO PROTECT AND FOSTER BIODIVERSITY AND ECOSYSTEM SERVICES.

LINES OF WORK

- IMPLEMENTATION OF THE BIODIVERSITY PROMOTION AND MANAGEMENT PLAN APPROVED IN 2023 WITH THE OBJECTIVE OF REVERSING BIODIVERSITY LOSS, INCREASING THE PRESENCE OF URBAN NATURE AND CONTRIBUTING TO THE CREATION OF A HEALTHIER CITY.
- PROMOTING NECESSARY COMMUNICATION AND TRAINING TO INTEGRATE THE BIODIVERSITY PROMOTION AND MANAGEMENT PLAN ACROSS ALL MUNICIPAL AREAS, SERVICES, AND PROJECTS, PARTICULARLY IN POLICIES THAT INCORPORATE THIS PERSPECTIVE IN A CROSS-CUTTING MANNER.
- STUDYING AND MANAGING THE EMERGENCE OF NEW PESTS, VECTORS AND POTENTIAL ASSOCIATED RISKS.
- EXPLORING NEW MODELS FOR THE RESTORATION AND MANAGEMENT OF URBAN NATURAL AREAS FOR CLIMATE ADAPTATION.

OBJECTIVE 3

OPTIMIZING WATER RESOURCES MANAGEMENT

GOALS

1 → ENSURING HYDRAULIC INFRASTRUCTURE TO PROTECT MADRID AGAINST EXTREME WEATHER EVENTS.

2 → IMPROVING WATER MANAGEMENT EFFICIENCY TO ENSURE QUALITY AND LONG-TERM ACCESS.

3 → INCREASING THE USE OF ALTERNATIVE WATER RESOURCES, SUCH AS THE REGENERATION OF TREATED WASTEWATER AND THE USE OF GROUNDWATER AND RAINWATER.

LINES OF WORK

- EXPANDING THE AREA AND COMPATIBLE USES OF THE RECLAIMED WATER NETWORK TO PRESERVE DRINKING WATER RESOURCES DURING HEAT WAVES.
- ENHANCING THE NATURAL WATER CYCLE IN URBAN DESIGN, SUCH AS THROUGH SUSTAINABLE DRAINAGE SYSTEMS, RAIN GARDENS, NATURAL PONDS, ETC.
- MONITORING AND EFFICIENTLY MANAGING THE STORM TANK NETWORK.
- EVALUATING THE SEWER SYSTEM DUE TO FREQUENT FLOODING.CONSIDERING THE NATURAL WATERCOURSE, STREAM NETWORK AND HISTORICAL WATERSHEDS OF MADRID IN SPATIAL PLANNING.
- PROMOTING THE DEVELOPMENT OF A SEPARATE WATER NETWORK.

OBJECTIVE 4

ADAPTING MUNICIPAL SERVICES AND FACILITIES

GOALS

1 → PROMOTING CLIMATE ADAPTATION IN THE DESIGN AND MANAGEMENT OF PUBLIC FACILITIES.

2 → IDENTIFYING AND PROMOTING A NETWORK OF PUBLIC AND PRIVATE FACILITIES TO ADDRESS CLIMATE RISKS.

LINES OF WORK

- ENERGY RETROFIT AND CLIMATE ADAPTATION OF PUBLIC FACILITIES: PROMOTING RENEWABLE ENERGIES, REDUCING DEMAND, AND RENATURALIZING BUILDINGS, SURROUNDINGS, AND COURTYARDS.
- DEFINING MANAGEMENT CRITERIA FOR PUBLIC FACILITIES ADAPTED TO CLIMATE CHANGE, INCLUDING THE LIST OF SHELTER FACILITIES INDICATED IN THE HEAT WAVE PROTOCOL.
- GENERATING SOCIAL INFRASTRUCTURE THROUGH NETWORKS, AND CITIZEN, PUBLIC AND PRIVATE INITIATIVES TO COORDINATE THE CLIMATE RESPONSE OF FACILITIES TO CLIMATE RISKS.

OBJECTIVE 5

GOVERNANCE FOR CLIMATE ADAPTATION

GOALS

1 → INTEGRATING CLIMATE ADAPTATION INTO POLICIES, PLANNING AND PROJECTS.

2 → PROMOTING MUNICIPAL COORDINATION AND COLLABORATION (AREAS AND DISTRICTS) WITH OTHER KEY ENTITIES (CRTM, CANAL ISABEL II...).

3 → PROMOTING THE EDUCATION AND TRAINING OF MUNICIPAL TECHNICIANS.

LINES OF WORK

* ENSURING THE INTEGRATION OF OBJECTIVES TO ADAPT PLANNING, REGULATIONS AND PUBLIC PROCUREMENT.
* COORDINATING WITH THE DIFFERENT MUNICIPAL SERVICES TO ANALYZE AND RESPOND TO EXTREME WEATHER EVENTS.
* PROMOTING ADEQUATE TECHNICAL TRAINING IN CLIMATE ADAPTATION, INCLUDING TRAINING, SUPPORT AND FOLLOW-UP.
* COLLABORATING WITH OTHER CITIES, OTHER PUBLIC ADMINISTRATIONS, UNIVERSITIES, SCIENTIFIC COMMUNITIES AND RELEVANT AGENTS OF THE CITY: FOR EXAMPLE THE EUROPEAN CLIMATE-NEUTRAL AND SMART CITIES MISSION.
* SECURING EXTERNAL FINANCING FOR THE PROMOTION OF CLIMATE ADAPTATION PROJECTS: NEXT GENEU, EUROPEAN FUNDS, AND THE EUROPEAN INVESTMENT BANK (EIB).
* PROMOTING REGULATORY INNOVATION INITIATIVES (SANDBOX).

OBJECTIVE 6

PROMOTING CLIMATE ADAPTATION FROM A SOCIAL, FAIR AND INCLUSIVE PERSPECTIVE

GOALS

1 → STRENGTHENING COMMUNITY NETWORKS AND SERVICES AND PROMOTE PUBLIC PLACES AS A CLIMATE ADAPTATION RESPONSE.

2 → PROMOTING SOCIAL INVOLVEMENT THROUGH CO-DESIGN, CULTURE AND COMMUNICATION.

3 → PROMOTING SPECIFIC ADAPTATION MEASURES FOR VULNERABLE GROUPS.

LINES OF WORK

- DEFINING SPECIFIC RESPONSE PROTOCOLS FOR CHILDREN, THE CHRONICALLY ILL, THE ELDERLY, OUTDOOR WORKERS AND THE HOMELESS (EXAMPLE OF PROTOCOLS FOR S.E.R. AND CLEANING AREA PERSONNEL).
- COLLABORATING WITH THE PRIVATE SECTOR TO PROMOTE TO HAVE ACTION PLANS FOR EXTREME TEMPERATURES.
- PROMOTING GREEN JOBS ASSOCIATED WITH ADAPTATION.
- INVOLVING CITIZENS IN THE DESIGN OF THEIR NEIGHBORHOODS.

OBJECTIVE 7

CLIMATE RISK ASSESSMENT, MONITORING AND CONTROL

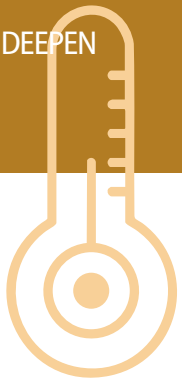
GOALS

1 → ANALYZING AND ASSESSING CLIMATE RISKS AND VULNERABILITY OF THE CITY.

2 → PROMOTING COMMUNICATION/AWARENESS ASSOCIATED WITH CLIMATE RISK MANAGEMENT.

LINES OF WORK

* MONITORING OF CLIMATIC VARIABLES. DG SUSTAINABILITY AND ENVIRONMENTAL CONTROL HAS A NETWORK OF 24 URBAN TEMPERATURE SENSORS TO ANTICIPATE RISK SITUATIONS. HTTPS://VISUALIZADATOS.MADRID.ES/PAGES/DATOS-METEOROLOGICOS
* MAPPING OF ZONES, POPULATION GROUPS AND ACTIVITY SECTORS TO ASSESS RISKS AND VULNERABILITY (PEOPLE/SPACE/ACTIVITY).
* PERIODICALLY MONITORING AND EVALUATING ADAPTATION MEASURES AND PROJECTS AND THEIR IMPACT.
* ACQUIRING THE TECHNOLOGY AND TOOLS NEEDED TO DEVELOP AND DEEPEN CLIMATE RISK AND RESPONSE CAPACITY.



OBJECTIVE 8

STRENGTHENING EMERGENCY RESPONSE TO EXTREME WEATHER EVENTS

GOALS

1 → IMPLEMENT PLANS, PROTOCOLS AND MECHANISMS FOR RESPONSE AND RECOVERY FROM EXTREME WEATHER EVENTS.

2 → PROMOTE INSTITUTIONAL TRAINING IN THE MANAGEMENT OF CLIMATE EMERGENCIES.

3 → TO DEVELOP CITIZEN INFORMATION AND COMMUNICATION SYSTEMS IN THE EVENT OF WEATHER EMERGENCIES.

- CREATE A WORKING GROUP FOR THE DEVELOPMENT OF THE CLIMATE RISK PROTOCOL WITH SPECIFIC GUIDELINES FOR SERVICES, INFRASTRUCTURE AND POPULATION SECTORS (INTEGRATED IN THE PEMAM).
- PROMOTE THE KNOWLEDGE OF CLIMATE RISKS AND THEIR RESPONSES WITH THE COLLABORATION OF THE SCIENTIFIC, ACADEMIC AND UNIVERSITY SPHERES.
- ESTABLISH PROTOCOLS FOR LABOR PREVENTION IN THE FACE OF CLIMATIC EVENTS IN THE AFFECTED SERVICES IN THE LOCAL ADMINISTRATION.

04

PILOTS PROJECTS OF CLIMATE ADAPTATION

4. Pilots projects of climate adaptation

The General Directorate of Sustainability and Environmental Control, in collaboration with other Departments and Government Areas, is working on the development of pilot projects following climate criteria. Each of these projects is working on several of the objectives mentioned above.

The projects presented as follows are not an exhaustive list of actions for climate adaptation in the city, but are intended to show the combined deployment of Objectives and Targets, Lines of Work and Initiatives aimed at achieving the goals proposed on the most relevant demonstration projects (DP).

DP 1

Intervention in school environments following climate adaptation criteria and air quality improvement

Through the selection of ten pilot educational centers, in collaboration with the SG Mobility Planning and the SG Conservation of Public Spaces, a series of criteria for intervention in public space have been defined, taking into account the climatic risks faced by the city of Madrid, particularly due to heat waves.

OBJECTIVES.GOALS	CONTRIBUTIONS
1.1, 1.3	+ THERMAL STUDIES; + SHADE-GENERATING TREES; + USE OF PAVEMENTS AND MATERIALS WITH A HIGHER ALBEDO INDEX; + INCLUSION OF FOUNTAINS AND WATER FEATURES IN THESE SPACES.
2.1	+ REDESIGN OF GREEN AREAS TO INCORPORATE NEW PLANT SPECIES.
3.3	+ USE OF RAINWATER FOR IRRIGATION OF VEGETATION; + INTRODUCTION OF PLANT SPECIES WITH LOWER WATER REQUIREMENTS.
4.1, 4.2	+ PROMOTING THE TRANSFORMATION OF PUBLIC SPACES ADJACENT TO EDUCATIONAL CENTERS AS EXTENSIONS OF SUCH SPACES; + IMPLEMENTATION OF THE CONCEPT OF *"OPENING THE FACILITY TO THE NEIGHBORHOOD".*

5.2, 5.3	+ COLLABORATIVE WORK OF THE DGS IN CROSS-CUTTING CLIMATE INITIATIVES IN THEIR SPECIFIC FIELD; + DEVELOPMENT OF TECHNICAL TRAINING TO ENCOURAGE BOTH SCALING UP AND THE INTRODUCTION OF THE CRITERIA AND LESSONS LEARNED IN OTHER AREAS OF INTEREST.
6.1, 6.2	+ WORKING TOGETHER WITH THE SCHOOL COMMUNITY, FROM SCHOOL MANAGEMENT TO FAMILY ASSOCIATIONS.
7.1, 7.2	+ ASSESSMENT OF THE EXISTING THERMAL SITUATION BEFORE AND AFTER THE INTERVENTION; + EXPORT OF THE EXPERIENCE TO OTHER INTERESTED MUNICIPAL AUTHORITIES.

Current status

The works and interventions on the first six pilot schools have been completed: CEIP Miguel de Unamuno and CEIP Menéndez y Pelayo [Arganzuela], CEIP Claudio Moyano [Chamberí], E.I. Osa Menor [D. Centro], CEIP República de Colombia (Carabanchel) and CEIP Hermanos Pinzón (Latina).

Works on the next two CEIP Ramón Mª de Valle Inclán (San Blas- Canillejas) and CEIP Agustina Díez (Puente de Vallecas) are expected to be completed during 2025.

As an overview, it is especially noteworthy the process of a first scaling of the initiative with the incorporation of new schools and nursery schools, with the joint and transversal intervention of the DGs of the Government Area, promoting a distributed leadership and sharing a joint vision of the adaptation of the city.

In addition, the DG Sustainability and Environmental Control within the Training School offers a course on “More Natural Schoolyards and School Environments” with the aim of training municipal technicians in the application of these criteria so they can be applied in other projects to be implemented in the city, in accordance with the **Manual of More Natural School Environments.**

https://www.madrid.es/UnidadesDescentralizadas/Sostenibilidad/EspeInf/EntornosEscolares/ficheros/ManualEntornosEscolaresMadrid_VF-Definitivo.pdf

On the other hand, and in relation to Objective # 6 aimed at promoting equitable social resilience, it should be noted that the design process of the interventions has been worked with the school community of each educational center and therefore participated with the management of the centers and family associations, trying to involve the largest number of people linked to the educational center in the climate adaptation measures.

In relation to the evaluative aspect, aimed at generating useful information from each Project implemented (Objective # 7), the application case in one of them has included the thermal simulation of the situations before and after the intervention, thus allowing to analyze the real benefits and impact of such interventions. The results will also be shared with other municipal areas to promote this type of interventions.

DP 2

Patios + Naturales: More natural schoolyards at CEIP Navas de Tolosa, Villaverde

Patios + Naturales is based on the pedagogical intention of making the urban environment, formal education and nature compatible. The redesign of the playgrounds is guided, moreover, by the achievement of the climate objectives of the city of Madrid in terms of carbon footprint, refreshment and biodiversity through Nature-Based Solutions (NBS). As a logical consequence of the revitalization of these spaces, it is expected that they will become, outside school hours, meeting and activity places for families and neighbors.

A clearly illustrative example is CEIP Navas de Tolosa, in Villaverde, where we can highlight:

OBJECTIVES.GOALS	CONTRIBUTIONS
1.1, 1.2, 1.3	+ WATER FEATURES, FOUNTAINS AND PERGOLAS; + STREET FURNITURE WITH NATURAL AND RECYCLED MATERIALS TO EXPERIMENT, DISCOVER AND ENCOURAGE FREE PLAY.
2.1	+ ADDING A VARIETY OF PLANTS TO THE PLAYGROUND TO ATTRACT BIODIVERSITY FROM THE NEARBY PARK.
3.2	+ RAINWATER HARVESTING THROUGH RECIRCULATION; + IMPROVED DRAINAGE AND INSTALLATION OF PERMEABLE PAVEMENTS; + NATIVE, CLIMATE-ADAPTED VEGETATION.
4.1, 4.2	+ REPLACING THE PERIMETER FENCE TO IMPROVE VISIBILITY BETWEEN THE CENTER AND THE SURROUNDING FOREST, WHILE ENHANCING ROOM VENTILATION; + FLEXIBLE ACCESS POINTS TO CONNECT WITH NEIGHBORING FACILITIES: DOORS TO THE PARK, THE SPORTS CENTER AND THE NEIGHBORHOOD; + VARIED SURFACES AND TEXTURES, INCLUDING PERMEABLE PAVEMENTS AND TIMBER ROCKS;

+ OPENING THE SCHOOLYARD TO THE NEIGHBORHOOD, OTHER USES AND ACTIVITIES;
+ COLLABORATION TO STREAMLINE PUBLIC RESOURCE MANAGEMENT ACROSS LOCAL FACILITIES;
+ INNOVATIVE EQUIPMENT DESIGNED TO MEET NEW NEEDS AND RESPOND TO CLIMATE IMPACTS.

5.2

+ PUBLIC SCHOOLS WITH THIS APPROACH SERVE AS VEHICLES FOR PUBLIC POLICIES, ACTING AS INTERVENTION HUBS FOR NEIGHBORHOOD CLIMATE ACTIONS AND SETTING STANDARDS FOR SCHOOLS AND OTHER PUBLIC FACILITIES;
+ DIAGNOSIS AND CO-DESIGN WITH THE EDUCATIONAL COMMUNITY AND THE NEIGHBORHOOD;
+ COLLABORATION AND MUNICIPAL COORDINATION BETWEEN AREAS AND DISTRICTS FOR THE DESIGN AND DEVELOPMENT OF THE PROJECT.

6.1, 6.2, 6.3

+ TURN THE COURTYARD INTO A SMALL CLIMATIC OASIS FOR THE SCHOOL COMMUNITY AND THE NEIGHBORHOOD;
+ MONITORING AND COMMUNICATING THE PROGRESS OF THE MEASURES THROUGH PARTICIPATORY WORKSHOPS WITH ALL STAKEHOLDERS;
+ SPACES DESIGNED TO PROMOTE INCLUSION AND DIVERSITY, AVOIDING THE MONOPOLY OF SPACE FOR SPORTS ACTIVITIES AND OPENING THEM UP TO DIVERSE GAMES FOR BOYS, GIRLS, AND ALL AGES;
+ PROMOTING INTERGENERATIONAL AND ASSOCIATIVE RELATIONSHIPS BY PROVIDING SMALL SPACES AND FACILITATING AREAS DURING NON-SCHOOL HOURS AND DAYS.

Current status

Within the district of Villaverde, in San Cristóbal de los Ángeles, Madrid + Natural projects are being developed in three educational centers: in addition to the improvement of the playground of CEIP Navas de Tolosa, already completed, there is an intervention in the school environment of CEIP Sagunto and it is also being proposed to open the playground of CEIP Azorín to the neighborhood, as well as an itinerary that connects the three facilities and small businesses.

DP 3

Intervention in educational centers and university campus: UPM South Campus, Puente de Vallecas

One of the most important lines of force that the city has imposed on itself within the deployment of its environmental transformation strategy refers to the alliance with educational centers and universities as a priority way to channel the culture of responsibility and environmental sustainability towards the entire social body of Madrid through concrete and replicable intervention projects. Educational facilities at all levels thus become nodes of urban regeneration aimed at the implementation of the renaturalization of spaces and climate neutrality.

For this purpose, the South Campus of the Universidad Politécnica de Madrid has been chosen as a pilot area for multimodality in sustainable urban mobility with the improvement of pedestrian connections and infrastructure both with the university campus itself and with the IES Palomeras-Vallecas or the CPEE Vallecas. In the redevelopment process, on the other hand, the renaturalization or the reconsideration of the lighting of the complex has been taken into account.

The actions, on the other hand, have considerably expanded this initial scope through the signing of an urban climate action agreement within the framework of the European Union's Smart and Climate Neutral Cities Mission, in which the municipality participates with the Mission Seal. This agreement broadens the horizon of the actions towards areas of characterization and analysis that look deeper into air quality and sustainability for the area.

OBJECTIVES.GOALS	CONTRIBUTIONS
1.1, 1.2	+ INCREASE OF GREEN AREAS ASSOCIATED WITH ALL PLANNED INTERVENTIONS, INCLUDING PROPOSALS ON BUILDING ROOFS;
2.1	+ SITUATIONAL ANALYSIS (CURRENT STATUS) OF THE EXISTING VEGETATION FOR REPLANTING, PRUNING, ETC.; + INTEGRATE NATURE AND ECOLOGICAL CONNECTIVITY WITH EMPHASIS ON THE CORRECT SELECTION OF SPECIES FOR THE CRITICAL MICROCLIMATE POINTS OF THE INTERVENTION.
3.3	+ SPECIFIC PROPOSAL FOR THE WATER CONSUMPTION OPTIMIZATION AND SUSTAINABLE WASTE MANAGEMENT.
4.1, 4.2	+ PILOT PROJECT FOR THE GENERATION OF A NETWORK OF LOW EMISSION ZONES (LEZ) IN THE CITY; + REDUCTION OF ENERGY DEMAND BY PROMOTING A MULTIMODAL LIFESTYLE;

+ THE LOW-EMISSION CRITERIA DEVELOPED HERE CAN BE SCALED TO URBAN FACILITIES;
+ TURNS SOUTH CAMPUS UPM AND ITS FUTURE MIRRORS PROJECTS (TWO MORE UNIVERSITY CAMPUSES INITIALLY) INTO A BENCHMARK FOR MOBILITY AND URBAN SPACE MANAGEMENT;
+ ENCOURAGE THE EFFICIENT USE OF PUBLIC TRANSPORTATION, MAKING IT BOTH MORE ATTRACTIVE AND EFFECTIVE.

5.1, 5.2

+ DIVERSIFIES ADMINISTRATIVE PROCEDURES WITHIN THE URBAN PLANNING, ENVIRONMENT AND MOBILITY AREA;
+ INVOLVEMENT OF INTERDEPARTMENTAL SERVICES FOR PROJECT DEVELOPMENT (SG CONSERVATION OF PUBLIC ROADS, SG MOBILITY PLANNING AND TRANSPORT, DISTRICT TECHNICIANS, DG SUSTAINABILITY AND ENVIRONMENTAL CONTROL, DG EDUCATION AND YOUTH);
+ COLLABORATIVE PROJECT, LED BY THE URBAN PLANNING, ENVIRONMENT AND MOBILITY AREA OF THE MADRID CITY COUNCIL, WITH THE COLLABORATION OF INSTITUTIONS SUCH AS THE UPM, ASSOCIATIONS SUCH AS C40, PUBLIC COMPANIES SUCH AS EMT OR METRO AND THE EDUCATIONAL COMMUNITY.

6.1, 6.2, 6.3

+ PROMOTION OF TERRITORIAL REBALANCING, BECOMING A CENTER OF ATTRACTION IN THE SOUTHEASTERN AREA OF MADRID;
+ CONTRIBUTES TO THE SOUTHWARD EXTENSION OF THE EBZ TO IMPROVE THE ENVIRONMENTAL PROTECTION OF THE DISTRICT;
+ IMPROVE ACCESSIBILITY, TRAFFIC CALMING, ETC. OF PUBLIC SPACE ESPECIALLY RELEVANT FOR VULNERABLE GROUPS;
+ THE DISCUSSION AND PARTICIPATION PROCESSES WILL INCLUDE ASSOCIATIONS OR EXPERTS ON TOPICS SUCH AS VISUAL OR HEARING IMPAIRMENT, AGING, CHILDHOOD AND TEENAGERS, ETC.;
+ STRENGTHENING OF SOCIAL COMMITMENTS, ATTENDING TO THE RELATIONSHIP AND INTERACTION OF THE DIFFERENT DISTRICTS AND EDUCATIONAL CENTERS.

7.1, 7.2

+ COMBINED ANALYSIS AND EVALUATION OF THE THERMAL AND CLIMATIC BEHAVIOR OF SOUTH CAMPUS AND ITS SURROUNDINGS WITH UPM'S OWN METHODOLOGY;

	+ BUILDING CHARACTERIZATION TO KNOW THE INTERRELATION AND IMPACTS ON THE AREA'S MICROCLIMATE; + DAY(S) OF DISSEMINATION OF THE RESULTS ACHIEVED IN THE MENTIONED AGREEMENT.

Current status

The redevelopment interventions are very advanced in their connection and infrastructure aspects, having started, on the other hand, the aspects associated with the University - City Council agreement for the environmental analysis and generation of additional intervention proposals to those of a structural type linked to those of urban mobility initially considered.

DP 4

San Cristóbal climate axis [Public facilities and spaces in Villaverde]

This project aims to achieve several climate and health objectives directly linked to the urban heat island effect using as a transforming vehicle the work with the citizens through the design and redevelopment of a specific itinerary in the neighbourhood of San Cristóbal de los Ángeles, Villaverde District and the coordination of the different facilities of the environment from the approach of climate oasis.

At the core of this purpose is the health of citizens, proving the bioclimatic improvement, together with the achievement of a more walkable neighborhood, has a direct impact on its improvement, which is particularly important in those cases where there are multiple vulnerabilities, as in this case. In addition, we have tried to connect in this pilot, with the intention of replicability, to essential nodes of daily life, such as schools or health centers.

OBJECTIVES.GOALS	CONTRIBUTIONS
1.1, 1.2, 1.3	+ SHARING AMONG THE VARIOUS STAKEHOLDERS OF PROPOSALS FOR THE USE OF FURNITURE AND BUILDING MATERIALS TO IMPROVE THERMAL COMFORT; + THE NATURAL WATER CYCLE IS FAVORED AND WITH IT A REDUCTION OF THE AMBIENT TEMPERATURE, BY MEANS OF SBN, SUCH AS SHADING WITH LARGE LEAFY SPECIES.
2.1	+ MICROCLIMATIC IMPROVEMENT ON SELECTED ROUTES THAT HELP COMBAT THE HEAT ISLAND AND PROMOTE BIODIVERSITY;

	+ INTERCONNECTION BETWEEN HABITATS (GREEN SPACES) PREVIOUSLY ISOLATED FROM EACH OTHER, FACILITATING, FOR EXAMPLE, THE GROWTH OF POLLINATOR POPULATIONS.
3.2, 3.3	+ REINFORCE THE VALUES OF WATER AND GREEN SPACES; + SUSTAINABLE STORMWATER MANAGEMENT SYSTEMS, USING SUSTAINABLE URBAN DRAINAGE SYSTEMS (SUDS), SUCH AS HIGH PERMEABILITY PAVEMENTS OR INFILTRATION TRENCHES.
4.1, 4.2	+ COLLABORATIVE AND INTERDISCIPLINARY WORK OF PROFESSIONALS AND TECHNICIANS IN THE SOCIAL AND HEALTH FIELDS IN CONTACT WITH NEIGHBORS; + COMMUNITY INVOLVEMENT IN MAINTENANCE, CONSIDERED KEY TO SCALING UP AND CONSOLIDATING RESULTS IN THE LONG TERM; + PLANNING OF SPACES AS POTENTIAL CLIMATE REFUGES.
5.1, 5.2, 5.3	+ COLLABORATIVE GOVERNANCE IN THE DESIGN AND MAINTENANCE OF REGENERATED SPACES, INCLUDING THE DEVELOPMENT OF A BEST PRACTICE GUIDE FOR THE IMPLEMENTATION OF THIS JOINT PROCESS; + SOCIAL INNOVATION: RELATIONSHIPS BETWEEN THE MUNICIPALITY, CITIZENS AND THE SCIENTIFIC COMMUNITY ARE PROMOTED IN THE CHOICE AND TREATMENT OF SOLUTIONS, THUS STRENGTHENING MUTUAL RELATIONS; + TRAINING OF MUNICIPAL SERVICES BASED ON LESSONS LEARNED IN THE PROCESS.
6.1, 6.2, 6.3	+ REVIEW FROM A CLIMATIC PERSPECTIVE OF PUBLIC HEALTH IN ITS INTERRELATIONSHIP WITH CURRENT SOCIAL AND CULTURAL FACILITIES, EXISTING SMALL SQUARES, MICRO-INFRASTRUCTURES TO BE GREENED, ETC.; + INTERVENTIONS SHARED WITH THE SAN DIEGO NEIGHBORHOOD TO ACHIEVE A PUBLIC SPACE TRANSFORMATION AIMED AT HEAT MITIGATION; + PRIORITY ADAPTATION OF THE AREAS MOST FREQUENTED BY THE MOST VULNERABLE POPULATION GROUPS; + CONFORMATION OF COMPETENCIES AND PROFILES ASSOCIATED WITH GREEN JOBS, FROM THE MUNICIPAL, ACADEMIC AND PRIVATE SECTOR PERSPECTIVE THROUGH TRAINING ACTIONS, ETC.

7.1, 7.2	+ CLIMATE RISK ASSESSMENT THROUGH THE INNOVATIVE INTRODUCTION OF THE QUINTUPLE HELIX INNOVATION MODEL [UNIVERSITY - INDUSTRY - GOVERNMENT - CITIZENSHIP - ENVIRONMENT], OF THE KNOWLEDGE SOCIETY; + DISSEMINATION OF A BETTER UNDERSTANDING OF CLIMATE RISKS AND THEIR EFFECTIVE RESPONSE THROUGH THE COLLABORATION OF THE VARIOUS STAKEHOLDERS INVOLVED IN THE AFOREMENTIONED KNOWLEDGE SCHEME.
8.1	+ RESPONSE TO HEAT WAVE EPISODES WITH THE DESIGN OF CLIMATICALLY EFFECTIVE ITINERARIES BY CHARACTERISTICS AND LOCATION, IN ADDITION TO SERVING AS A CONTINUOUS IMPROVEMENT TOOL TO MATERIALIZE INITIATIVES, INCLUDING EXPERIMENTAL ONES.

Current status

This climate action axis and itinerary as a climate corridor are currently in the implementation phase.

MADRID

urbanismo,
medio ambiente
y movilidad