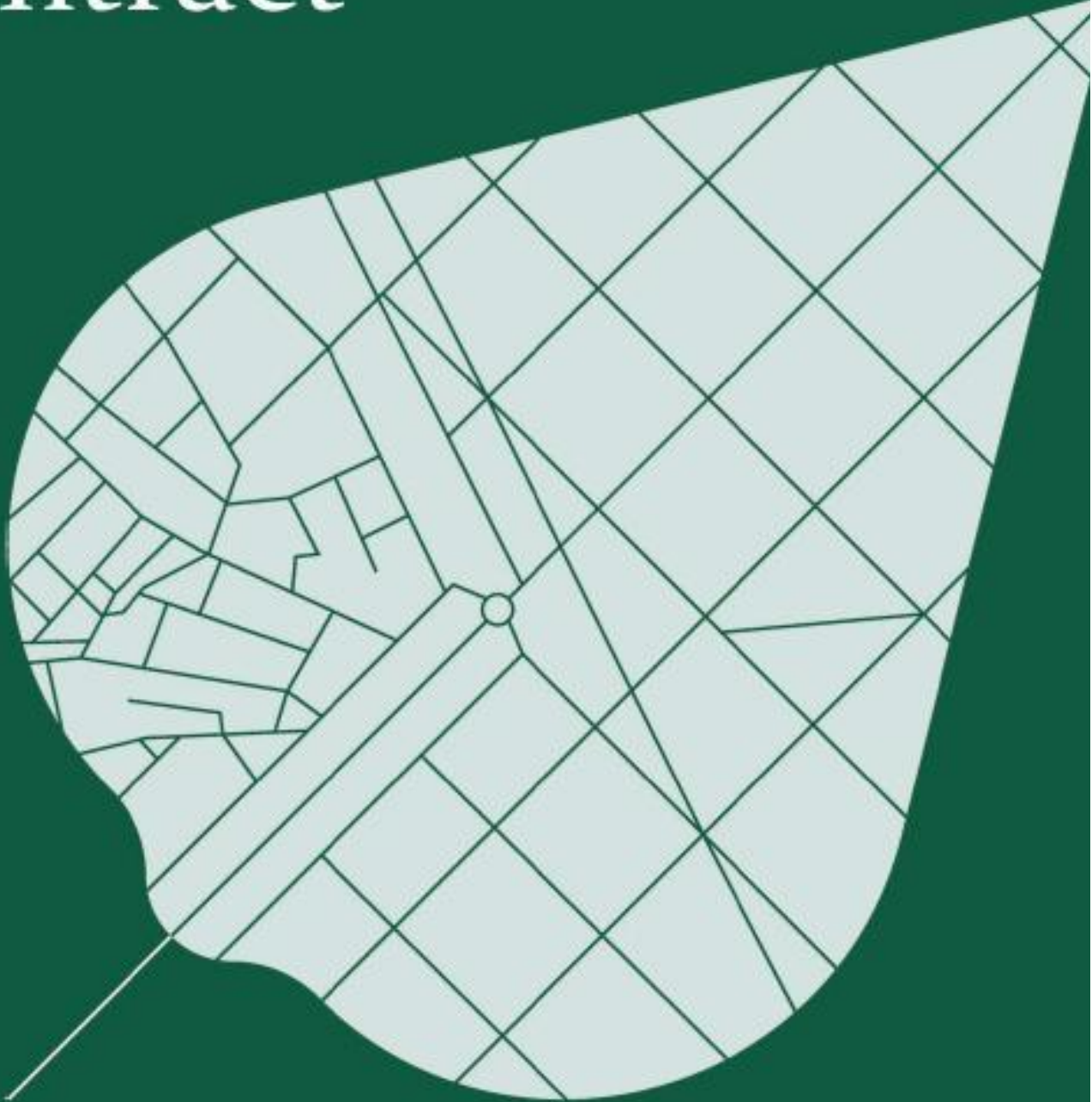


# *Seville* Climate City Contract







SEVILLE'S EUROPEAN SEAL AS A CLIMATE-NEUTRAL AND SMART CITY

# CLIMATE AGREEMENT CITY OF SEVILLE

Formal iteration  
March 2026

## MEMORY





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# 1. Introduction

Seville is one of the cities selected by the European Commission to participate in the **Smart and Climate Neutral Cities Mission**, an ambitious programme whose objective is for 100 European cities to achieve carbon neutrality by **2030**, twenty years earlier than the rest of the EU.

Seville proposed its Climate Agreement in September 2023, and received the Seal as a Climate Neutral City in April 2024, following the evaluation process by the EU. This *label* validates that our plan is serious, technically feasible and bankable; it approves our roadmap and must grant preferential access to European funding. We are facing a process that contains the geographical City (from the physical, human and economic perspective), which includes the Administrative City.

It is now, in 2026, the first formal iteration of the aforementioned Climate Agreement of the City of Seville (SCCC), which will review and update the situation of the City in terms of **emissions** (2005-2024) and will include the perspectives in the field of **adaptation** to the different expected scenarios, as a result of the changes planned for the future (mainly more and greater heat waves, more frequent and intense droughts, pluvial and river floods).

Likewise, the **climate neutrality objectives** for 2030 are reviewed, incorporating new challenges in the areas of just transition or embedded carbon, among many others.

Strategic priorities and interventions **will also be presented**, with the most representative actions for mitigation and adaptation, in the different areas of intervention.

Included in this iteration are monitoring **and co-benefit indicators**, issues that were not addressed in depth in the initial Agreement. And the **criteria for monitoring and updating** the SCCC will also be reviewed.

In this iteration, within the framework of its commitment to a **fair and comprehensive climate transition**, the City of Seville is committed to incorporating climate change adaptation aspects in a cross-cutting way in all its actions. In particular, it undertakes to carry out the update of the **climate risk assessment** in its municipal area, in coordination with the regional, provincial and metropolitan administrations, in order to ensure a coherent, effective response aligned with the broader territorial frameworks.

We are currently awaiting the approval of the new **European Urban Agenda (SEA)**. This situation conditions the reality of all urban spaces in the EU, especially those in which we work within the framework of the Climate Mission. However, we have defined the framework through the collaborative work programme established in 2016 through the **Amsterdam Pact**. Its aim is not to create new laws, but to **improve the way cities participate in the design and implementation of European Union policies**.

The Agenda does not seek more bureaucracy, but focuses on three operational pillars:

- **Better regulation:** revising existing laws to make them easier to enforce at the local level, eliminating "bottlenecks".
- **Better Financing:** facilitating the access of municipalities to European funds (such as the Cohesion Funds or NextGenerationEU) in a simpler and more effective way.





- **Better Knowledge:** Sharing success stories and data between cities so as not to "reinvent the wheel" in the face of common problems.

This Agenda addresses the problems of cities, establishing partnerships between the Commission, EU organisations, national governments, local authorities and stakeholders (e.g. non-governmental organisations).

Together, action plans are developed to:

- Better regulation
- improve funding programmes
- Sharing knowledge (data, studies, good practices)

EU legislation is often applied in cities, with direct and indirect implications for municipal governments. However, legislation may affect different recipients differently and be difficult to implement at local level. These are some of the difficulties that EU legislation must address, and which are the subject of the EUA.

UA aims to assist relevant stakeholders in implementing policies, laws and instruments in a more effective and coherent manner. The Commission shall ensure that its objectives are met at minimum cost and **without imposing unnecessary administrative burdens** on the companies and other organisations involved.

It is well known to the Community bodies that cities are among the main **beneficiaries of public funding**. However, obtaining such funding is often difficult due to the large number of EU institutions that can provide it and the various ways in which it is granted. Also, in the case of Spain, as the municipalities (almost never) do not have structures capable of assisting in the entire life cycle that is required in the process of these grants.

It is not lost on anyone in a diagnosis of the situation that many municipalities are not specialists in the management of these complex processes that often do not allow the contracting of the external support that is needed for these tasks.

We understand that, among others, for this reason, the AUE wants to **improve the quality of the sources of financing and facilitate the access of municipal governments to these funds**. It is already noted that this UA will not generate additional funding, but, based on experience, will make it easier for municipal governments to apply for funding from all EU programmes, including those belonging to cohesion policy.

It therefore remains to be seen what mechanisms the EU will have in place to support Mission Cities in the outstanding task of carrying out and monitoring their CAs, especially to face the costs involved in the cancellation or minimisation of the outstanding GHG emissions gap compared to the base year.

We are confident that an effective solution to this issue will soon be found, on which the success of the Climate Neutral and Smart Cities Mission will clearly depend. As we will see in the current iteration of the SCCC 2026, the City of Seville has achieved a significant reduction in GHG emissions since 2005, and we have planned several packages of actions with which we expect





significant progress. For the rest, the emissions gap will be essential for the Commission's support.

Success **stories** and other knowledge about the evolution of cities need to be better harnessed and made more widely known.

We are pleased to see that the new SUE notes that, in the EU, from one city to another, the responsibilities of the authorities and the corresponding administrative structures can vary considerably. It is important to have reliable data to ensure that urban policy is evidence-based and that specific solutions can be found to the most important challenges.

The SUE will help to build a knowledge base on urban policy and encourage the exchange of good practices. Seville will be decisively supporting these objectives.

Some of the **EU's priority issues for cities**, in line with local policies for sustainable development are:

- Air quality
- Circular economy
- adaptation to climate change
- Digital transition
- Energy transition
- Housing
- Innovative and responsible public procurement
- jobs and skills in the local economy
- Sustainable land use and nature-based solutions
- Urban mobility
- Urban poverty

These urban issues were already defined in the **Amsterdam Pact**, ratified by the ministers of urban policy of the EU member countries in May 2016. The matter is nothing new: let us all also remember the **Green Paper on the Urban Environment**, published by the then Commission of the European Communities on 26 July 1990.

At the crucial moment in the global response to climate-related emergencies, the EU is committed to leading climate action and has set the targets and legislation to be able to achieve this. Thus, the EU must reduce its emissions by at least 55% by 2030 and achieve climate neutrality by mid-century. This commitment is reflected in the **European Green Deal** and the **European Climate Law**, which make these targets legally binding.

The European Climate Law, **Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999**, adopted in June 2021, establishes and defines the objective of climate neutrality in the EU by 2050 and provides a framework for advancing efforts to adapt to impacts of climate change, whereby all Member States must put in place adaptation strategies and plans.





In addition, it sets a binding target for the Union **to reduce net greenhouse gas emissions** (emissions after removals) by at least 55% by 2030 compared to 1990 levels. In order to ensure that sufficient measures are taken to reduce and avoid emissions by 2030, the Climate Law introduces a limit of 225 million tonnes of CO<sub>2</sub> equivalent to the contribution of removals to this target. It also states that the EU's next emissions reduction target will be by 2040.

The Law also puts in place a mechanism for **monitoring and evaluating progress** by the Commission that will have to assess, both at European and national level, every five years, progress towards the goal of climate neutrality and adaptation and the coherence of European and Member State policies with these objectives.

To carry out this evaluation exercise, the Law establishes that the Commission must base itself on an indicative linear trajectory that establishes the path of emission reduction from the emission reduction target to 2030 established in the text to climate neutrality in 2050.

It also includes a review clause, whereby the operation of this regulation must be reviewed every five years, opening the door for the Commission to present proposals if necessary. Therefore, **the review will take place in the month of June 2026**, so we are attentive to new revisions.

The European Climate Law also establishes a **European Scientific Advisory Council on Climate Change** that has been set up under the umbrella of the European Environment Agency. This Council provides independent scientific advice and will produce reports on EU actions, climate targets, indicative greenhouse gas budgets and consistency with European climate law and with the EU's international commitments under the Paris Agreement.

**Cities play a crucial role in the European Climate Law**, not only because they are large emitters of greenhouse gases, but also because they are the places where many climate policies are implemented. We are responsible for 70% of global CO<sub>2</sub> emissions, and cities and regions are key to implementing EU legislation in the fight against climate change.

In this context, **cities are called upon to play a fundamental role**, both to accelerate the decarbonisation process and to ensure a fair and equitable transformation, which contributes to the well-being of society as a whole.

Not surprisingly, European cities, despite occupying only around 3% of the earth's surface, generate more than 70% of greenhouse gas emissions and consume more than 65% of energy globally. And it is important that we act as **centres of experimentation and innovation in the transition to climate neutrality**.

The **European Union Mission "100 climate-neutral and smart cities by 2030"** aims to support the transformation of cities to accelerate compliance with the Paris Agreement, and to be both a catalyst and driver of the implementation of the **European Green Deal**, and a demonstrator that it is possible to achieve climate neutrality before 2050.

In Spain, on 8 September 2021, the Government of Spain and the City Councils of Barcelona, Madrid, Seville and Valencia signed the **Declaration "Climate-neutral cities in 2030"**, as a boost to the commitments and initiatives of the signatory cities and a support from the Government for the transformation of these cities to achieve climate neutrality and improve their resilience.





Following the path opened, on December 13, the City Councils of Soria, Valladolid, Vitoria-Gasteiz and Zaragoza adhered to the Declaration.

In addition, on 15 September 2021, the **Senate Plenary approved** a motion urging the Government to promote climate neutrality in cities within the framework of the European Cities Mission. The motion recognises the critical role of cities in responding to the climate emergency and highlights the opportunity to accelerate the **necessary and cross-cutting changes to make cities climate neutral by 2030**. It also appreciates that the different territorial administrations promote and facilitate the climate neutrality of Spanish cities through their incorporation into the Cities Mission and through the development of transformation projects.

In this regard, on 25 November 2021 the Cities Mission launched a call for expressions of interest aimed at European cities with more than 50,000 inhabitants interested in participating. Of the 377 that were presented, 100 from the EU-27 were selected, including the Spanish cities of **Barcelona, Madrid, Seville, Valencia, Valladolid, Vitoria-Gasteiz and Zaragoza**.

The **Mission's Implementation Plan** foresees that each of the 100 selected cities will draw up a **City Climate Neutrality Agreement** adapted to its own reality, through a process of co-creation and in collaboration **with civil society as a whole and with citizens**, detailing the strategy for deploying and monitoring innovative and digital solutions to achieve climate neutrality; and that allows other cities to follow suit before 2050.

Thus, after two years of hard work, and after a first proposal rejected by the Mission's evaluators, the **City of Sevilla Climate City Contract (SCCC)** was configured in September 2023: a clear commitment, not only to the European Commission and national, regional and local authorities, but also to citizens, and includes a first package of proposals for a general climate action plan in the different sectors, such as **energy, buildings, waste management (urban solids and wastewater) and transport**, together with the corresponding investment forecasts that would be necessary, according to the estimates of this European Mission<sup>1</sup>.

The entire process was defined in Seville in accordance with the process already initiated in 2009, within the framework **of the Covenant of Mayors for Sustainable Climate and Energy**, and specifically in the **Action Plan for Sustainable Climate and Energy** (2010-2013-2017 and 2020).

In this way, the SCCC responds to the requirements of the programme set up for the European Cities Mission. It is being prepared with the data available in the city; It collects the main concerns and forecasts of other public and private actors, establishing **indicative planning to achieve climate neutrality**.

In particular, cities recognize that the Mission cannot succeed without being firmly anchored in the local community and garnering broad support. Therefore, **it is necessary to involve civil society**, youth groups, cultural institutions, foundations, **local media, companies**, private industry, unions, **academia and research, and the public sector**, among others, in their corresponding functions as decision-makers, users, consumers, producers and owners. This is what has been called the **fivefold helix to achieve climate neutrality**.

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<sup>1</sup> This document is now an iteration of the initial document, which contains the basis of the ACCS, with the progress achieved until March 2026.





In addition, we integrate the qualities and heritage of the city, which guarantee the local dimension of the **transition towards climate neutrality**; but also its inclusive character, following the path of the values of the New European Bauhaus. We try to promote a sense of belonging and ownership on the part of the city's inhabitants and professional actors, highlighting that their unique contribution is relevant and that compliance with this Agreement will result in a better quality of life and a better environment (including health) for all.

It is known that **the costs of inaction** far exceed those required to achieve **better air quality and climate conditions**. Inaction on climate change generates significant economic, social, and environmental costs, including impacts on health, infrastructure, agriculture, and the economy in general. It is estimated that the net costs of inaction could reach between 11% and 27% of accumulated GDP.

The report<sup>2</sup> notes that allowing global warming to reach 3°C by 2100 could reduce cumulative economic output by 15% to 34%. Alternatively, investing between 1% and 2% in mitigation and adaptation would limit warming to 2°C, reducing economic damage by 2% to 4%. This net cost of inaction is equivalent to between 11% and 27% of cumulative GDP, equivalent to three times global health spending, or eight times the amount needed to overcome the global poverty line by 2100.

On the other hand, the entire Mission is configured within the framework of an **iterative process**, as a document that is **subject to monitoring and updating**, both through the signing of addenda and other adhesion documents, thus bringing together other actors necessary for the city to achieve the climate neutrality objective established with the maximum involvement of the different actors. In particular, the commitments included may be extended or updated so that they effectively contribute to the achievement of climate neutrality in the city. Thus, the municipal body in charge of the process in Seville, the **Energy and Sustainability Agency**, is establishing a monitoring system that *regularly* integrates the new commitments and progress that are being registered in the City, by all the actors, thus configuring a continuous climate accounting system.

Supra-municipal policies that are incorporated into regional and national planning will also be of special relevance. Attending to the metropolitan reality is essential, especially for the purposes of mobility management, but also in the treatment of urban waste or wastewater.

Following the guidelines established in the European Mission from NetZeroCities<sup>3</sup>, the Climate Agreement is divided into several parts: one relating to **the city's commitment** to achieve climate

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<sup>2</sup> The report, "*Too Hot to Think Straight, Too Cold to Panic: Landing the Economic Case for Climate Action With Decision Makers*," was released in March 2025 by climate change experts and sustainability consulting of Boston Consulting Group, the Cambridge Judge Business School and the climaTraces Lab of the University of Cambridge.

<sup>3</sup> **NetZeroCities** is the European initiative that seeks to support cities in their transition to climate neutrality, with the aim of drastically reducing greenhouse gas emissions and achieving a balance between the emissions that are produced and those that are eliminated. NZC acts as a support platform, offering tools, resources and knowledge to European cities so that they can develop strategies and action plans adapted to their local and regional contexts.

The NetZeroCities (NZC) project is part of the Horizon 2020 Research and Innovation Programme and provides the necessary assistance to the cities of the European Cities Mission (<https://netzerocities.eu/the-nzc-project/>)

In Spain we also have the **citiES2030** support platform, a team of facilitators for the process in charge of removing, with maximum efficiency, the obstacles that cities encounter in this complex process.





neutrality; another relating to the **institutional support and coordination** of the different public administrations; another part referring to its **monitoring and updating**; and a final part that includes the annexes corresponding to the **Climate Action Plan** (Annex I), the **Climate Investment Plan** (Annex II) and the **Adhesion Plan of the city's climate actors** and commitments assumed (Annex III).

For the first two annexes, NZC has established the specific templates, with their associated algorithms, which seek to give homogeneity to the process for all cities. These calculations are under continuous review, and their definition will be refined as more data can be entered into the model.

The third must include the set of bodies, companies or groups that decide to join the SCCC, providing the basic data on their situation with respect to the CH and the actions planned to tend towards climate neutrality.

In all cases, and for the 100 participating cities, the models developed by NetZeroCities, which audits the process, are followed. Thus, some of the results presented in the Agreement respond to the calculation algorithms established to give uniformity to all the Climate Agreements in Mission Cities in the EU.

Finally, this 2026 iteration addresses the plans and programs that affect the objectives of our SCCC, whether they are local, regional, or statewide.

## 1.1. Seville Strategic Plan

The **Seville 2030 Strategic Plan (PES 2030)** is the guiding document designed to guide the future of the city based on a "**Shared Seville**" model. Its central purpose is to build a city identified with the common good, more equitable, sustainable and interconnected.

PES 2030 acts as an integrating framework that coordinates 44 pre-existing or drafted municipal plans. Among the most relevant are:

- **Mobility:** Sustainable Urban Mobility Plan (SUMP) focused on decarbonised public transport and pedestrians.
- **Housing:** Municipal Housing Plan 2018-2023 to guarantee affordable access and eradicate slums.
- **Environment:** Climate and Sustainable Energy Action Plan (PACES) and the Tree Master Plan.
- **Social:** Comprehensive Neighbourhood Plans (such as Polígono Sur or Tres Barrios-Amate) and the Social Innovation Plan for Employment.

## 1.2. 2030 Agenda

This document presents the **Local Action Plan of the Seville Urban Agenda 2030**, a strategic framework designed to transform the city towards a more sustainable, inclusive and resilient model, aligned with the UN Sustainable Development Goals (SDGs) and the Spanish Urban Agenda.





➤ **Context and objectives of the Plan**

- **Pilot project:** Seville was selected by the Ministry of Transport to act as a pilot project, accumulating useful experience for other Spanish municipalities.
- **Funding:** The project was supported by a grant from the European Union's NextGenerationEU funds.
- **Central vision:** the main idea is the "Shared Seville", which advocates an interconnected city, with social equity and equal opportunities.

➤ **Strategic dimensions and diagnosis**

The plan organizes its diagnosis into 10 priority dimensions, from which 30 subdimensions and 56 "Urban Facts" are derived:

- **Territorial Planning:** seeks a rational use of the land and the protection of natural and cultural heritage. Seville stands out for having 11.3 m<sup>2</sup> of green areas per inhabitant, exceeding the Spanish average.
- **Sustainable Mobility:** promotes the "15-minute city" and non-motorized transport. Currently, 28% of trips are made on foot and 3.4% by bicycle.
- **Climate Change:** focuses on reducing CO<sub>2</sub> emissions (3.9 tons per inhabitant in 2019) and improving resilience to risks such as droughts and heat waves.
- **Social cohesion:** a critical challenge is to reduce inequality, as several neighbourhoods in Seville are among the lowest-income in Spain (e.g. Polígono Sur, Torreblanca).
- **Housing:** the aim is to facilitate access to decent and affordable housing, especially for young people, and to eradicate slums.
- **Urban Economy:** the service sector dominates the economy (92.19% of the land of economic activity). The aim is to diversify towards the technology industry and sustainable and smart tourism.

➤ **Implementation methodology**

The strategy is based on three operational elements:

- **Urban facts:** 56 challenges or needs identified through SWOT analysis.
- **City Challenges:** 30 strategic keys on which the City Council must act.
- **Proposals for action:** 230 measures for social and economic reactivation and 19 strategic projects are included (such as the 29/XXI project linked to the centenary of the 1929 Exhibition).

➤ **Governance and participation**

The plan emphasizes the need for multi-level governance and administrative modernization through e-administration to improve efficiency and transparency. It also highlights the importance of the associative fabric of the neighbourhoods to consolidate social cohesion.

### 1.3. Municipal Sustainable Mobility Plan (SUMP 2030)

It is a strategic planning tool approved in May 2021. Its central objective is to transform Seville's mobility model to make it more efficient, socially equitable and protective of the environment.

Key points of the strategic document are the following:

➤ **Diagnosis and justification**





- **Emissions:** transport is the main emitter of greenhouse gases (GHG) in Seville, accounting for more than a third of the total.
- **Car dependence:** private vehicles generate 73% of the emissions of the transport sector.
- **Current mobility:** approximately 1.14 million journeys are made on a working day. Private vehicles account for 40.5% of the modal distribution, followed by pedestrians (28.6%) and public transport (24%).
- **Metropolitan Pressure:** almost 46% of the vehicles circulating in the city come from abroad, mainly from Aljarafe and the eastern area.

➤ **Strategic Objectives for 2030**

The plan is based on three pillars of sustainability (social, environmental and economic) with specific goals:

- **Emission reduction:** reduce GHG emissions by 55% compared to 2005 levels.
- **Modal distribution:** ensuring that 2/3 of journeys are made in sustainable modes and only 1/3 in private vehicles (33.3% target).
- **"The city in 20 minutes":** to ensure that the average travel time is less than 20 minutes and that no mode exceeds 25 minutes on average.
- **Decarbonisation of public transport:** at least 75% of public transport journeys should be made in "zero-emission" vehicles.

**Outstanding proposals for action**

➤ **Pedestrian and bicycle mobility**

- **Superblocks:** implementation of at least one "superblock" per district to restrict passing traffic and recover space for coexistence.
- **Restricted Traffic Zones:** Creation of controlled access areas in the Old Town and the historic area of Triana.
- **Pedestrian axes:** pedestrianization of key roads such as Av. de la Cruz Roja, sections of San Jacinto and Asunción Street.
- **Cycling network:** complete the network in industrial estates and improve intermodality with safe bike stations.

➤ **Public Transport**

- **High capacity:** promotion of Lines 2 and 3 of the Metro and extension of the Metrocentro to Santa Justa.
- **Rapid Transit Network:** Temporary creation of a network of 6 rapid bus lines (BTR type) with reserved lanes and traffic light priority.
- **Infrastructure:** Expansion of the bus lane network by 35%, from 35 km to 47 km.

➤ **Metropolitan Mobility and Decarbonisation**

- **Connections:** completion of the SE-40, Santa Justa-Airport railway connection and creation of park-and-ride facilities at the accesses (e.g. Charco de la Pava).
- **Low Emission Zone (LEZ):** implementation of a LEZ on the Isla de la Cartuja through the eCitySevilla project.
- **Logistics:** new Urban Goods Distribution (DUM) model with segregated schedules and "last mile" platforms with electric vehicles.





### ➤ **Plan Evaluation**

According to Scenario 5 simulations (combination of all measures), the plan would allow a **58.5% reduction** in mobility emissions by 2030, exceeding the EU target. The average overall travel time would be **19.9 minutes**.

## **1.4. Air Quality Plan**

This document presents the **Proposal for a Short-Term Action Plan for the Improvement of Air Quality in Seville**, prepared by the Junta de Andalucía together with the Seville City Council. Its main objective is to establish a coordinated framework for action to prevent alert thresholds from being reached and to minimise the effects of episodes of high pollution by particulate matter and nitrogen dioxide.

The key points of the plan are summarized below:

### ➤ **Justification and diagnosis**

- **Critical pollutants:** the plan is based on the risk of exceeding the PM10 alert threshold (mainly due to African air intrusions) and the NO2 and O3 information thresholds.
- **Origin of pollution:** the main local sources are road traffic, followed by the domestic sector and port activities. However, natural factors (African dust) and regional transport have a determining weight on PM10 and O3 levels.
- **Scope:** the plan applies exclusively to the municipality of Seville.

### ➤ **Levels and thresholds of action**

The plan establishes three levels of response based on the concentration of pollutants: activation, information and alert.

If the thresholds are exceeded exclusively due to natural causes (such as African air intrusions), the actions will be limited to informing and recommending, without activating additional emission restrictions.

### ➤ **Main intervention measures**

In situations where the cause is anthropogenic (human), measures such as:

- **Traffic:** limiting access to Low Emission Zones, reducing speed, strengthening public transport and promoting teleworking.
- **Industry and construction:** temporary suspension of excavations, demolitions and irrigation of roads to avoid suspended dust.
- **Residential sector:** reduction of heating in public buildings to a maximum of 20°C and campaigns to limit the use of wood-burning fireplaces.
- **Urban services:** prohibition of the use of blowers in street cleaning and increase in street washing.

### ➤ **Surveillance and public information**

- **Monitoring:** the Andalusian Air Quality Monitoring and Control Network will be used together with 72-hour predictive models.
- **Dissemination:** information will be provided through the municipal website, social networks, variable messaging panels on roads and local media.





- **Health:** the plan details specific recommendations for risk groups (people with asthma or heart problems) and the general population according to the level of alertness.

## 1.5. Municipal Emergency Plan

Seville's Municipal Emergency Plan (PEM) not only includes forecasts for adverse weather events, but in recent years has been integrated into a much broader strategy for **resilience and climate emergency**.

Seville was the first Spanish city to declare a **Climate Emergency** (2019), which has forced its emergency response protocols to adapt to the new reality of more intense and frequent phenomena.

### ➤ Specific Plans integrated into the PEM

The Municipal Emergency Plan acts as an "umbrella", but it is nourished by sectoral plans designed specifically for the risks of climate change in the city:

- **Climate Emergency Plan (PEC):** prepared together with municipal companies such as EMASESA. It focuses on the management of water resources and the protection of critical infrastructures from extreme floods or droughts.
- **Emergency Plan for Drought Situations (PES):** establishes alert levels and restrictions on water use, foreseeing much longer periods of scarcity than in previous decades.
- **High Temperature Protocols:** given that Seville is one of the "ground zero" of heat in Europe, the PEM integrates warnings and public health measures coordinated with the AEMET for extreme heat waves.

### Risk Update

The PEM has gone from being a static document to one that contemplates **emerging risk scenarios**:

- **Explosive weather events:** such as intense storms (e.g. the recent Marta storm in February 2026) that activate local emergency levels due to unusual gusts of wind and torrential rains.
- **Floodability:** The risk maps have been updated taking into account that the rainfall regime has changed, concentrating large volumes of water in a very short time.

### Operation in Alert Levels

When there is an orange or red warning for weather phenomena, the City Council activates different phases of the PEM:

- **Level 1 (Pre-emergency/Local Emergency):** preventive closure of parks, sports facilities and reinforcement of Firefighters and Local Police.
- **Adaptation of the city:** use of "green clauses" and bioclimatic criteria so that the urban infrastructure itself reduces the impact of emergencies (such as the use of draining pavements or the increase in tree mass).

It is intended to incorporate a specific Climate Resilience Plan that further unifies the emergency response with long-term urban planning.





## 1.6. Andalusian Climate Action Plan

The **Andalusian Climate Action Plan (PAAC) 2021-2030** is the strategic roadmap of the **Junta de Andalucía** to combat climate change in the region. Its main objective is to transform the region into a resilient, low-carbon territory aligned with the Paris Agreement.

It contains three fundamental programs:

### ➤ **Energy Transition and Mitigation Program**

The goal is to reduce the causes of global warming by acting directly on emissions.

- **Emission reduction:** the aim is to reduce "diffuse" greenhouse gas (GHG) emissions (transport, waste, agriculture) by 39% by 2030 (compared to 2005).
- **Energy Efficiency:** reduce primary energy consumption by at least 39.5%.
- **Renewable Energies:** to ensure that 42% of gross final energy consumption comes from renewable sources.
- **Key sectors:** the plan focuses on sustainable mobility, the energy rehabilitation of homes and the decarbonisation of industry and the agricultural sector.

### ➤ **Adaptation Program**

Andalusia is one of the most vulnerable regions in Europe. This program seeks to minimize the risks of climate impacts that are already inevitable.

- **Water Management:** absolute priority in the fight against drought and the efficient management of water resources.
- **Risk Prevention:** specific plans for floods, soil erosion and desertification.
- **Public Health:** monitoring the effects of heat waves and new climate-related diseases.
- **Biodiversity:** protection of key ecosystems and prevention of "new generation" forest fires.

### ➤ **Communication and Engagement Program**

For the plan to work, the Board considers the involvement of society essential.

- **Governance:** creation of the Interdepartmental Commission on Climate Change to coordinate all the ministries.
- **Environmental Education:** awareness campaigns to promote responsible consumption.
- **Local Support:** helps municipalities to create their own Municipal Plans against Climate Change, which are mandatory by law in the community.

In 2026, we are in full deployment of the plan's intermediate targets. Investments in green hydrogen and hydraulic infrastructure are accelerating, as climate change has ceased to be a future threat and has become an immediate economic and social challenge for Andalusia.

## 1.7. NetZeroPlanner Additional Information

Annexes I and II of the Climate Agreements, under the Climate Neutral Cities Mission, are non-binding. In order to standardize the treatment of information for all Mission Cities, the scheme





followed by NZC integrates a capital planning that highlights investment forecasts for five sectors.

In the case of Seville, the aforementioned platform simulates the following structure, with respect to the total investment needed to achieve climate neutrality:

- Citizenship: 58%
- Private sector: 23%
- Transport operators: 9%
- Utility Providers: 6%
- City Council: 4%

According to the aforementioned modelling, by 2026 the city would need a total investment of 1,965 euros to achieve climate neutrality by 2030.

The resulting simulated GHG emissions gap assumes that we would subtract a 25-30% reduction compared to the base year 2025, a value that agrees with the evolution of the IER that we present in the next chapter of the 2026 Iteration.





## 2. Seville's situation: emissions and adaptation

### 2.1. Introduction

The region of Andalusia is in a vulnerable situation in the face of climate change, already showing effects such as the radicalization of **droughts** or an increase in the average temperature, with the consequent **heat waves**. As we will detail later, the regional government, which together with the State brings together the competences in the matter, is developing plans and strategies to mitigate the impact and adapt to the new conditions. Certainly, Spanish city councils have few powers in this area, although it is worth remembering the provisions contained in Law 7/1985, of 2 April, regulating the **Bases of Local Government** (art. 25), or in Law 5/2010, of 11 June, on **Local Autonomy of Andalusia** (art. 9). In addition, in our autonomous community, we have Law 8/2018, of 8 October, on **measures against climate change** and for the transition to a new energy model in Andalusia (art. 15). All these regulations, although diffuse, make it clear that municipalities have the obligation to plan and carry out actions to improve the environment. And these include actions to mitigate GHG emissions and for adaptation to inventoried adverse climate scenarios.

Legally, the Environment is recognized in our EC as a collective legal good and a human right, which implies that everyone has the right to a healthy and balanced environment and the obligation to protect it.

The only Andalusian city in the Mission of Climate Neutral Cities is Seville; together with its **metropolitan environment**, it represents one of the European urban regions located on **the front line of global warming**. Its latitude and climate place it in an area of high incidence of rising temperatures and adverse climatic scenarios (**droughts, heat waves, pluvial and river floods**).

The climate in Seville, of the continental Mediterranean type, has characteristics that make it adverse at some times of the year, especially in summer, due to the high temperatures and low humidity. This, added to the location in the Guadalquivir depression and the proximity to North Africa, contributes to further increase the feeling of heat.

In the historical archive of Sevilla.org it is stated that heat waves, yellow, orange or red alerts, preventive measures, restricted working hours, are terms that in recent decades have been constantly transmitted to us from the media, as early as June (or even in May, as happened in 2025). Seville, due to its geographical location, has always been one of the hottest provincial capitals on the Iberian Peninsula. The average maximum temperatures in summer range between 26 and 44°C, usually exceeding the absolute maximum temperatures of 40°C in the shade in the central hours of the day. In the thermal statistics collected since the last quarter of the nineteenth century<sup>4</sup>, some alarming figures are considered, such as the 49.3°C of 1876, the 46.8°C of 1897, the 44.6°C of 1967, the 43.3°C of 1970, the 45°C of 1985, the 46°C of 2002 or the 44.5°C of 2018. In other words, we have always had heat and high temperatures in Seville, although the frequency of these increases.

The classic **jug, the fan, the nap in the shade**, cooling off in a fountain or the simple handkerchief to collect sweat or the straw hat were some of the remedies that the ordinary Sevillian had at his disposal to mitigate the summer heatwave. Heat is part of our way of life, and it conditions the

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<sup>4</sup> José Jaime Capel Molina: A Century of Thermal Observations in Seville: 1871-1970





ways we live. None of this has to do with the technical advances and prevention measures that we have today when facing these episodes of high temperatures, although it is essential to continue researching with new measures that help improve living conditions in these latitudes.

In line with the provisions **of the Sustainable Development Goals**, Seville has also set itself a strategic objective to reduce emissions and fight against climate change, placing special emphasis on those actions that have an impact on economic, social and environmental sustainability, adaptation to the environment and decarbonisation. In this sense, Seville is promoting a strategy to reduce emissions, leading an energy transition towards a more efficient model, based on more sustainable energy sources, energy efficiency and savings and more sustainable management of the transport of people and goods.

To achieve the diagnosis and work on the mitigation of emissions and for adaptation to new climate scenarios, the Carbon **Footprint of** Andalusian municipalities (HCM) application is a tool that allows access to data on GHG emissions at the municipal level in the main emitting sectors. The HCM has been developed by the Ministry of Sustainability and the Environment and made available to citizens and those responsible for all Andalusian municipalities<sup>5</sup>.

The app calculates emissions of **carbon dioxide (CO<sub>2</sub>)**, **methane (CH<sub>4</sub>)**, **nitrous oxide (N<sub>2</sub>O)** and **fluorinated gases (PFCs)**, and expresses the results in terms of CO<sub>2</sub> equivalent. The emitting sectors considered are:

- electricity consumption,
- road traffic,
- waste and wastewater management,
- agriculture,
- livestock,
- fossil fuel consumption in fixed installations,
- and fluorinated gases.

In addition, information is included on the consumption of renewable energies and **the sink capacity**, which allows us to have an approximate figure of the **annual carbon removals** that take place in the municipality, according to the activities contemplated by the Kyoto Protocol.

The starting data are based on statistical sources, from the Multiterritorial Information System of Andalusia (SIMA), the National Inventory of GHG Emissions and various Ministries of the Junta de Andalucía. These data are processed following sectoral methodologies for the calculation of emissions, based on the guidelines and guidance guides for the preparation of GHG inventories of the National Inventory and the Intergovernmental Panel on Climate Change (IPCC).<sup>6</sup>

This tool, which has been in operation since 2009 and has been improved in 2021, allows consultation on GHG emissions inventories, with a **historical series since 2005**. A new version of

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<sup>5</sup> [https://www.juntadeandalucia.es/medioambiente/portal/web/cambio-climatico/indice/-/asset\\_publisher/hdxWUGtQGkX8/content/huella-de-carbono-de-los-municipios-andaluces/20151](https://www.juntadeandalucia.es/medioambiente/portal/web/cambio-climatico/indice/-/asset_publisher/hdxWUGtQGkX8/content/huella-de-carbono-de-los-municipios-andaluces/20151)

<sup>6</sup>

[https://www.juntadeandalucia.es/medioambiente/portal/documents/20151/33609659/Informe+Metodologico\\_3.pdf/0ce29a79-3a2a-da15-3241-f6ce7fb7b3bb?t=1643811351145](https://www.juntadeandalucia.es/medioambiente/portal/documents/20151/33609659/Informe+Metodologico_3.pdf/0ce29a79-3a2a-da15-3241-f6ce7fb7b3bb?t=1643811351145)





the HCM introduces improvements, incorporates new emitting sectors, updates calculation methodologies and uses better sources of statistical information.

## 2.2. Diagnosis

To address the **situation of the City of Seville in terms of GHG emissions**, and its evolution, we consider the base year 2005 and its evolution until 2024<sup>7</sup>. All data will be expressed in t CO<sub>2</sub>e.

### 2.2.1. Total emissions, diffuse emissions and diffuse emissions per capita

The results of the inventory can be seen in the following table and graph, and a detailed analysis of each of the sources of issuance will be made later in this document:

*Table 1. Evolution of total GHG emissions per capita (t CO<sub>2</sub>e/inhabitant).*

Year	Total emissions (tCO <sub>2</sub> e)	Diffuse emissions (tCO <sub>2</sub> e)	Diffuse emissions per capita (tCO <sub>2</sub> e/inhabitant)
2005	3.605.142,77	2.259.423,91	3,21
2006	3.414.670,19	2.012.394,59	2,87
2007	3.465.821,41	2.043.391,21	2,92
2008	3.172.682,19	1.957.634,19	2,79
2009	2.934.761,19	1.833.300,05	2,61
2010	2.534.187,43	1.741.387,87	2,47
2011	2.600.713,57	1.687.931,21	2,4
2012	2.507.685,11	1.509.411,59	2,15
2013	2.212.526,08	1.471.118,89	2,11
2014	2.300.899,76	1.561.564,89	2,25
2015	2.423.651,06	1.429.252,51	2,06
2016	2.334.825,54	1.431.551,91	2,07
2017	2.486.883,97	1.393.738,90	2,02
2018	2.422.053,84	1.402.045,20	2,04
2019	2.215.551,92	1.462.303,01	2,12
2020	1.760.154,07	1.182.815,45	1,72
2021	1.893.101,07	1.272.882,64	1,86
2022	1.938.220,34	1.287.267,28	1,88
2023	1.853.170,66	1.215.335,40	1,77
2024	1.831.000,00	1.199.000,00	1,75

<sup>7</sup> The data for 2024 has been extrapolated from previous years and circumstances

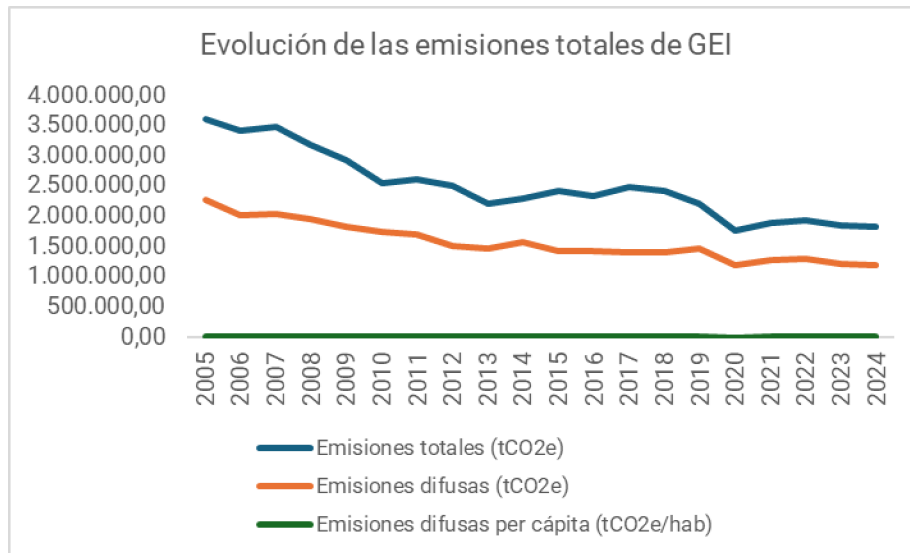


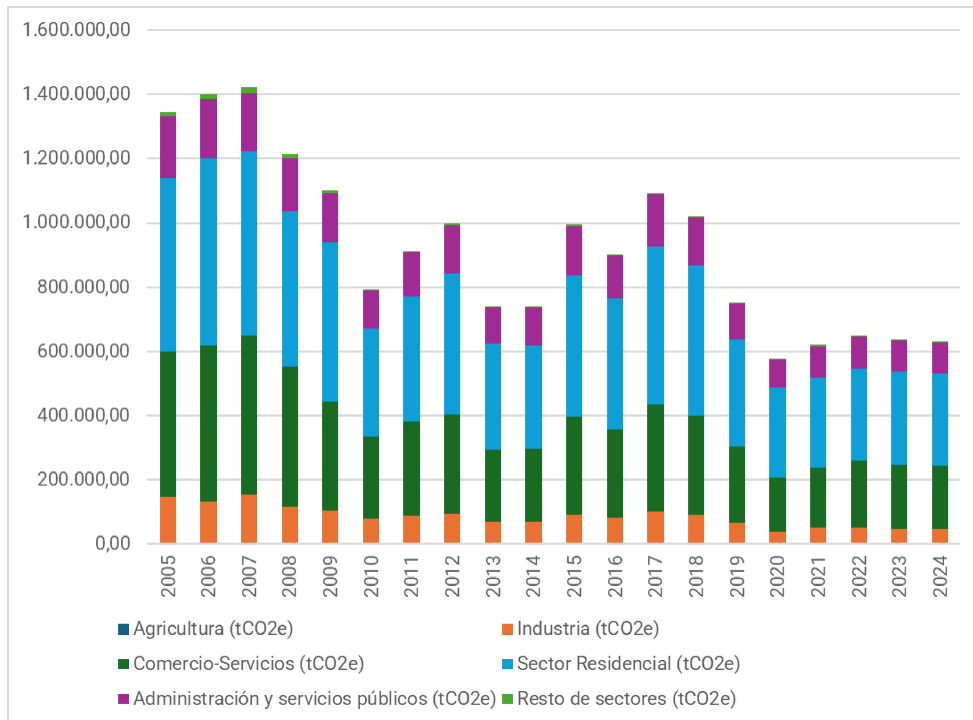
Figure 1. History of total GHG emissions 2005-2024.

Table 2. Diffuse emissions by type of emitting activity.

Year	Agriculture (tCO <sub>2</sub> e)	Industry (tCO <sub>2</sub> e)	Trade-Services (tCO <sub>2</sub> e)	Residential Sector (tCO <sub>2</sub> e)	Administration and public services (tCO <sub>2</sub> e)	Other sectors (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	4.098,80	143.084,00	453.936,74	537.289,24	192.691,92	14.618,17	<b>1.345.718,86</b>
2006	2.447,28	131.076,88	484.925,32	581.976,12	183.704,84	18.145,16	<b>1.402.275,60</b>
2007	2.638,80	151.942,95	494.696,70	572.637,15	183.393,00	17.121,60	<b>1.422.430,20</b>
2008	1.846,80	114.365,60	435.928,00	485.474,00	162.797,60	14.636,00	<b>1.215.048,00</b>
2009	2.081,88	102.542,15	340.737,48	493.749,00	152.870,76	9.479,88	<b>1.101.461,15</b>
2010	1.437,52	76.694,81	258.021,12	334.930,12	118.079,92	3.636,08	<b>792.799,57</b>
2011	1.946,49	87.192,11	293.403,59	388.129,69	137.907,72	4.202,76	<b>912.782,36</b>
2012	2.623,98	93.698,73	307.705,11	440.228,62	149.674,19	4.342,89	<b>998.273,52</b>
2013	1.767,12	69.446,50	224.283,58	329.272,07	113.751,06	2.886,86	<b>741.407,20</b>
2014	1.642,74	69.378,06	228.065,29	320.672,52	116.576,55	2.999,72	<b>739.334,87</b>
2015	2.289,55	91.083,39	304.819,26	439.255,18	153.210,90	3.740,26	<b>994.398,54</b>
2016	1.681,28	81.524,07	273.972,35	408.050,18	135.000,89	3.044,86	<b>903.273,63</b>
2017	2.344,05	100.051,42	330.915,84	493.905,83	161.843,85	4.084,09	<b>1.093.145,08</b>
2018	1.905,32	91.462,14	305.828,79	467.293,91	149.860,22	3.658,26	<b>1.020.008,64</b>
2019	1.680,75	65.844,11	237.097,02	334.239,57	111.141,21	3.246,24	<b>753.248,91</b>
2020	1.108,65	37.178,10	168.751,82	280.763,38	86.578,43	2.958,24	<b>577.338,62</b>
2021	1.189,82	51.408,04	187.132,42	280.719,14	96.361,04	3.407,97	<b>620.218,43</b>
2022	1.031,98	51.719,27	205.881,07	287.378,05	101.872,34	3.070,35	<b>650.953,06</b>
2023	950,21	46.962,27	200.072,83	288.146,06	98.217,88	3.486,00	<b>637.835,27</b>
2024	935,96	46.023,02	198.072,10	286.705,33	97.235,70	3.451,14	<b>632.423,25</b>

The data are shown graphically for a better understanding of the evolution:





**Figure 2.** Diffuse emissions by type of emitting activity

Below are the values segregated by emission sources, as shown in the municipal carbon footprint calculation tool.

### 2.2.2. Emissions derived from the generation of electricity consumed by the municipality in the different sectors

Firstly, the emissions derived from electricity consumption in the period 2005-2024 are shown:





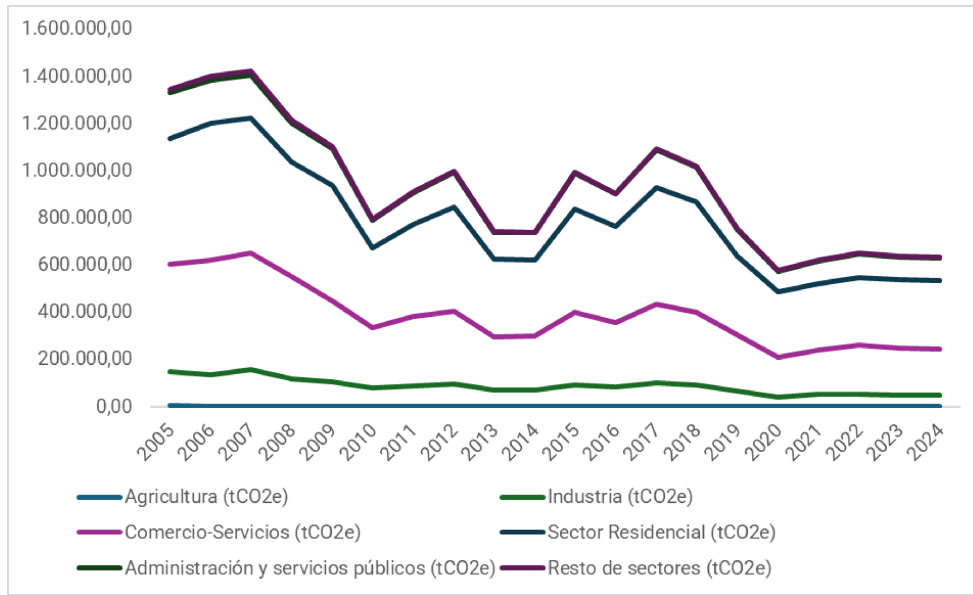
**Table 3.** Evolution of emissions derived from electricity consumption (tCO<sub>2e</sub>).

Year	Agriculture (tCO <sub>2e</sub> )	Industry (tCO <sub>2e</sub> )	Trade-Services (tCO <sub>2e</sub> )	Residential Sector (tCO <sub>2e</sub> )	Administration and public services (tCO <sub>2e</sub> )	Other sectors (tCO <sub>2e</sub> )	Total (tCO <sub>2e</sub> )
2005	4.098,80	143.084,00	453.936,74	537.289,24	192.691,92	14.618,17	1.345.718,86
2006	2.447,28	131.076,88	484.925,32	581.976,12	183.704,84	18.145,16	1.402.275,60
2007	2.638,80	151.942,95	494.696,70	572.637,15	183.393,00	17.121,60	1.422.430,20
2008	1.846,80	114.365,60	435.928,00	485.474,00	162.797,60	14.636,00	1.215.048,00
2009	2.081,88	102.542,15	340.737,48	493.749,00	152.870,76	9.479,88	1.101.461,15
2010	1.437,52	76.694,81	258.021,12	334.930,12	118.079,92	3.636,08	792.799,57
2011	1.946,49	87.192,11	293.403,59	388.129,69	137.907,72	4.202,76	912.782,36
2012	2.623,98	93.698,73	307.705,11	440.228,62	149.674,19	4.342,89	998.273,52
2013	1.767,12	69.446,50	224.283,58	329.272,07	113.751,06	2.886,86	741.407,20
2014	1.642,74	69.378,06	228.065,29	320.672,52	116.576,55	2.999,72	739.334,87
2015	2.289,55	91.083,39	304.819,26	439.255,18	153.210,90	3.740,26	994.398,54
2016	1.681,28	81.524,07	273.972,35	408.050,18	135.000,89	3.044,86	903.273,63
2017	2.344,05	100.051,42	330.915,84	493.905,83	161.843,85	4.084,09	1.093.145,08
2018	1.905,32	91.462,14	305.828,79	467.293,91	149.860,22	3.658,26	1.020.008,64
2019	1.680,75	65.844,11	237.097,02	334.239,57	111.141,21	3.246,24	753.248,91
2020	1.108,65	37.178,10	168.751,82	280.763,38	86.578,43	2.958,24	577.338,62
2021	1.189,82	51.408,04	187.132,42	280.719,14	96.361,04	3.407,97	620.218,43
2022	1.031,98	51.719,27	205.881,07	287.378,05	101.872,34	3.070,35	650.953,06
2023	950,21	46.962,27	200.072,83	288.146,06	98.217,88	3.486,00	637.835,27
2024	935,96	46.023,02	198.072,10	286.705,33	97.235,70	3.451,14	632.423,25





This same information is represented in the following graph:



**Figure 3.** History of emissions from electricity consumption.

### 2.2.3. Emissions from road traffic

The emissions from road traffic in the period 2005-2024 are shown:





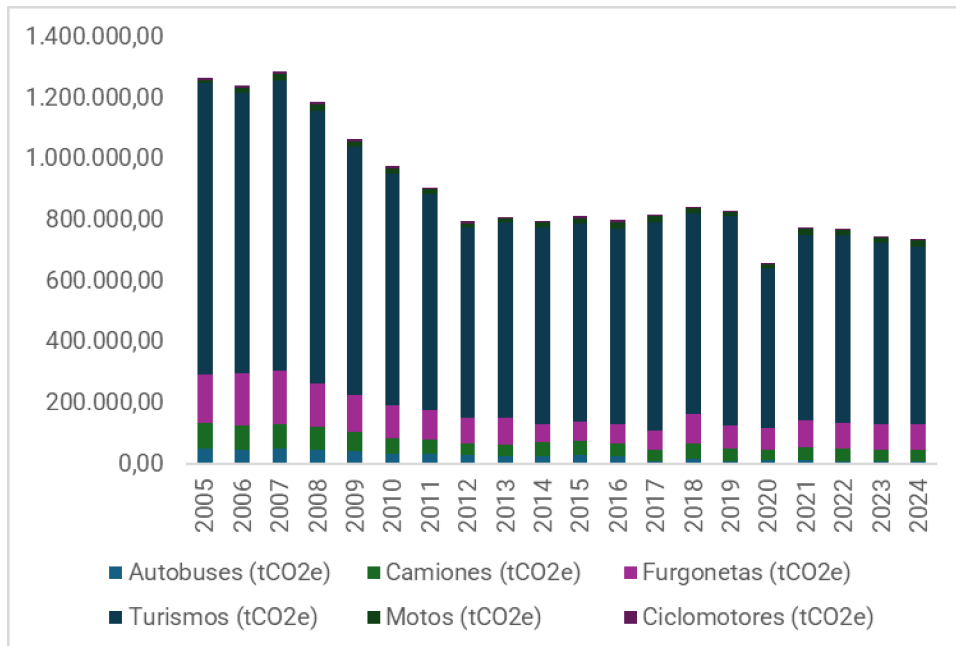
**Table 4.** Evolution of emissions from road traffic (tCO<sub>2</sub>e).

Year	Buses (tCO <sub>2</sub> e)	Trucks (tCO <sub>2</sub> e)	Vans (tCO <sub>2</sub> e)	Passenger cars (tCO <sub>2</sub> e)	Motorcycles (tCO <sub>2</sub> e)	Mopeds (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	50.271,47	83.503,35	158.143,91	958.183,80	9.931,20	7.664,54	1.267.698,27
2006	47.161,73	76.747,73	172.024,10	920.018,67	17.632,55	8.859,24	1.242.444,02
2007	50.165,06	79.940,17	175.863,75	953.503,80	19.667,11	8.921,64	1.288.061,53
2008	46.948,65	73.039,29	145.627,69	892.002,20	19.608,09	8.074,29	1.185.300,21
2009	41.742,08	62.805,58	120.121,41	815.374,75	18.063,67	6.765,65	1.064.873,15
2010	33.963,90	51.840,15	108.811,96	758.275,09	17.436,64	6.246,69	976.574,42
2011	33.458,53	47.759,93	97.033,70	707.048,11	17.031,01	5.851,55	908.182,84
2012	29.193,20	38.804,99	82.169,45	624.654,67	15.817,87	5.311,94	795.952,10
2013	26.268,49	35.752,80	87.686,65	641.487,53	14.644,89	4.934,35	810.774,72
2014	25.445,21	46.399,49	59.508,04	642.876,86	16.765,02	5.585,03	796.579,65
2015	27.964,02	46.538,95	63.765,58	651.782,61	17.207,32	5.531,85	812.790,33
2016	24.911,06	43.297,89	62.746,68	643.021,89	20.058,70	5.587,02	799.623,24
2017	9.441,91	36.291,34	64.596,41	682.747,06	19.534,63	5.154,96	817.766,31
2018	18.697,16	46.443,58	97.526,56	658.700,44	15.585,83	3.735,79	840.689,36
2019	8.403,84	39.897,98	76.810,70	687.572,39	15.728,89	3.659,64	832.073,45
2020	13.685,66	32.603,07	72.486,40	522.950,21	12.527,63	2.923,56	657.176,52
2021	14.471,93	38.205,45	91.688,56	606.810,01	19.349,56	5.370,67	775.896,19
2022	8.950,33	39.705,82	87.136,88	613.895,50	17.439,32	3.763,66	770.891,52
2023	8.038,27	37.897,25	86.094,67	591.814,83	19.836,85	3.595,09	747.276,95
2024	7.636,36	37.139,31	85.233,72	582.937,61	20.233,59	3.559,14	736.739,79





This same information is represented in the following graph:



**Figure 4.** Evolution of emissions from road traffic (tCO<sub>2</sub>e).

As can be seen in the table and graph, the evolution of emissions from road traffic has decreased significantly since the base year 2005.

#### 2.2.4. Emissions from fossil fuel consumption in fixed installations

The emissions derived from the consumption of fossil fuels in fixed installations in the period 2005-2024 are shown:



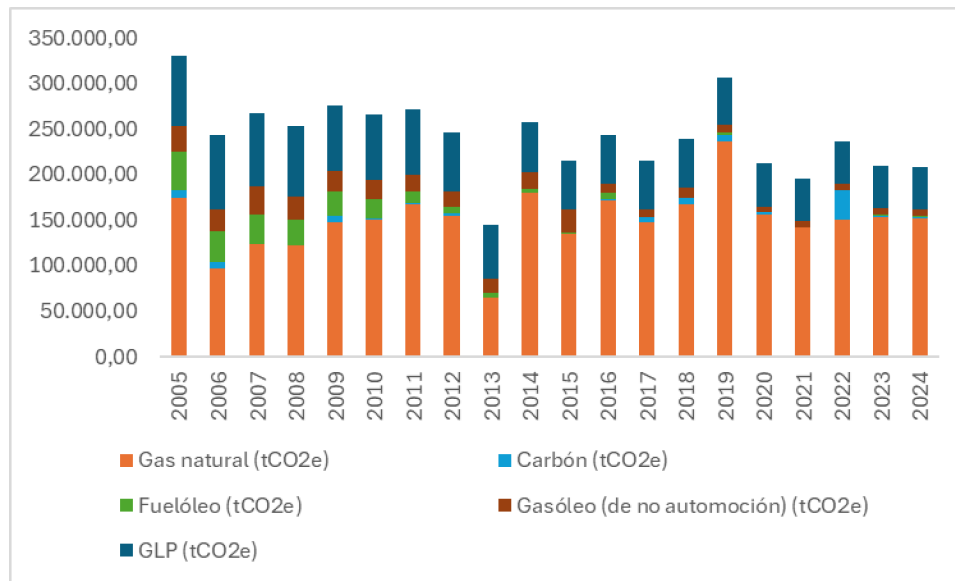
**Table 5.** Evolution of emissions derived from the consumption of fossil fuels in fixed installations (tCO<sub>2</sub>e).

Year	Natural gas (tCO <sub>2</sub> e)	Coal (tCO <sub>2</sub> e)	Fuel oil (tCO <sub>2</sub> e)	Diesel (non-automotive) (tCO <sub>2</sub> e)	LPG (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	174.041,83	9.195,11	41.251,92	27.899,08	77.866,47	330.254,41
2006	96.628,57	6.952,05	33.930,00	24.486,94	80.692,58	242.690,15
2007	123.321,32	0,00	32.658,17	30.887,72	80.786,63	267.653,85
2008	121.999,89	0,00	28.645,26	25.233,73	77.436,45	253.315,33
2009	148.062,92	6.825,39	26.465,67	22.807,68	71.182,33	275.344,00
2010	150.704,56	1.227,23	20.565,53	21.660,68	71.568,68	265.726,69
2011	167.418,14	1.650,00	11.919,36	18.878,44	71.474,52	271.340,46
2012	154.317,31	3.602,76	6.097,32	17.351,58	64.126,87	245.495,85
2013	64.216,25	816,35	5.894,37	14.604,91	59.901,05	145.432,93
2014	179.618,13	827,94	3.050,46	18.606,94	54.487,71	256.591,17
2015	134.582,70	805,79	737,22	25.104,36	53.375,49	214.605,57
2016	171.071,21	1.568,94	7.775,11	9.906,70	53.517,03	243.838,99
2017	147.313,77	5.670,13	0,00	9.277,05	52.338,39	214.599,35
2018	167.991,11	6.960,15	0,00	9.926,58	54.080,25	238.958,09
2019	236.089,44	6.842,89	3.769,09	8.025,58	51.216,29	305.943,30
2020	156.680,31	2.162,36	0,00	5.868,46	47.800,33	212.511,47
2021	142.284,66	0,00	0,00	6.503,61	46.446,24	195.234,50
2022	150.432,01	32.679,39	345,73	6.549,74	46.402,65	236.409,51
2023	153.680,12	580,48	1.943,44	7.366,14	46.492,39	210.062,58
2024	152.143,32	522,43	1.846,27	7.292,48	46.027,47	207.831,97





This same information is represented in the following graph:



**Figure 5.** Evolution of emissions derived from the consumption of fossil fuels in fixed installations (tCO<sub>2</sub>e).

As can be seen in the table and graph, the evolution of emissions derived from fossil fuel consumption in fixed installations has decreased insignificantly.

### 2.2.5. Emissions from waste management and wastewater treatment

Emissions from waste management and wastewater treatment in the period 2005-2024 are shown:

**Table 6.** Evolution of emissions derived from waste management (tCO<sub>2</sub>e).

Waste management				
Year	Landfill (tCO <sub>2</sub> e)	Compost (tCO <sub>2</sub> e)	Biogas (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	225.487,23	11.121,07	0,00	236.608,30
2006	57.813,24	11.058,78	18,90	68.890,92
2007	59.150,20	10.999,41	19,34	70.168,95
2008	60.390,04	11.008,60	19,75	71.418,38
2009	61.562,71	10.565,19	20,13	72.148,04
2010	62.503,11	8.364,72	20,44	70.888,26
2011	62.568,35	16.011,05	20,46	78.599,87
2012	61.925,03	17.822,95	20,25	79.768,22
2013	61.384,10	15.493,40	20,07	76.897,57
2014	60.524,76	15.903,46	19,79	76.448,01
2015	59.698,95	15.245,95	19,52	74.964,42
2016	58.994,91	14.478,55	19,29	73.492,76
2017	58.306,11	13.383,31	19,07	71.708,48





Waste management				
Year	Landfill (tCO <sub>2</sub> e)	Compost (tCO <sub>2</sub> e)	Biogas (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2018	57.743,55	13.661,38	18,88	71.423,82
2019	57.223,43	13.002,25	18,71	70.244,40
2020	56.753,59	9.916,03	18,56	66.688,17
2021	56.820,32	11.787,69	18,58	68.626,59
2022	56.943,98	12.848,57	18,62	69.811,17
2023	57.009,13	13.222,55	18,64	70.250,32
2024	57.123,15	13.486,00	18,73	70.627,88

**Table 7.** Evolution of emissions from wastewater treatment (tCO<sub>2</sub>e).

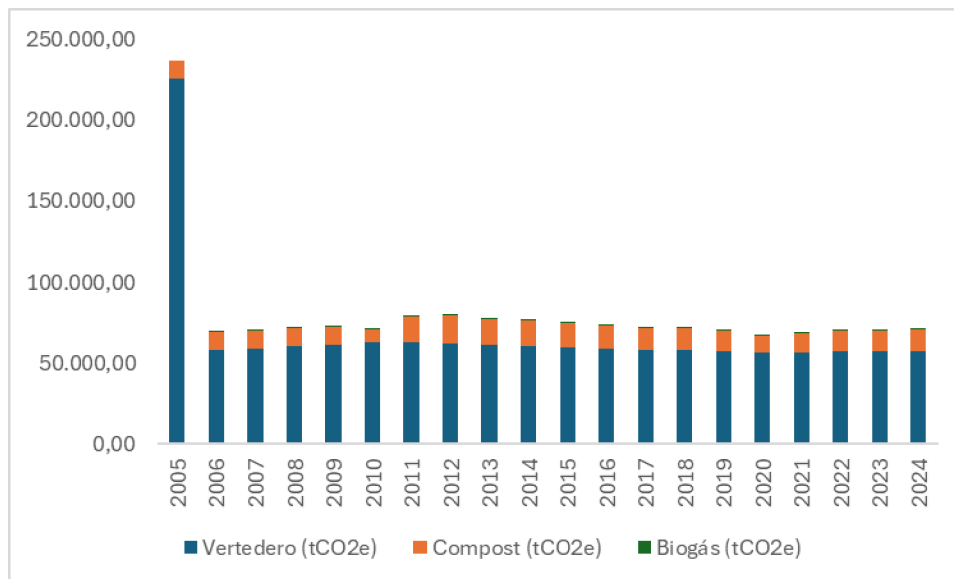
Wastewater Treatment				
Year	Protein consumption (tCO <sub>2</sub> e)	Degradation in WWTPs (tCO <sub>2</sub> e)	Biogas WWTP (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	9.546,28	234.798,92	0,00	244.345,20
2006	9.325,77	233.964,12	0,00	243.289,89
2007	9.352,14	162.595,39	6,86	171.954,39
2008	10.086,53	179.838,47	5,28	189.930,28
2009	9.912,54	174.226,07	5,66	184.144,26
2010	9.717,13	183.047,31	4,88	192.769,33
2011	9.643,31	182.684,13	5,08	192.332,52
2012	9.646,01	134.435,46	9,78	144.091,26
2013	9.773,95	180.996,17	5,13	190.775,25
2014	9.526,49	177.583,23	5,36	187.115,08
2015	9.401,30	173.356,13	5,67	182.763,10
2016	9.434,57	163.542,61	6,56	172.983,75
2017	9.062,44	164.191,71	6,38	173.260,53
2018	9.012,00	142.677,55	8,50	151.698,05
2019	11.064,59	147.900,37	7,61	158.972,57
2020	11.644,51	151.893,20	7,29	163.545,00
2021	10.626,50	142.494,98	7,81	153.129,29
2022	9.686,18	117.197,53	7,93	126.891,64
2023	9.507,81	116.383,49	7,84	125.899,14
2024	9.412,73	114.055,82	7,88	123.476,43



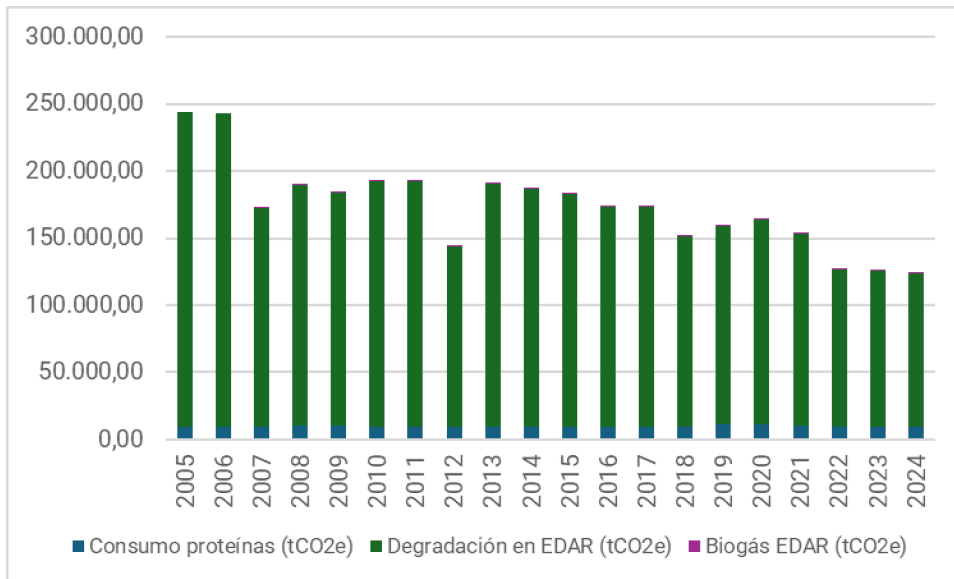
**Table 8.** Evolution of emissions from waste management and wastewater treatment (tCO<sub>2</sub>e).

Year	Waste management (tCO <sub>2</sub> e)	AARR Treatment (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	236.608,30	244.345,20	480.953,50
2006	68.890,92	243.289,89	312.180,81
2007	70.168,95	171.954,39	242.123,34
2008	71.418,38	189.930,28	261.348,66
2009	72.148,04	184.144,26	256.292,29
2010	70.888,26	192.769,33	263.657,59
2011	78.599,87	192.332,52	270.932,39
2012	79.768,22	144.091,26	223.859,48
2013	76.897,57	190.775,25	267.672,82
2014	76.448,01	187.115,08	263.563,08
2015	74.964,42	182.763,10	257.727,52
2016	73.492,76	172.983,75	246.476,51
2017	71.708,48	173.260,53	244.969,02
2018	71.423,82	151.698,05	223.121,86
2019	70.244,40	158.972,57	229.216,97
2020	66.688,17	163.545,00	230.233,18
2021	68.626,59	153.129,29	221.755,87
2022	69.811,17	126.891,64	196.702,81
2023	70.250,32	125.899,14	196.149,46
2024	70.627,88	123.476,43	194.104,31

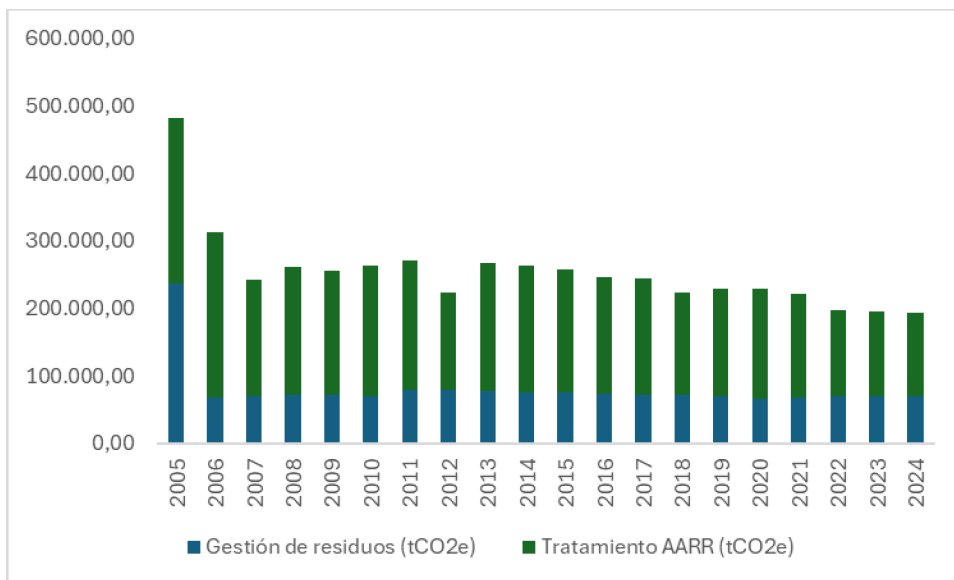
This same information is represented in the following graphs:



**Figure 6.** Evolution of emissions derived from waste management (tCO<sub>2</sub>e).



**Figure 7.** Evolution of emissions from wastewater treatment (tCO<sub>2</sub>e).



**Figure 8.** Evolution of emissions from waste management and wastewater treatment (tCO<sub>2</sub>e).

As can be seen in the table and graph, the evolution of emissions from waste management has decreased very significantly in 2006 and has remained slightly decreasing since that year.

Regarding emissions from wastewater treatment, these have also decreased significantly.



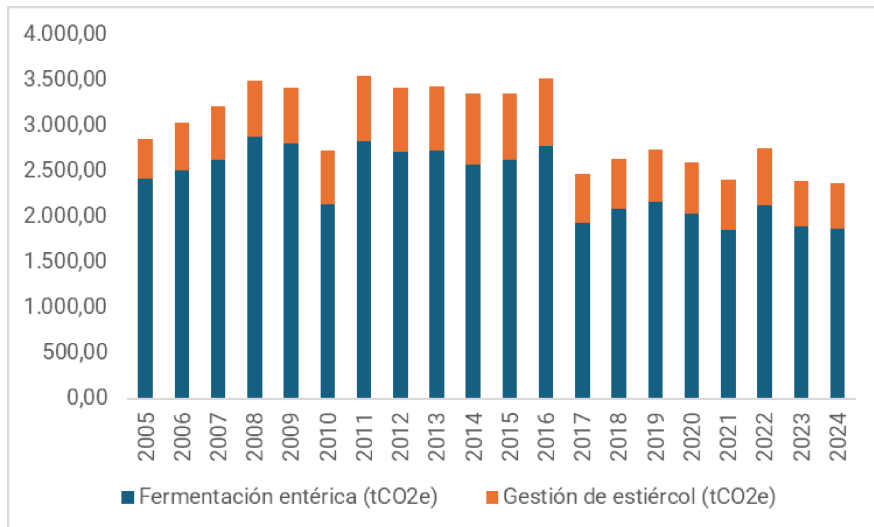
## 2.2.6. Emissions from livestock and agriculture

Emissions from livestock and agriculture in the period 2005-2024 are shown:

**Table 8.** Evolution of emissions from livestock farming (tCO<sub>2</sub>e).

Livestock			
Year	Enteric fermentation (tCO <sub>2</sub> e)	Manure management (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	2.409,72	444,18	2.853,91
2006	2.501,71	529,18	3.030,90
2007	2.625,09	580,18	3.205,27
2008	2.878,99	617,69	3.496,69
2009	2.805,75	608,49	3.414,24
2010	2.129,90	589,84	2.719,74
2011	2.821,34	724,33	3.545,67
2012	2.706,72	711,38	3.418,10
2013	2.720,81	704,79	3.425,60
2014	2.572,87	782,31	3.355,18
2015	2.618,60	736,01	3.354,61
2016	2.771,02	745,91	3.516,93
2017	1.925,91	546,60	2.472,52
2018	2.077,45	555,51	2.632,95
2019	2.164,13	575,18	2.739,31
2020	2.028,09	560,51	2.588,60
2021	1.847,50	553,43	2.400,93
2022	2.123,09	619,44	2.742,53
2023	1.889,02	505,04	2.394,06
2024	1.870,13	499,99	2.370,12

This same information is represented in the following graph:



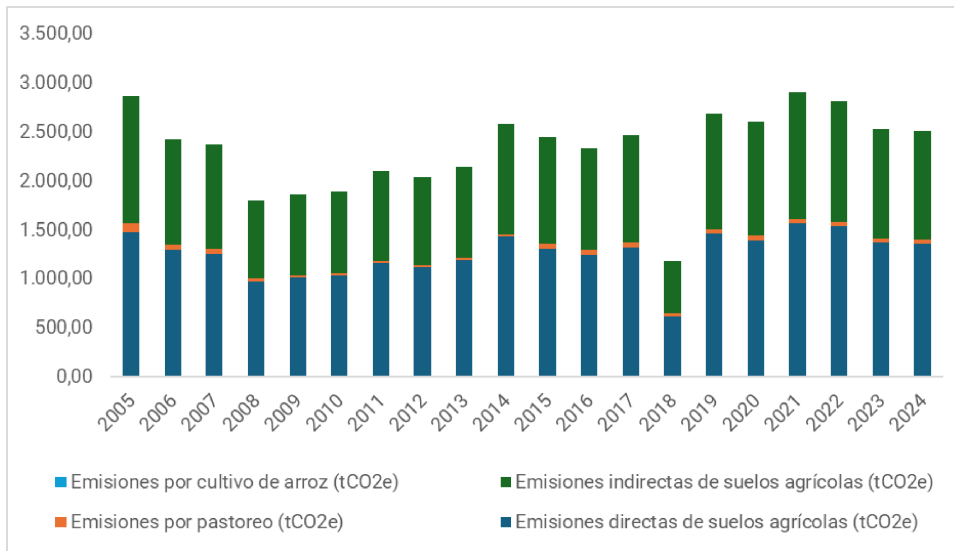
**Figure 9.** Evolution of emissions from livestock farming (tCO<sub>2</sub>e).

**Table 9.** Evolution of emissions from agriculture (tCO<sub>2</sub>e).

Agriculture					
Year	Direct emissions from agricultural soils (tCO <sub>2</sub> e)	Grazing emissions (tCO <sub>2</sub> e)	Indirect emissions from agricultural soils (tCO <sub>2</sub> e)	Emissions from rice cultivation (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	1.479,09	85,89	1.307,02	0,00	2.872,00
2006	1.300,15	45,65	1.080,76	0,00	2.426,56
2007	1.254,81	54,71	1.067,25	0,00	2.376,77
2008	974,95	29,35	799,04	0,00	1.803,34
2009	1.012,97	26,74	819,82	0,00	1.859,54
2010	1.038,91	22,57	832,31	0,00	1.893,79
2011	1.163,09	22,54	918,09	0,00	2.103,71
2012	1.118,71	20,82	896,88	0,00	2.036,41
2013	1.194,37	14,78	935,35	0,00	2.144,49
2014	1.435,06	20,07	1.131,69	0,00	2.586,81
2015	1.309,84	53,11	1.090,70	0,00	2.453,65
2016	1.242,95	58,97	1.034,00	0,00	2.335,92
2017	1.320,13	54,91	1.092,64	0,00	2.467,68
2018	613,00	38,84	525,75	0,00	1.177,59
2019	1.461,76	42,03	1.187,35	0,00	2.691,14
2020	1.395,06	50,09	1.162,01	0,00	2.607,16
2021	1.571,77	45,22	1.288,10	0,00	2.905,10
2022	1.535,79	41,98	1.234,52	0,00	2.812,29
2023	1.375,53	39,40	1.119,05	0,00	2.533,97
2024	1.361,77	38,61	1.107,86	0,00	2.508,24

This same information is represented in the following graph:





**Figure 10.** Evolution of emissions from agriculture (tCO<sub>2</sub>e).

As can be seen in the tables and graphs, the evolution of emissions derived from both livestock and agriculture has decreased insignificantly, although we must highlight the low relevance of these sectors in the city of Seville.

### 2.2.7. F-gas emissions

The emissions from F-gas leaks in the period 2005-2024 are shown:

**Table 10.** Evolution of emissions from fluorinated gas leaks (tCO<sub>2</sub>e).

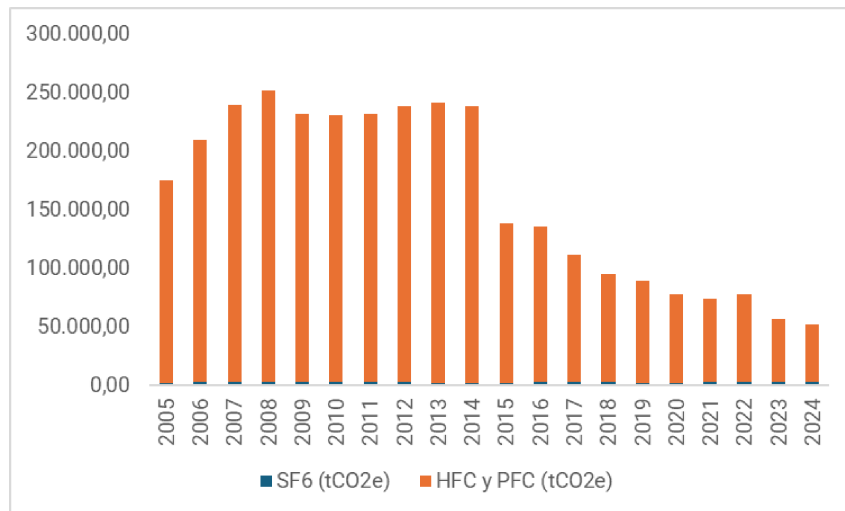
Year	SF6 (tCO <sub>2</sub> e)	HFCs and PFCs (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2005	2.684,19	172.107,64	174.791,83
2006	3.037,08	206.585,07	209.622,15
2007	3.084,28	236.886,17	239.970,45
2008	2.993,96	249.376,01	252.369,97
2009	3.027,58	228.489,24	231.516,82
2010	2.984,80	227.830,83	230.815,63
2011	2.985,07	228.841,06	231.826,13
2012	2.855,01	235.794,64	238.649,65
2013	2.732,88	238.935,44	241.668,32
2014	2.600,62	236.288,37	238.888,99
2015	2.732,94	135.587,89	138.320,84
2016	2.777,02	132.983,29	135.760,32
2017	2.778,06	108.685,97	111.464,03
2018	2.760,32	92.705,03	95.465,35
2019	2.689,38	86.949,46	89.638,84
2020	2.654,81	75.043,72	77.698,53
2021	2.853,74	71.836,31	74.690,04





Year	SF6 (tCO <sub>2</sub> e)	HFCs and PFCs (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
2022	3.041,12	74.667,50	77.708,62
2023	3.087,61	53.830,76	56.918,37
2024	3.118,49	49.524,30	52.642,79

This same information is represented in the following graph:



**Figure 11.** History emissions from fluorinated gas leaks (tCO<sub>2</sub>e).

As can be seen in the table and graph, the evolution of emissions from F-gas leaks has decreased very significantly in the period of analysis.

### 2.3. Emissions Summary

This report details the evolution of Greenhouse Gas (GHG) emissions and energy consumption based on activity data between 2005 and 2024 (estimated).

Emissions have shown a significant downward trend over the past two decades.

- **Total emissions:** 3,605,142.77 tCO<sub>2</sub>e were recorded in 2005, a figure that has been reduced to an estimated **1,831,000.00 tCO<sub>2</sub>e** in 2024.
- **Per capita emissions:** have fallen from **3.21 tCO<sub>2</sub>e/inhabitant** in 2005 to **1.75 tCO<sub>2</sub>e/inhabitant** projected for 2024.
- **Sink capacity:** it has remained stable since 2009 at **526.22 tCO<sub>2</sub>e**, with the annual crop area converted to woody being the largest contributor (**384.90 tCO<sub>2</sub>e**).

The analysis by emitting activity allows us to identify the main sources of environmental impact.

- **Transport and road traffic:** this is the sector with the greatest weight in diffuse emissions.
  - Total road traffic went from **1,267,698.27 tCO<sub>2</sub>e** (2005) to **736,739.79 tCO<sub>2</sub>e** (2024).





- Passenger cars account for the majority of these emissions, with **582,937.61 tCO<sub>2</sub>e** by 2024.

➤ **Waste and Wastewater:**

- Emissions from **waste management** fell drastically from 236,608.30 tCO<sub>2</sub>e in 2005 to 70,627.88 tCO<sub>2</sub>e in 2024.
- Wastewater treatment fell from 244,345.20 tCO<sub>2</sub>e to 123,476.43 tCO<sub>2</sub>e in the same period.

➤ **Other Diffuse Sectors (2024 projection data):**

- **Fossil fuels (Fixed installations):** 207,961.95 tCO<sub>2</sub>e.
- **Fluorinated gases (Leaks):** 52,933.08 tCO<sub>2</sub>e.
- **Livestock:** 2,370.12 tCO<sub>2</sub>e.
- **Agriculture:** 2,508.63 tCO<sub>2</sub>e.

**Energy Consumption and Electricity:** energy consumption is a fundamental pillar in the generation of derived emissions.

- **Evolution of electricity consumption:** total electricity consumption has fallen from **2,751,981.31 MWh** (2005) to **2,462,981.02 MWh** (2024).
- **Residential sector:** it is the largest consumer of electricity with **1,113,795.35 MWh** (2024).
- **Renewable Energies:** total consumption of renewables reaches **369,528.18 MWh** by 2024, highlighting the bio fraction of fuels (**241,824.01 MWh**) and the incipient appearance of biomass and solar thermal in recent years.

### 2.3.1. Sinkhole Capacity Evolution

The evolution of sink capacity in the period 2005-2024 is shown:

*Table 11. Evolution of the sump capacity by type of surface (tCO<sub>2</sub>e).*

Year	Sump capacity (tCO <sub>2</sub> e)	Wooded forest area (tCO <sub>2</sub> e)	Thick pasture surface (tCO <sub>2</sub> e)	Annual cropping area converted to woody cropping (tCO <sub>2</sub> e)	Area of agricultural land converted to forest (tCO <sub>2</sub> e)
2005	462,07	139,49	1,83	320,75	0,00
2006	483,45	139,49	1,83	342,13	0,00
2007	504,84	139,49	1,83	363,51	0,00
2008	526,22	139,49	1,83	384,90	0,00
2009	526,22	139,49	1,83	384,90	0,00
2010	526,22	139,49	1,83	384,90	0,00
2011	526,22	139,49	1,83	384,90	0,00
2012	526,22	139,49	1,83	384,90	0,00
2013	526,22	139,49	1,83	384,90	0,00
2014	526,22	139,49	1,83	384,90	0,00





Year	Sump capacity (tCO <sub>2</sub> e)	Wooded forest area (tCO <sub>2</sub> e)	Thick pasture surface (tCO <sub>2</sub> e)	Annual cropping area converted to woody cropping (tCO <sub>2</sub> e)	Area of agricultural land converted to forest (tCO <sub>2</sub> e)
2015	526,22	139,49	1,83	384,90	0,00
2016	526,22	139,49	1,83	384,90	0,00
2017	526,22	139,49	1,83	384,90	0,00
2018	526,22	139,49	1,83	384,90	0,00
2019	526,22	139,49	1,83	384,90	0,00
2020	526,22	139,49	1,83	384,90	0,00
2021	526,22	139,49	1,83	384,90	0,00
2022	526,22	139,49	1,83	384,90	0,00
2023	526,22	139,49	1,83	384,90	0,00
2024	526,22	139,49	1,83	384,90	0,00

This same information is represented in the following graph:

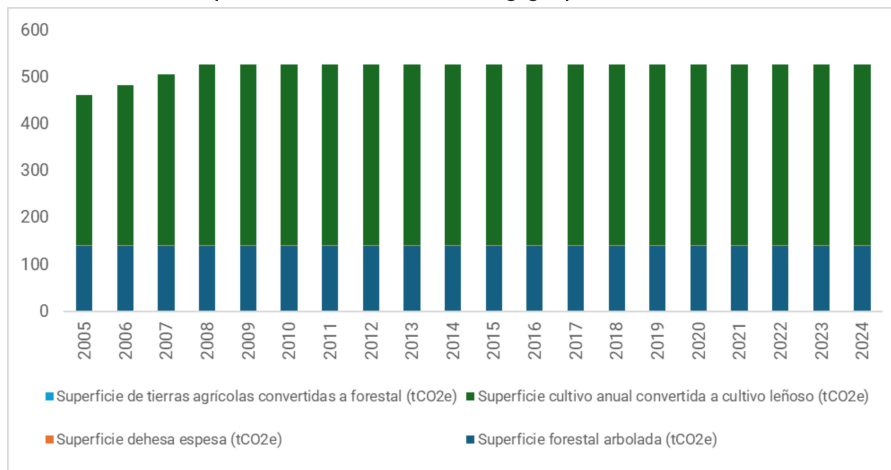


Figure 12. Evolution of the sump capacity by type of surface (tCO<sub>2</sub>e).

As can be seen in the table and graph, the evolution of sink capacity has remained stable.

## 2.4. Electrical power consumption

This section shows the energy situation of the municipality, providing the value both aggregated and segregated by type of consumption.

The electricity consumption by sector in the period 2005-2024 is shown:





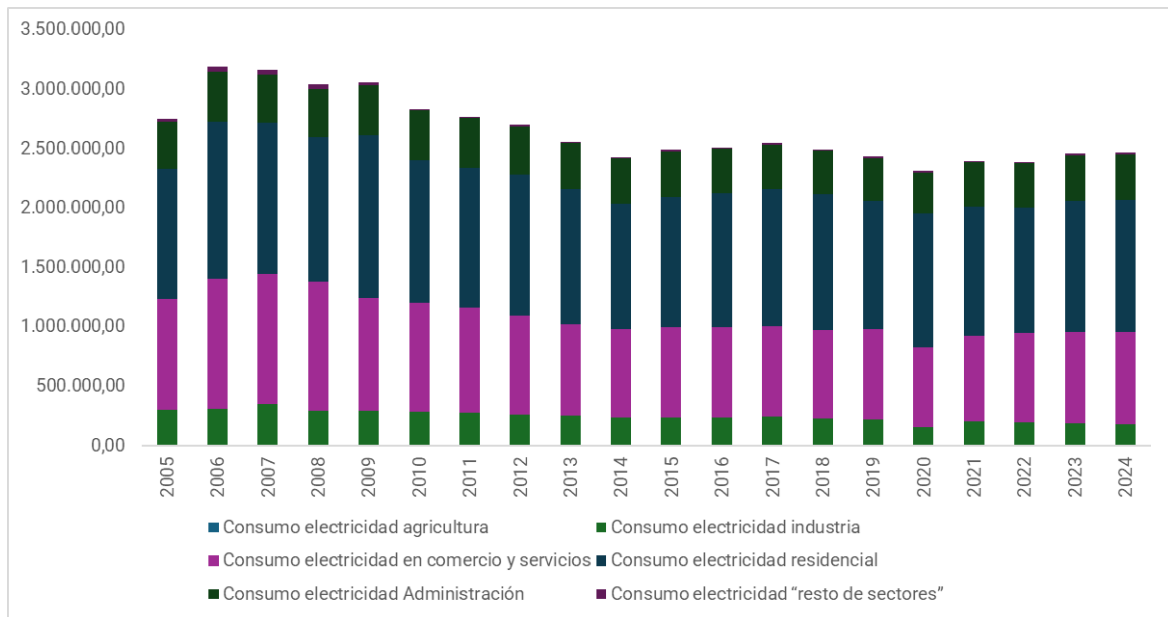
**Table 12.** Evolution of electricity consumption by sector (MWh).

Year	Electricity consumption agriculture	Industry electricity consumption	Electricity consumption in commerce and services	Residential electricity consumption	Electricity consumption Administration	Electricity consumption "other sectors"	Total electricity consumption	Electricity consumption per capita (MWh/inhabitant)
2005	8.382,00	292.605,31	928.296,00	1.098.751,00	394.053,00	29.894,00	2.751.981,31	3,91
2006	5.562,00	297.902,00	1.102.103,00	1.322.673,00	417.511,00	41.239,00	3.186.990,00	4,54
2007	5.864,00	337.651,00	1.099.326,00	1.272.527,00	407.540,00	38.048,00	3.160.956,00	4,52
2008	4.617,00	285.914,00	1.089.820,00	1.213.685,00	406.994,00	36.590,00	3.037.620,00	4,33
2009	5.783,00	284.839,30	946.493,00	1.371.525,00	424.641,00	26.333,00	3.059.614,30	4,35
2010	5.134,00	273.910,02	921.504,00	1.196.179,00	421.714,00	12.986,00	2.831.427,02	4,02
2011	5.898,45	264.218,51	889.101,80	1.176.150,58	417.902,18	12.735,63	2.766.007,15	3,94
2012	7.091,85	253.239,80	831.635,44	1.189.807,07	404.524,84	11.737,54	2.698.036,54	3,85
2013	6.093,53	239.470,69	773.391,67	1.135.420,94	392.245,03	9.954,69	2.556.576,55	3,66
2014	5.386,02	227.469,04	747.755,05	1.051.385,30	382.218,20	9.835,14	2.424.048,75	3,49
2015	5.723,88	227.708,48	762.048,14	1.098.137,96	383.027,24	9.350,66	2.485.996,36	3,59
2016	4.670,22	226.455,76	761.034,30	1.133.472,73	375.002,48	8.457,94	2.509.093,43	3,64
2017	5.451,27	232.677,71	769.571,73	1.148.618,20	376.381,05	9.497,89	2.542.197,85	3,69
2018	4.647,11	223.078,38	745.923,88	1.139.741,25	365.512,74	8.922,58	2.487.825,94	3,61
2019	5.421,78	212.400,36	764.829,10	1.078.192,17	358.520,04	10.471,74	2.429.835,19	3,52
2020	4.434,59	148.712,40	675.007,28	1.123.053,52	346.313,72	11.832,96	2.309.354,48	3,36
2021	4.593,90	198.486,63	722.518,99	1.083.857,70	372.050,35	13.158,18	2.394.665,75	3,51
2022	3.780,13	189.447,89	754.143,12	1.052.666,85	373.158,75	11.246,71	2.384.443,46	3,49
2023	3.654,67	180.624,13	769.510,88	1.108.254,08	377.761,09	13.407,71	2.453.212,56	3,58
2024	3.581,58	175.205,41	777.206,99	1.113.795,35	379.649,90	13.541,79	2.462.981,02	3,59





This same information is represented in the following graph:



**Figure 13.** Evolution of electricity consumption by sector (MWh).

As can be seen in the table and graph, the evolution of electricity consumption has decreased insignificantly.

Regarding the specific consumption of the administration, the following table is shown below:

**Table 13.** Evolution of specific electricity consumption (MWh).

Year	Total electricity consumption Administration (MWh)	Fossil electricity consumption Administration (MWh)	Renewable electricity consumption Administration (MWh)	% of renewable electricity compared to total Administration
2005	394.053,00	332.974,79	61.078,22	15,50 %
2006	417.511,00	340.688,98	76.822,02	18,40 %
2007	407.540,00	325.624,46	81.915,54	20,10 %
2008	406.994,00	323.967,22	83.026,78	20,40 %
2009	424.641,00	312.535,78	112.105,22	26,40 %
2010	421.714,00	281.704,95	140.009,05	33,20 %
2011	417.902,18	288.352,50	129.549,68	31,00 %
2012	404.524,84	282.762,86	121.761,98	30,10 %
2013	392.245,03	234.562,53	157.682,50	40,20 %
2014	382.218,20	227.419,83	154.798,37	40,50 %
2015	383.027,24	329.403,43	53.623,81	14,00 %
2016	375.002,48	327.377,17	47.625,31	12,70 %
2017	376.381,05	356.809,24	19.571,81	5,20 %
2018	365.512,74	347.602,62	17.910,12	4,90 %





Year	Total electricity consumption Administration (MWh)	Fossil electricity consumption Administration (MWh)	Renewable electricity consumption Administration (MWh)	% of renewable electricity compared to total Administration
2019	358.520,04	345.254,80	13.265,24	3,70 %
2020	346.313,72	325.534,90	20.778,82	6,00 %
2021	372.050,35	351.959,63	20.090,72	5,40 %
2022	373.158,75	362.337,14	10.821,60	2,90 %
2023	377.761,09	362.272,89	15.488,20	4,10 %
2024	379.649,90	363.387,29	16.262,61	4,28 %

This same information is represented in the following graph:

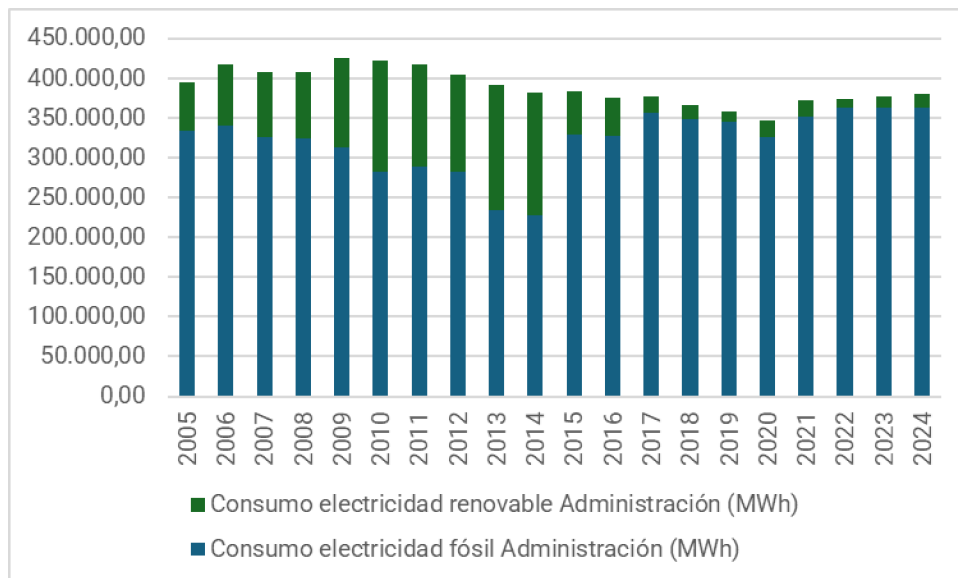


Figure 14. History of electricity consumption by sector (MWh).

### 2.4.1. Overview of electrical energy consumption

The analysis of the data shows a general trend of reduction in total electricity consumption since the beginning of the series, going from a peak of more than **3 million MWh** in 2006 to stabilized values of around **2.4 million MWh** in the most recent years.

- **Total and per capita consumption:**
  - **Peak consumption:** the year 2006 registered the highest total consumption with **3,186,990.00 MWh**.
  - **Historic low:** 2020 marked the lowest point in the series with **2,309,354.48 MWh**, coinciding with the reduction in global activity.
  - **Per capita consumption:** it has progressively decreased from **4.54 MWh/inhabitant** in 2006 to **3.59 MWh/inhabitant** by 2024.
- **Renewable Energies in the Administration:** a significant fluctuation is observed in the origin of the energy consumed by the public administration:





- **Evolution of the renewable percentage:** it reached a maximum of **40.50%** in 2014.
- **Current situation:** after several years with low percentages (reaching 2.90% in 2022), the estimate for 2024 stands at **4.28%** renewable energy compared to the total for the public sector.
- **Associated GHG emissions:** the reduction in consumption and changes in the energy mix have had an impact on emissions derived from electricity.

In **2005**, the electricity consumed in Seville generated **1,345,718.86 tCO<sub>2</sub>e**.

By **2024**, it is estimated that these emissions have fallen to **632,423.25 tCO<sub>2</sub>e**, which represents a reduction of more than 50% compared to the beginning of the period.

## 2.5. Consumption of fossil fuels in fixed installations

Fossil fuel consumption in fixed installations by fuel type in the period 2005-2024 is shown:

**Table 14.** Evolution of fossil fuel consumption in fixed installations by type of fuel (MWh).

Year	Natural Gas (MWh)	Coal (MWh)	Fuel Oil (MWh)	Non-automotive diesel (MWh)	LPG (MWh)	Total consumption (MWh)
2005	867.640,93	26.326,51	152.297,53	107.233,20	336.123,93	1.489.622,11
2006	479.150,08	19.510,27	123.960,97	93.224,36	344.612,13	1.060.457,80
2007	611.510,89	0,00	119.314,44	117.592,79	345.013,76	1.193.431,88
2008	604.958,32	0,00	104.653,54	96.067,44	330.706,24	1.136.385,54
2009	734.196,54	18.764,64	96.690,55	86.831,24	303.996,89	1.240.479,86
2010	747.295,59	3.373,96	75.134,79	82.464,48	305.646,85	1.213.915,68
2011	830.172,86	4.536,25	43.546,58	71.872,20	305.244,74	1.255.372,63
2012	765.210,07	9.904,86	22.276,13	66.059,30	273.865,29	1.137.315,65
2013	318.427,77	2.244,35	21.534,69	55.602,43	255.818,16	653.627,40
2014	889.374,77	2.277,05	10.947,67	69.751,60	239.864,90	1.212.215,99
2015	666.382,96	2.216,15	2.645,77	94.108,43	234.968,71	1.000.322,01
2016	842.549,31	4.315,02	27.903,79	37.137,13	235.591,78	1.147.497,03
2017	728.252,20	15.594,43	0,00	34.776,78	230.403,21	1.009.026,61
2018	833.586,96	19.142,33	0,00	37.211,64	238.071,19	1.128.012,11
2019	1.168.366,28	18.819,83	13.526,75	30.085,41	225.463,53	1.456.261,79
2020	776.629,36	5.947,09	0,00	21.999,02	210.425,84	1.015.001,31
2021	703.515,77	0,00	0,00	24.379,99	204.464,86	932.360,63
2022	746.323,78	89.877,30	1.240,76	24.552,95	204.272,98	1.066.267,76
2023	761.894,02	1.596,49	6.974,73	27.613,38	204.668,02	1.002.746,65
2024	769.512,96	1.277,19	6.626,99	27.889,51	202.621,34	1.007.928,00

This same information is represented in the following graph:



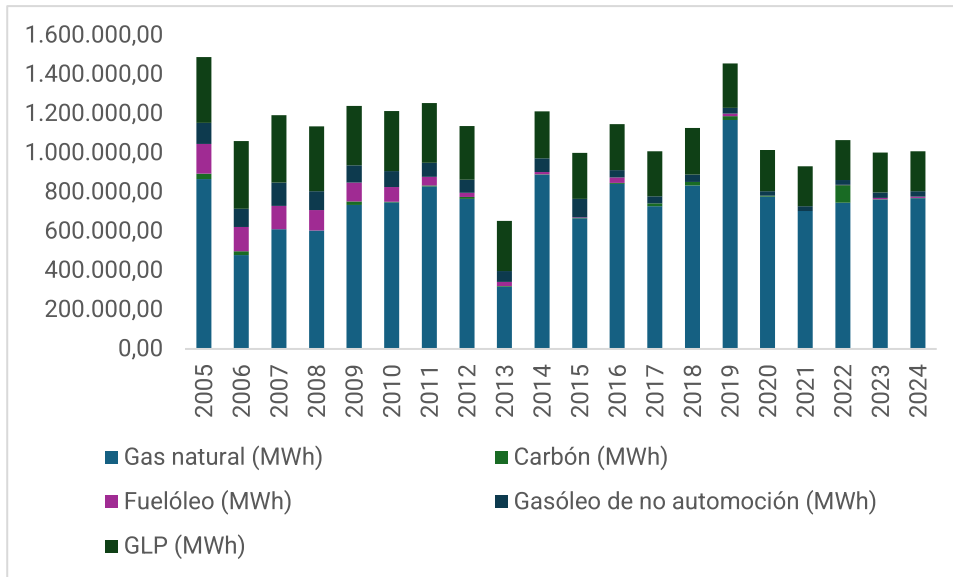


Figure 15. Evolution of fossil fuel consumption in fixed installations by type of fuel (MWh).

As can be seen in the table and graph, the evolution of fossil fuel consumption in fixed installations has decreased insignificantly.

### 2.5.1. Summary of fossil fuel consumption

The consumption of fossil fuels in fixed installations has shown a general downward trend, going from a maximum of **1,489,622.11 MWh** in 2005 to a projected value of **1,007,928.00 MWh** by the end of 2024. This represents a cumulative reduction of approximately **32.3%** over the last two decades.

**Dynamics of total consumption:** the behaviour of consumption has not been linear, highlighting several milestones:

- **Record low (2013):** a drastic drop was recorded to **653,627.40 MWh**, mainly driven by a collapse in the use of natural gas.
- **Recovery and stabilisation:** after 2013, consumption was once again above one million MWh, with a notable rebound in 2019 (**1,456,261.79 MWh**) before stabilising at around one million in the most recent years (2023-2024).

**Impact on GHG emissions:** the reduction in consumption and the substitution of more polluting fuels (such as fuel oil and coal) with less intensive ones has had a direct impact on emissions:

- **Total emissions from the sector:** they have gone from **330,254.41 tCO<sub>2</sub>e** in 2005 to a projection of **207,831.97 tCO<sub>2</sub>e** in 2024.
- **Relative efficiency:** despite the fact that total energy consumption fell by 32%, emissions from this specific sector were reduced by **37%**, suggesting an improvement in the energy mix of these fuels.

## 2.6. Automotive fuel consumption

Automotive fuel consumption by fuel type in the period 2005-2024 is shown:

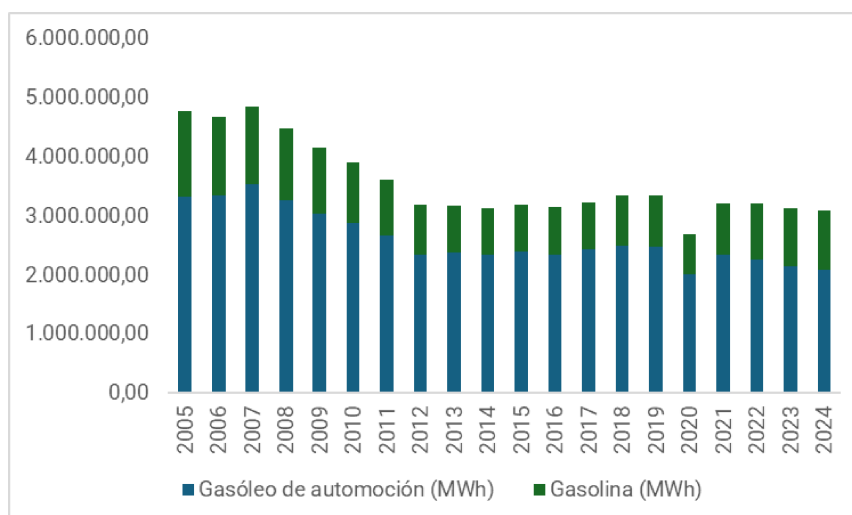




**Table 15.** Evolution of automotive fuel consumption by fuel type (MWh).

Year	Automotive diesel (MWh)	Petrol (MWh)	Total consumption (MWh)
2005	3.328.953,37	1.448.695,98	4.777.649,35
2006	3.338.553,52	1.346.767,67	4.685.321,19
2007	3.543.640,06	1.316.811,02	4.860.451,08
2008	3.272.702,22	1.202.359,09	4.475.061,31
2009	3.041.572,78	1.117.695,56	4.159.268,33
2010	2.887.416,55	1.026.415,09	3.913.831,64
2011	2.674.001,92	947.211,30	3.621.213,22
2012	2.340.967,61	851.575,69	3.192.543,30
2013	2.382.904,52	793.425,65	3.176.330,16
2014	2.335.878,62	791.372,69	3.127.251,31
2015	2.404.801,20	785.971,17	3.190.772,38
2016	2.348.209,37	798.053,76	3.146.263,13
2017	2.441.797,00	797.847,91	3.239.644,90
2018	2.492.694,29	848.555,25	3.341.249,54
2019	2.481.524,11	862.942,21	3.344.466,31
2020	2.014.360,19	672.587,35	2.686.947,54
2021	2.340.381,24	867.646,87	3.208.028,11
2022	2.274.906,65	938.026,76	3.212.933,41
2023	2.140.275,90	984.180,61	3.124.456,52
2024	2.097.470,38	1.003.864,22	3.101.334,60

This same information is represented in the following graph:



**Figure 16.** Evolution of automotive fuel consumption by fuel type (MWh).



As can be seen in the table and graph, the evolution of automotive fuel consumption has decreased insignificantly.

#### 2.6.4. Automotive fuels overview

Energy consumption in the land transport sector has shown a general downward trend since the beginning of the series, marked by specific economic and social milestones that have altered the demand for diesel and petrol.

**Consumption overview:** Total automotive fuel consumption has risen from a peak of **4,860,451.08 MWh in 2007** to an estimated **3,101,334.60 MWh by 2024**. This represents a cumulative reduction of approximately **36.2%** from the historical peak of the series.

The comparison between automotive diesel and petrol shows different dynamics:

- **Automotive diesel:** remains the dominant fuel. It reached its maximum in 2007 with **3,543,640.06 MWh**. Although it has declined, it still accounts for the largest share of total consumption, with a forecast of **2,097,470.38 MWh** by 2024.
- **Gasoline:** presented a sustained decline since 2005 (**1,448,695.98 MWh**) to its lowest point in 2020, starting a gradual recovery trend since then, estimated at **1,003,864.22 MWh** by 2024.

**Analysis of relevant milestones:**

- **Period 2007-2014:** there was a sharp and constant drop in total consumption, coinciding with the financial crisis, from 4.86 million MWh to 3.12 million MWh.
- **Impact of the Pandemic (2020):** 2020 registers the historical minimum of the entire series with **2,686,947.54 MWh**, due to mobility restrictions.
- **Integration of Renewables:** from 2013, the system began to account for the "Bio fraction of automotive fuels", which by 2024 is estimated at **241,824.01 MWh**, contributing to the decarbonisation of the sector.
- As a direct consequence of this evolution in consumption, emissions from road traffic have fallen from **1,267,698.27 tCO<sub>2</sub>e in 2005** to **736,739.79 tCO<sub>2</sub>e in 2024**. Passenger cars continue to be the main responsible for these emissions, **contributing 582,937.61 tCO<sub>2</sub>e** in the last projected year.

## 2.7. Renewable energy consumption

Renewable energy consumption by type in the period 2005-2024 is shown<sup>8</sup>:

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<sup>8</sup> The HCM tool has information on the consumption of biomass, solar thermal energy and self-consumption of electricity with photovoltaic from 2019. For previous years, a value of zero has been assigned because the data is not available.



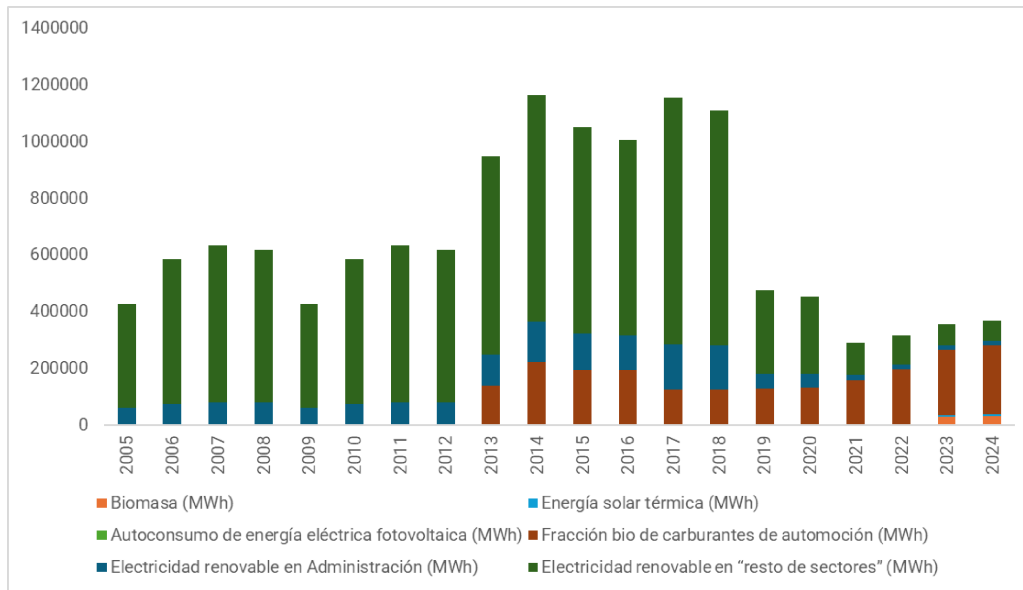
**Table 16.** Evolution of renewable energy consumption by type (MWh).

Year	Biomass (MWh)	Solar thermal energy (MWh)	Self-consumption of photovoltaic electricity (MWh)	Bio fraction of automotive fuels (MWh)	Renewable Electricity in Administration (MWh)	Renewable electricity in "other sectors" (MWh)	Total consumption (MWh)
2005	0,00	0,00	0,00	0,00	61.078,22	365.478,89	426.557,10
2006	0,00	0,00	0,00	0,00	76.822,02	509.584,14	586.406,16
2007	0,00	0,00	0,00	0,00	81.915,54	553.436,62	635.352,16
2008	0,00	0,00	0,00	0,00	83.026,78	536.647,70	619.674,48
2009	0,00	0,00	0,00	0,00	61.078,22	365.478,89	426.557,10
2010	0,00	0,00	0,00	0,00	76.822,02	509.584,14	586.406,16
2011	0,00	0,00	0,00	0,00	81.915,54	553.436,62	635.352,16
2012	0,00	0,00	0,00	0,00	83.026,78	536.647,70	619.674,48
2013	0,00	0,00	0,00	139.092,38	112.105,22	695.632,95	946.830,56
2014	0,00	0,00	0,00	224.554,65	140.009,05	800.024,72	1.164.588,42
2015	0,00	0,00	0,00	193.664,86	129.549,68	727.912,54	1.051.127,07
2016	0,00	0,00	0,00	194.754,07	121.761,98	690.347,02	1.006.863,07
2017	0,00	0,00	0,00	126.445,78	157.682,50	870.061,27	1.154.189,55
2018	0,00	0,00	0,00	126.221,78	154.798,37	826.941,37	1.107.961,52
2019	0,00	0,00	0,00	128.663,14	53.623,81	294.415,68	476.702,63
2020	0,00	0,00	0,00	134.551,93	47.625,31	271.029,55	453.206,80
2021	0,00	0,00	0,00	159.420,34	19.571,81	112.622,47	291.614,63
2022	0,00	0,00	0,00	196.746,03	17.910,12	103.993,35	318.649,50
2023	29.916,31	6.005,13	1.212,80	230.308,58	13.265,24	76.638,66	357.346,71
2024	32.907,94	6.605,64	1.455,36	241.824,01	13.928,50	72.806,73	369.528,18





This same information is represented in the following graph:



**Figure 17.** Evolution of renewable energy consumption by type (MWh).

As can be seen in the table and graph, the evolution of renewable energy consumption has decreased very significantly.

### 2.7.1. Renewable Energy Overview

When analyzing the data in detail, it is confirmed that there is a **net decrease** if we compare the beginning and the end of the historical series.

➤ **Global Balance (2005 vs. 2024):**

- Consumption in 2005: 426,557.10 MWh.
- Consumption in 2024 (forecast): 369,528.18 MWh.
- **Result:** there is a **13.37% decrease** in total renewable energy consumption over these 20 years.

**Stages of evolution:** consumption has not been linear, but has gone through three very marked phases:

- **Growth phase (2005-2014):** during this period, consumption tripled, reaching its historical peak in **2014 with 1,164,588.42 MWh**. This was mainly due to the increase in renewable electricity in the "rest of the sectors" and the introduction of biofuels.
- **Collapse phase (2014-2021):** a drastic drop of **75%** is recorded in just seven years, reaching the lowest point in the series in **2021 (291,614.63 MWh)**. This drop coincides with a massive reduction in renewable electricity accounted for in the sectors analysed.





- **Recent recovery phase (2021-2024):** in the last three years there has been a slight upturn (from 291,614 MWh to 369,528 MWh), driven by the appearance of **biomass** and **solar energy** in 2023, which were previously listed as zero.

The determining factor is **renewable electricity in the Administration and other sectors**, which has fallen very sharply:

- In **2005**, renewable electricity totalled **426,557.11 MWh**.
- In **2024**, renewable electricity (Administration + other sectors) barely totals **86,735.23 MWh**.

Although in the last two years (2023-2024) there are signs of recovery thanks to the diversification of sources (solar, biomass, self-consumption), the total figure is still lower than two decades ago, due to the loss of weight of renewable electricity in the municipality's mix.

## 2.8. Gross Domestic Product of Seville

The evolution of Seville's **Gross Domestic Product (GDP)** between 2005 and 2024 reflects an economic rollercoaster marked by three main milestones: the end of the real estate bubble, the post-crisis recovery of 2008 and the impact (followed by a spectacular rebound) of the 2020 pandemic.

The key periods of this evolution are detailed below:

### ➤ **The cycle of expansion and crisis (2005–2013):**

- **2005–2007: The Boom.** Seville experienced robust growth, driven by the services sector and construction. In these years, GDP per capita and municipal gross value added were at historic highs prior to the crisis.
- **2008–2013: The Collapse.** The financial crisis hit hard. Seville, highly dependent on the service sector and commerce, saw its economy contract. The lowest point of this cycle was around 2013, when the unemployment rate reached critical levels and municipal GDP stagnated.

### ➤ **Recovery and consolidation (2014–2019):**

From 2014, Seville began a path of sustained growth.

- **Tourism and Aeronautics:** the tourism sector became the great engine, breaking records for overnight stays year after year. At the same time, the aeronautical sector (with the Seville-Cádiz axis) consolidated the city as a relevant industrial node.
- **GDP Per Capita:** by 2019, the GDP of the province and the city had already recovered much of the lost ground, standing at **over €21,000** per capita.

### ➤ **The impact of COVID-19 and the "rebound" (2020–2024)**

- **2020: The Parenthesis.** The pandemic caused a historic drop (more than **10%** of GDP) due to the total stoppage of tourism and hospitality, basic pillars of the Seville economy.
- **2021–2023: Robust recovery.** The city bounced strongly. In 2023, GDP per capita reached **€24,871**, exceeding pre-pandemic levels thanks to the reactivation of domestic consumption and the strength of the services sector.





- **2024: Stabilization and moderate growth.** According to the Seville Economic Barometer, it is estimated that GDP has grown by around **1.8% - 3.2%** during the last year. The Seville economy is now showing greater resilience, with an unemployment rate that, for the first time in almost two decades, has fallen below **14-15%**.

The historical series of **the GDP of the city of Seville** (million euros) and **GDP per capita is presented below**. The data for 2023 and 2024 are estimates based on the *Seville Economic Barometer* and the Independent Authority for Fiscal Responsibility (AIReF).<sup>9</sup>

**Table 17.** Evolution of renewable energy consumption by type (MWh).

Year	City GDP (M€ approx.)	GDP per capita (€)	Economic context
2005	13.950	19.810	Construction boom
2008	16.420	23.400	Pre-financial crisis ceiling
2011	15.110	21.510	Deep recession
2014	14.890	21.405	Start of recovery
2017	16.200	23.440	Tourism consolidation
2019	17.150	24.890	Pre-pandemic maximum
2020	15.300	22.150	Fall by COVID19
2021	16.550	23.900	Economic rebound
2022	18.210	26.250	Full Recovery
2023	19.340	28.010	Closing Estimate
2024	20.010	29.100	Current projection

The values between 2005 and 2021 are consolidated data from the INE/IECA. The years **2023 and 2024** are based on growth projections of 2.3% and 2.1% respectively for the metropolitan area and the capital.

Comments on the data:

- **Inflation Effect:** the significant increase in 2022-2024 not only reflects real growth, but also the impact of inflation on nominal GDP (current prices).

<sup>9</sup> It is important to make a technical distinction that statisticians often emphasize: the **National Institute of Statistics (INE)** and the **IEA** (Institute of Statistics of Andalusia) publish official GDP data at the provincial level quickly, but the municipal accounts (the city of Seville as such) always have a lag of about 2 to 3 years due to the complexity of the calculation.





- **Services Sector:** Seville concentrates almost **85%** of its GDP in services (trade, tourism and public administration), which explains the vertical fall in 2020 and the rapid recovery after the total opening.
- **Provincial gap:** historically, the GDP per capita of the city of Seville is between **15% and 20% higher than** the average for its province, due to the concentration of administrative headquarters and companies in the capital.

We can conclude that the notable decrease in GHG emissions, according to the Emissions Inventory presented, has not been reflected in the evolution of the City's GDP. This shows us that **the fight against diffuse emissions in the urban context does not condition its economic development.**

## 2.9. Environmental problems

It should be noted that the Climate Agreements pursue a **holistic vision of the environmental problems of urban spaces**, so it is not possible to fail to consider other aspects of the urban environment.

For more than two decades, the main perceived problems attributed to the City of Seville in environmental matters have focused on four main blocks:

### 2.9.1. Air pollution

Road traffic is the main source of air pollution in Seville and its metropolitan area. Increased traffic has contributed to a greater air pollution problem. Ozone pollution is also a problem in Seville, especially during the summer months.

The **main goal of the Air Quality Improvement Plan for Seville and its Metropolitan Area** (promoted by the Regional Government of Andalusia and coordinated with the City Council) is to reduce pollution levels to protect public health and the environment.

#### ➤ Main objectives

The plan focuses on reducing the concentration of four critical pollutants that usually exceed the legal limits or the recommendations of the WHO in the capital of Seville:

- **Nitrogen dioxide (NO<sub>2</sub>):** generated mainly by road traffic.
- **Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>):** from traffic, industry, and occasionally Saharan dust intrusions.
- **Tropospheric ozone (O<sub>3</sub>):** a secondary pollutant that is formed especially in summer by high solar radiation and traffic gases.

#### ➤ Measures and Lines of Action

The plan is structured into several areas of intervention:

- **Sustainable Mobility:** this is the central axis. It includes the creation and management of the **Low Emission Zone (LEZ)**, the promotion of public transport, the expansion of the network of bike lanes and the electrification of municipal fleets.
- **Traffic Management:** measures to reduce congestion in the centre and main arteries, as well as the promotion of "safe school routes".





- **Industrial and Works Control:** stricter monitoring of industrial emissions in the metropolitan area and protocols to reduce dust on construction sites.
- **Green Infrastructure:** increase in the tree mass in the city to act as a natural filter of pollutants and help mitigate the "heat island" effect.

➤ **Protocol for Pollution Episodes**

The plan establishes an alert system with three levels (**Warning, Warning and Alert**) that are activated according to the measurements of the stations of the air quality network. Depending on the level, the following may apply:

- Temporary traffic restrictions.
- Speed limitation on access to the city.
- Direct information to the vulnerable population (elderly, children, people with asthma).

➤ **Geographical scope**

Unlike old plans, this one has a **metropolitan focus**, as it understands that Seville's air does not depend only on the capital, but also on the flow of vehicles and industrial activity from neighbouring municipalities such as Dos Hermanas, Alcalá de Guadaíra or the Aljarafe area.

## 2.9.2. Noise pollution

Noise is another major environmental problem for Sevillians.

Seville has a well-defined regulatory and strategic framework to combat noise. Currently, the city operates under two main pillars: the **Municipal Ordinance against Noise Pollution** (which establishes the day-to-day rules) and the new **Action Plan against Noise (Phase IV)**, designed for the period 2024-2029.

➤ **Noise Action Plan (RAP) 2024-2029**

This plan is the most recent strategic roadmap. It is based on the Strategic Noise Map and aims to:

- **Major road axes:** **More than 10 million euros have recently been allocated** to reduce noise on high-impact roads such as the **A-49**, through the use of sound-absorbing pavements and acoustic screens.
- **Quiet Zones:** The plan identifies and protects areas of the city that still maintain low noise levels to prevent them from degrading.
- **Public Transport:** Includes specific plans to reduce the acoustic impact of infrastructures such as the **Metrocentro**.

➤ **City Ordinance (rules and schedules)**

The ordinance regulates the activities that most affect the neighbors. Inside the homes, any activity that disturbs rest is strictly prohibited between **11:00 p.m. and 7:00 a.m.**

➤ **Acoustically saturated zones (ZAS)**

Seville maintains special vigilance in the so-called **ZAS Zones**, which are areas with a high density of bars and nightlife where more severe restrictions are applied (such as the prohibition of opening new premises or stricter limits on terraces).





The new Regulation for the preservation of acoustic quality in Andalusia (**Decree 50/2025**) has recently come into force, which obliges Andalusian municipalities to update their measurement and control methods to be more accurate with low-frequency noise and vibrations.

### 2.9.3. Lack of sufficient green areas

The lack of sufficient green spaces in the city also contributes to environmental degradation.

Seville's **Green and Blue Ring Plan** is one of the city's most ambitious strategic projects for this decade. Its main objective is to surround the capital with a **42-kilometer ecological corridor** that connects the existing large parks, recovers riverbanks and streams, and creates new recreational areas.

The plan seeks to renaturalize the city. It is not just about planting trees, but about creating a **green** (parks and groves) and **blue** (rivers, canals and lagoons) infrastructure that works as a connected network. This helps to:

- **Mitigate heat:** Reduce the "heat island" effect through shade and humidity.
- **Promote biodiversity:** create corridors so that local fauna and flora can move.
- **Public Health:** Offer walking or biking trails that circle the entire city without interruption.

In the 42-kilometre route, the ring is mainly divided into four large sections that take advantage of Seville's natural resources:

- **North Sector:** from San Jerónimo Park and the Olympic Stadium, connecting with Miraflores Park.
- **East sector:** following the course of the **Tamarguillo Stream** and the wetlands (such as the Lagunas de El Sapo) towards East Seville and the Torreblanca pine forests.
- **South sector:** connection with the **Guadaíra Park** and the banks of the river towards the Palmas Altas area.
- **West Sector (El Río):** the urban corridor of the **Guadalquivir**, which acts as the great blue axis that closes the circle.

After years of proposals from social groups and ecologists (such as the *Seville for Climate network*), the Seville City Council has made the plan official within the **2030 Urban Agenda**.

- In **2026**, the Strategic Plan will be awarded to technically define the final route and the necessary expropriations or agreements with private or metropolitan land.
- The construction of **ecological walkways is contemplated** to overcome barriers such as the SE-30 or the SE-20, allowing the ring to be continuous.

It is a commitment to turn Seville into a more resilient city to climate change, transforming the "grey" of transport infrastructures into a green crown that connects the city with its metropolitan area.





#### 2.9.4. Other problems

Street cleaning, improved wastewater management and traffic congestion (mobility) are also environmental problems that are often highlighted by various civil society groups.

As for street cleaning and urban solid waste collection, Seville has a structured planning for street cleaning and waste management, articulated mainly through **Lipasam** (the municipal public cleaning company).

For 2026, the city has consolidated a strategy that combines a record budget with specific shock plans.

The City Council has projected for this year 2026 an investment of approximately **150 million euros** exclusively for cleaning, which represents almost 15% of the total municipal budget. The pillars of this plan include:

- **Fleet renewal:** replacing old vehicles with more efficient and sustainable machinery (electric or gas).
- **Staff increase:** reinforcements in the workforce to cover all districts, especially in areas with greater influx.
- **Control and supervision:** inspection has been strengthened to ensure compliance with the **Municipal Ordinance on Public Cleaning and Waste Management**.

##### ➤ Specific shock plans

In addition to the ordinary service, Seville applies "special plans" according to the need:

- **Clearing and weeding plan:** seasonal reinforcement (especially after rains) to clean pavements and plots.
- **Bitter orange collection:** a specific device to remove bitter orange from public roads and avoid accidents.
- **Selective collection:** promotion of separation at source, with special attention to **bio-waste** (the brown container).

A relevant point in the planning for this year 2026 is the adaptation to state regulations (Law 7/2022). This city plan seeks to:

- To finance investments in treatment plants and clean points.
- Encourage "those who pollute the most, pay the most", through surveillance and awareness systems

In terms of **wastewater management**, Seville has a very robust and up-to-date wastewater management system, mainly led by **EMASESA** (Metropolitan Water Supply and Sanitation Company of Seville).

Currently, this plan is not just a static document, but a comprehensive strategy that is grouped under several key programs:

##### ➤ The EMASESA 2030 Strategic Plan





This is the main framework that guides the current management. It focuses on the circular economy and sustainability. One of its most ambitious objectives is to transform treatment plants (WWTPs) into "biofactories". This means that they no longer only "clean" the water, but also generate resources:

- **Energy production:** Use of biogas for self-consumption.
- **Sludge recovery:** Transformation of waste into compost for agriculture.
- **Reuse:** Use of reclaimed water for the irrigation of green areas and golf courses.

➤ **Action Plan 2024-2027**

For the **2026** financial year, Seville has approved a budget of **218 million euros**. The following stand out from this plan:

- **Infrastructure renovation:** Investment of more than 50 million euros in 2026 alone to improve municipal networks and general collectors.
- **Adaptation of the Port Outfall Collector:** A critical work of more than 90 million euros (in collaboration with the Guadalquivir Hydrographic Confederation) to adapt the network to European regulations and protect the environment of Doñana.
- **Digitalisation (CREANDO Project):** Use of artificial intelligence and sensors to better manage discharges and relief during episodes of heavy rainfall.

➤ **Sanitation Infrastructures**

The system is supported by a technical network that includes:

- **5 Treatment Plants (WWTPs)**, which process the water of the capital and the metropolitan area.
- **Storm tanks:** massive underground tanks that retain rainwater to prevent flooding and direct discharges into the river without purification.

Finally, it should be noted that Seville is adapting its management plans to the new Royal Decree of 2023, which requires much stricter control over "runoff water overflows" (what is left over when it rains heavily) to minimise the environmental impact on the Guadalquivir.

And as for **traffic management**, we have referred in previous sections to the Municipal Sustainable Mobility Plan (SUMP).

In short, from the Seville City Council and the Municipal Companies we work to mitigate or cancel these discomforts, being able to present notable advances in most of them. Communication and public information protocols must address these realities, so that citizens are aware in detail of the diagnosis of the situation and the actions that are being taken to tackle these problems.

Environmental protection is integrated into almost all municipal areas, and is developed according to their delimited competence frameworks.

In other words, the municipal body competent in the aforementioned matters, the Energy and Sustainability Agency, does not take into account the management of potentially hazardous waste carried out by Municipal Buildings, for example; or the results in terms of environmental sustainability derived from a certain measure in terms of Mobility. Nor in terms of emissions,





discharges or waste from industry or civil society, since this is integrated into the tasks of some public companies or the regional administration of the Junta de Andalucía. For all these reasons, it will be necessary to provide the Energy and Sustainability Agency of the Seville City Council with a department that collects and coordinates all these flows, making it possible to publish complete environmental reports at the municipal level.

## 2.10. Adaptation

In terms of **Adaptation**, in our SCCC we work with the climate change scenario viewer, AdapteCCa, as well as with the regionalised climate scenarios for Andalusia.

We show that the Junta de Andalucía is part of the Mission for Adaptation to Climate Change. At CitiES2030 we have been working to contemplate adaptation actions in the CAs, given the close link between the two Missions. The City Council and the Regional Government of Andalusia maintain effective coordination.

In the Seville SECAP (Adaptation Plan) it is stated that the general methodology applied for the development of the document is that provided for by the Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Report. The IPCC defines risk as the potential to be impacted when something of value is at stake and where the outcome is uncertain. Risk is often represented as a probability of occurrence of dangerous events or trends multiplied by the impacts or consequences if these events were to eventually occur. Risk, therefore, results from the interaction of vulnerability, exposure and threat (which must have a forecast of the consequences).

On the other hand, **impacts** are the effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services and infrastructures due to the interaction of climate change and the vulnerability of exposed elements. **The fact that there is a risk does not guarantee that the impact will occur, but it does indicate that there is a probability that it will occur.**

Thus, Seville's Climate Change Adaptation Plan includes a detailed analysis for the four scenarios defined by the IPCC and AEMET: **heat waves, droughts, river floods**, and pluvial floods, which we present below.





Receptor	Ola de calor		
	Probabilidad	Consecuencia	Riesgo climático
Población	Muy probable	Significativo	Riesgo alto
Edificios residenciales existentes		Mínimo	Riesgo medio
Futuros desarrollos urbanos		Nula	Sin riesgo
Áreas protegidas		Nula	Sin riesgo
Usos agrícolas		Moderado	Riesgo alto
Instalaciones industriales		Moderado	Riesgo alto
Establecimientos comerciales		Mínimo	Riesgo medio
Puntos de interés turístico y turistas		Moderado	Riesgo alto
Hostelería		Mínimo	Riesgo medio
Academia y centros de investigación		Mínimo	Riesgo medio
Red viaria		Mínimo	Riesgo medio
Red ferroviaria		Mínimo	Riesgo medio
Puerto		Mínimo	Riesgo medio
Aeropuerto		Mínimo	Riesgo medio
Red de autobuses, tranvía y Metro		Mínimo	Riesgo medio
Agua y saneamiento		Mínimo	Riesgo medio
Gestión de residuos		Mínimo	Riesgo medio
Energía Eléctrica		Moderado	Riesgo alto
Telecomunicaciones		Nula	Sin riesgo
Red ciclista		Mínimo	Riesgo medio
Sanidad	Moderado	Riesgo alto	
Educación	Mínimo	Riesgo medio	
Zonas verdes	Moderado	Riesgo alto	
Centros deportivos	Mínimo	Riesgo medio	
Emergencias	Mínimo	Riesgo medio	

Figure 18. Scenarios defined by the IPCC and AEMET: heat waves.

In the case of **heat waves**, the event is classified as Very Likely, with relevant consequences for the population, agriculture, industry, tourism, electricity grid, health services and green areas.

Adaptation actions are needed at all levels.



Receptor	Sequia		
	Probabilidad	Consecuencia	Riesgo climático
<b>Población</b>		Moderado	Riesgo medio
Edificios residenciales existentes		Nula	Sin riesgo
Futuros desarrollos urbanos		Nula	Sin riesgo
<b>Áreas protegidas</b>		Moderado	Riesgo medio
<b>Usos agrícolas</b>		Significativo	Riesgo alto
Instalaciones industriales		Moderado	Riesgo medio
Establecimientos comerciales		Moderado	Riesgo medio
<b>Puntos de interés turístico y turistas</b>		Nula	Sin riesgo
Hostelería		Moderado	Riesgo medio
Academia y centros de investigación		Nula	Sin riesgo
<b>Red viaria</b>		Nula	Sin riesgo
Red ferroviaria		Nula	Sin riesgo
Puerto	Bastante probable	Nula	Sin riesgo
Aeropuerto		Nula	Sin riesgo
<b>Red de autobuses, tranvía y Metro</b>		Nula	Sin riesgo
Agua y saneamiento		Significativo	Riesgo alto
Gestión de residuos		Nula	Sin riesgo
Energía Eléctrica		Moderado	Riesgo medio
Telecomunicaciones		Nula	Sin riesgo
Red ciclista		Nula	Sin riesgo
Sanidad		Nula	Sin riesgo
Educación		Nula	Sin riesgo
Zonas verdes		Significativo	Riesgo alto
Centros deportivos		Nula	Sin riesgo
Emergencias		Nula	Sin riesgo

**Figure 19.** Scenarios defined by the IPCC and AEMET: drought.

In the case of **droughts**, a Fairly Likely probability is assigned, with consequences that require attention for the population, agriculture, industry and commerce, hospitality, water and energy supply, and green areas.

The scenario requires priority adaptation actions to guarantee the Sustainable Development of the City.



Receptor	Inundación fluvial		
	Probabilidad	Consecuencia	Riesgo climático
<b>Población</b>		Grave	Riesgo alto
Edificios residenciales existentes		Grave	Riesgo alto
Futuros desarrollos urbanos		Significativo	Riesgo medio
Áreas protegidas		Moderado	Riesgo bajo
<b>Usos agrícolas</b>		Grave	Riesgo alto
Instalaciones industriales		Grave	Riesgo alto
Establecimientos comerciales		Significativo	Riesgo medio
Puntos de interés turístico y turistas		Grave	Riesgo alto
Hostelería		Significativo	Riesgo medio
Academia y centros de investigación		Significativo	Riesgo medio
<b>Red viaria</b>		Muy grave	Riesgo alto
Red ferroviaria		Muy grave	Riesgo alto
Puerto	Probable	Significativo	Riesgo medio
Aeropuerto		Nula	Sin riesgo
Red de autobuses, tranvía y Metro		Significativo	Riesgo medio
Agua y saneamiento		Moderado	Riesgo bajo
Gestión de residuos		Nula	Sin riesgo
Energía Eléctrica		Muy grave	Riesgo alto
Telecomunicaciones		Nula	Sin riesgo
Red ciclista		Significativo	Riesgo medio
Sanidad		Grave	Riesgo alto
Educación		Significativo	Riesgo medio
Zonas verdes		Nula	Sin riesgo
Centros deportivos		Moderado	Riesgo bajo
Emergencias		Grave	Riesgo alto

**Figure 20.** Scenarios defined by the IPCC and AEMET: river flooding.

As for **river floods**, the third level of probability is granted. The consequences are assessed as very serious, serious or significant in many cases. We are in a scenario in which actions to adapt to these risks are urgent.



Receptor	Inundación pluvial		
	Probabilidad	Consecuencia	Riesgo climático
Población	Probable	Grave	Riesgo alto
Edificios residenciales existentes		Grave	Riesgo alto
Futuros desarrollos urbanos		Significativo	Riesgo medio
Áreas protegidas		Moderado	Riesgo bajo
Bienes agrícolas		Grave	Riesgo alto
Instalaciones industriales		Grave	Riesgo alto
Establecimientos comerciales		Significativo	Riesgo medio
Puntos de interés turístico y turistas		Grave	Riesgo alto
Hostelería		Significativo	Riesgo medio
Academia y centros de investigación		Significativo	Riesgo medio
Red viaria		Muy grave	Riesgo alto
Red ferroviaria		Muy grave	Riesgo alto
Puerto		Significativo	Riesgo medio
Aeropuerto		Significativo	Riesgo medio
Red de autobuses, tranvía y Metro		Significativo	Riesgo medio
Agua y saneamiento		Muy grave	Riesgo alto
Gestión de residuos	Moderado	Riesgo bajo	
Energía Eléctrica	Muy grave	Riesgo alto	
Telecomunicaciones	Nula	Sin riesgo	
Red ciclista	Significativo	Riesgo medio	
Sanidad	Grave	Riesgo alto	
Educación	Significativo	Riesgo medio	
Zonas verdes	Nula	Sin riesgo	
Centros deportivos	Moderado	Riesgo bajo	
Emergencias	Grave	Riesgo alto	

Figure 21. Scenarios defined by the IPCC and AEMET: pluvial flooding.

The **probability of pluvial floods** has decreased with respect to the situation in Seville until the third quarter of the last century, when the works to regulate the Guadalquivir River and the execution of the Corta de La Cartuja significantly mitigated these floods.

However, the probability of occurrence persists (it is enough to analyse the situations created in January and February 2026), so it will be necessary to continue ensuring adaptation actions for this climate risk in Seville, especially due to the importance that the consequences could reach.

Given the relevance of adaptation and the requirements to achieve climate resilience, we incorporate as **Attachment Document 1** a synthesis of the aforementioned Adaptation Plan.



### 3. Climate neutrality target for 2030

The **commitment to climate neutrality**, in addition to responding to an environmental obligation, also responds to an urgent need to **improve public health**. Climate change **mitigation** policies represent an unprecedented opportunity to reduce the burden of disease associated with air pollution, environmental noise, extreme heat and sedentary lifestyles. Acting now means **preventing** respiratory, cardiovascular, neurodegenerative and metabolic diseases, reducing premature mortality, improving mental health and increasing the general well-being of citizens. Accelerating the energy transition, promoting active mobility, expanding green infrastructure and reducing exposure to air pollutants are all life-saving measures, especially among the most vulnerable groups. In this framework, climate action is also a health policy based on scientific evidence and social justice criteria, as underlined by organisations such as WHO Europe and its Pan-European Commission on Climate and Health.

The City of Seville's interest in joining the Cities Mission and committing to the goal of achieving climate neutrality by 2030, as defined in the context of the Mission, is already contained in four institutional commitments:

- The first, by being part of the **European Conference on Sustainable Cities and Towns**, having initially signed the Aalborg Charter (1998), and later the Aalborg Commitments (2004); it also came to organize together with ICLEI the 5th European Conference on Sustainable Cities and Towns "*Taking the Commitments to the streets*", (Seville, 2007).
- The second is evidenced by being part of **the Covenant of Mayors for Sustainable Climate and Energy** since 2009 (with subsequent ratifications in 2013 and 2017 - and Rev. 2020-); it is the current Covenant of Mayors.
- The third was approved by the Governing Board in a session held on July 30, 2021, based on the provisions of the **Seville 2030 Strategic Plan**, which had been approved by the Plenary of the Seville City Council on April 11, 2019;
- And the fourth is contained in the **Local Action Plan of Seville** to develop the 2030 Urban Agenda, approved by the Plenary of the Seville City Council on July 21, 2022.

Additionally, it should be noted that Seville has chaired the **Spanish Network of Cities for Climate** of the Spanish Federation of Municipalities and Provinces (FEMP), since 2015.

Let us remember that, as a result of the tasks implicit in all these agreements over the last 28 years, Seville's balance in terms of its carbon footprint shows the mitigation of GHG emissions by 47% (compared to the base year, 2005), according to the official data of the Junta de Andalucía that we have presented in the reference inventory.

Therefore, the commitments that are now assumed with the Mission were already mostly contained in those institutional agreements of the Seville City Council. We must also add the **Declaration of Climate Emergency (DEC)**, approved by the Municipal Plenary on July 24, 2019, which was the first local initiative in this regard, at the national level.

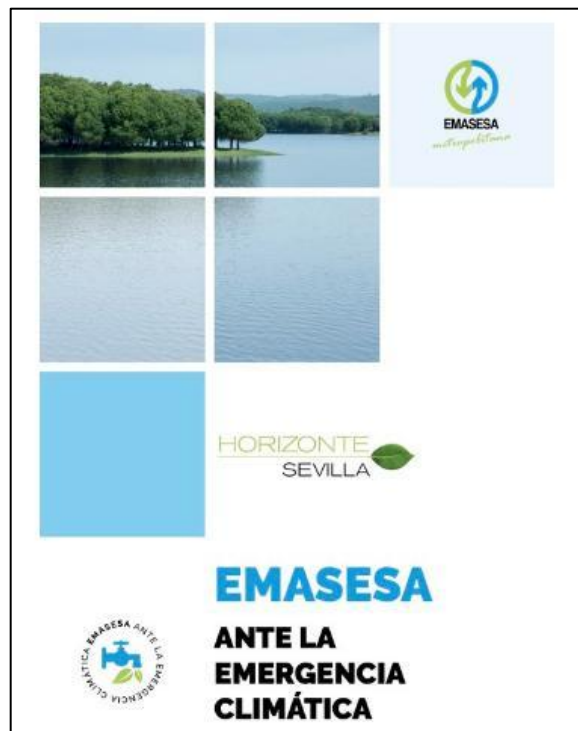
The commitment implicit in the DEC is not a mere recognition of intentions, but commits all public institutions and organisations to the implementation of precise and detailed actions in the fight against climate change in our local environment, all of them framed in the SDGs agreed by the





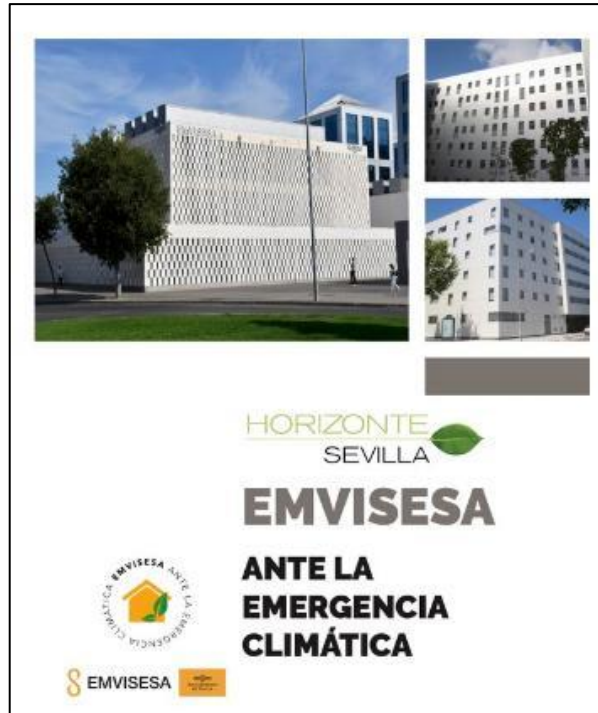
United Nations. **The declaration reinforces all the actions that have been planned** and that will be implemented in the coming years from the local corporation itself and its municipal companies.

In view of this DEC, each of the municipal companies (management of the integral water cycle, housing, waste and public transport) establish their own commitments, planning and prioritization of actions, and this is reflected in the following documents of the Corporation of Municipal Companies of Seville.

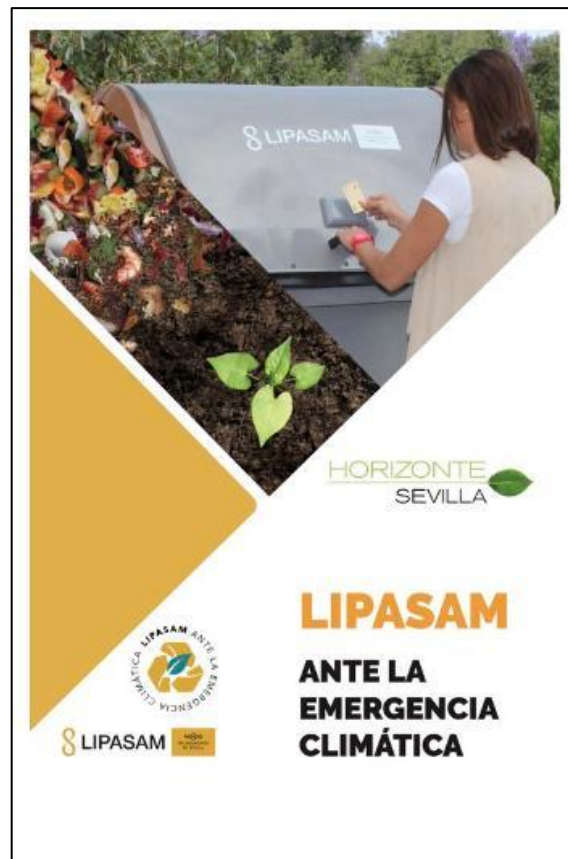


**Illustration 1.** Cover of EMASESA's document *Facing the Climate Emergency*.





*Illustration 2. Cover of the document Facing the Climate Emergency by ENVIRESA.*



*Illustration 3. Cover of the document Facing the Climate Emergency by LIPASAM.*





*Illustration 4. Cover of the document Facing the Climate Emergency by TUSAM.*

And as we have been reiterating in this document, it is worth highlighting the preparation **of the Seville Climate Action Plan (PACC)**, whose culmination is scheduled for this year 2026, in compliance with the requirement contained in Law 8/2018, on climate change of the Autonomous Community of Andalusia (art. 15). Such planning will fully contain the projections and commitments established by the Mission, which we are now dealing with. And it will shape in a single document all the actions for mitigation and adaptation to climate change derived from the 2030 Agenda, the Strategic Plan, also renewing the Aalborg Commitments, within the framework of the European Conference on Sustainable Cities and Towns.

This means that Seville will become **the first city to have a regulated CA**, thus acquiring a **mandatory and decisive condition** for all municipal actions, leaving behind indicative planning. In this context, the drafting of a municipal climate change ordinance by the Energy and Sustainability Agency is planned

Therefore, the Mission's main contribution to our climate change planning is located in the work dynamics, moving from the consideration of all those actions as projects, to a process: continuous iteration, multilevel work, involvement and holistic vision of the problem, coordination and participation of all actors, etc. And, above all, as we understand is the case with the rest of the cities, the expectation that arose within the initiative to find **ways of financing** (adapting existing ones or creating other ad hoc ones) for the actions that are needed to cover the emissions gap, and those necessary to face the adaptation to the scenarios that highlight the vulnerability of our urban environment, our health and our survival in conditions of optimal quality of life.

To achieve this objective, it is essential to **improve energy effectiveness and efficiency in all areas of urban life: transport, construction and maintenance of public and private buildings, street lighting, waste management, etc.** Along the same lines, the development of distributed





**renewable energy production** is promoted, with buildings producing **mainly photovoltaic** electricity, facilitating and economically encouraging the installation of panels and electricity self-consumption in public and private buildings. The use of **clean energy sources for public and private transport is also encouraged**, developing the necessary infrastructures for this purpose. Innovative actions are also implemented aimed at **improving the thermal comfort of citizens in public spaces**, which we will detail in this iteration of the SCCC.

In the **development of the city adapted to climate change**, green space and trees take centre stage, both as natural CO<sub>2</sub> sinks and as climate moderators for a more liveable city. In this way, the **management of trees and green spaces** in general becomes a strategic element for the performance of this city objective.

For its part, we integrate regional planning to combat climate change **into our climate neutrality objective**, which is established through the **Andalusian Climate Action Plan (PAAC)**, approved by the Governing Council on 13 October 2021 and published by Decree 234/2021, of 13 October, approving the Andalusian Climate Action Plan. in BOJA No. 87 of October 23, 2021. It is the general strategic planning instrument in Andalusia for the fight against climate change, and is derived from Law 8/2018 on climate change in Andalusia. Its mission **is to integrate climate change into regional and local planning**, while aligning them with the plans of the Government of Spain, the European Green Deal and the Paris Agreement, contributing to achieving the Sustainable Development Goals set by the United Nations 2030 Agenda.

The PAAC establishes 6 strategic objectives for 2030, 12 sectoral objectives and more than 137 lines of action distributed in three Programmes: Mitigation and Energy Transition, Adaptation and Communication/Participation, which are developed in its operational deployments with a horizon of 2022, 2026 and 2030. The purpose of the Emissions Mitigation Programme for the Energy Transition is to establish the strategies and actions necessary to achieve the emission **reduction target**, as well as the coordination, monitoring and promotion of policies, plans and actions that contribute to this reduction and the **transition to a new energy model**. It defines ten strategic areas in terms of mitigation, in accordance with the forecasts established in the city of Seville, and aligned with the objectives of the EU Climate Mission.

As we have already pointed out, coordination teams have been formed between this City Council and the Junta de Andalucía for joint and coordinated work in all these lines.

Now, the objective of **our Mission must integrate all these sectoral instruments to take advantage of existing synergies**, placing the objective at the most complete decarbonisation by 2030. This requires redoubling efforts, within the framework of a more active and participatory work dynamic, in a process of multilevel, iterative involvement and continuous learning, which allows us to achieve the goal through joint and co-creative work. To this end, the active participation of the quintuple helix, cooperation between cities and, above all, support from NZC, with the citiES2030 platform in Spain, will be essential.

Thus, we will have to stage **new models capable of removing the obstacles** that have traditionally been concentrated in cities for the modernization that is now needed, through the application of key concepts and ideas such as the following:

- Collective intelligence





- Holistic view
- Multi-level governance against climate change
- Promotion of participation. Citizen activation strategy
- Projection of the image of the future: image 2030
- Supportive Partnerships
- Co-creative work
- Multilevel intervention
- New narratives, adapted to the purpose of the Mission
- Multi-Stakeholder Ecosystem
- Social dimension: no one will be left behind
- Eco-social innovation
- From a linear evolution to circular transformation
- Start-up of the fivefold propeller
- Cooperation between Mission Cities
- Viewing Achievements
- Collaborative development
- Attention to ecosystem services
- Co-benefits
- Generation of data, indicators and reports

Summarizing **our goal of climate neutrality**, for the city to be considered neutral, its objectives must impact four critical areas:

➤ **Energy and buildings:**

- Achieve zero emissions in all new buildings by 2030.
- Accelerate the rate of energy renovation of the existing building stock.
- Decarbonize heating and cooling through heat pumps and local renewables.

➤ **Sustainable Urban Mobility:**

- Reduce transport **emissions by 90%** by 2050.
- Promote the *15-minute city*, prioritizing public transport, cycling and walking.
- Massive electrification of public fleets and deployment of charging infrastructure.

➤ **Waste Management and Circular Economy:**

- Implement zero-waste systems and dramatically improve biowaste recycling.
- Encourage the reuse of materials in construction to reduce the embedded carbon footprint.

➤ **Ecosystems and Nature-Based Solutions:**

- Increase green areas to act as carbon sinks and combat heat islands.





To achieve the aforementioned climate neutrality objectives, the Seville City Council has forged alliances with academia, through agreements with the University of Seville and the Pablo de Olavide University, and in collaboration with the JRC-Seville, among other entities.





## 4. Priorities. Planned actions and strategic interventions

In line with the climate neutrality objectives set out in this SCCC, we have established a series of **priorities**, ongoing and planned actions, and interventions that are considered strategic within the framework of the SCCC.

### 4.1. Priorities

Seville is at a key moment in its urban transformation, driven by its commitment as one of the **100 climate-neutral European cities by 2030**. As we have been pointing out, this Climate Mission marks the current roadmap, which is divided into several priority axes to combat extreme heat and reduce emissions.

#### ➤ **Green infrastructure and the "Green Belt"**

One of the big bets is the creation of a **green and blue ring, 42 kilometers long**. This project seeks to:

- To connect the large parks on the outskirts with the beds of the Guadalquivir and Guadaíra rivers.
- Create **bioclimatic corridors** to lower the temperature of the city through natural shading and the recovery of wetlands.
- Promote urban biodiversity to mitigate the "heat island" effect.

#### ➤ **Sustainable mobility and decarbonisation**

As we have seen in the IER, transport is the sector that generates the most emissions in the city. Current priorities include:

- **Expansion of the public transport network:** promotion of the Metro Network (Line 3) and the extension of the Trambus as high-capacity alternatives.
- **Low Emission Zone (LEZ): consolidate** the LEZ in La Cartuja and evaluate its expansion, although this point is the subject of current political debate regarding the flexibility of sanctions.
- **Active mobility:** maintenance and improvement of the network of bike lanes, considered an international benchmark.

#### ➤ **Energy rehabilitation and building**

Under the slogan of the "Double Zero Strategy" (zero emissions and zero waste), Seville prioritizes:

- **Housing rehabilitation:** especially in vulnerable neighbourhoods, to improve thermal insulation and reduce energy poverty.
- **Self-consumption:** installation of photovoltaic panels in public buildings (schools, sports centres) to function as clean energy hubs.

#### ➤ **Adaptation to extreme heat (Resilience)**

Given the city's climate, adaptation is just as important as mitigation:





- **Awning and shading:** expansion of the awning areas not only in the shopping center, but also in bridges and transport stops.
- **Sustainable drainage systems:** projects to better manage rainwater and prevent flooding in the face of extreme events, integrating water into the urban landscape (the "blue component").

➤ **Circular Economy and Waste Management**

The city is updating its plans to comply with the Andalusian Law on Climate Change, seeking:

- Improve the recycling rate and reduce waste generation by promoting the circular economy.
- Turning waste management into a source of resources, minimizing the use of landfills.

Having the "**Mission Label**" of the European Commission should give Seville priority in accessing European funds, to finance the set of projects that are needed for the transformation until 2030.

## 4.2. Planned actions

As for the planned actions, we started the planned staff with the necessary mechanisms for **CO<sub>2</sub> capture**. Seville's great environmental commitment in terms of green areas is the creation of a 42-kilometre belt of parks that will surround the city, in what has come to be called the **Green Belt**, and which represents a long-standing aspiration of the city, present in the different phases of environmental planning, since 1998.

It is an ambitious project that requires the collaboration of all administrations (multilevel), since the land is not only municipal, but also of other metropolitan towns, the Provincial Council of Seville, the Junta de Andalucía, the Guadalquivir Hydrographic Confederation (State), as well as part of private ownership.

This green belt, which was relaunched in 2019 when the Seville 2030 Strategic Plan was approved, aims **to interconnect green ecosystems and the capital's river banks**, also involving the municipalities of Santiponce, Camas, Alcalá de Guadaíra and Dos Hermanas. The first step has consisted of the tender for technical assistance, which has a budget of 200,000 euros and will be planned this year 2026.

In terms of **mobility**, also, under the objective of climate neutrality, Seville will continue and strengthen its commitment to **sustainable urban mobility**, which it has been developing since the last decade, with relevant milestones such as the development of the bike lane, new means of electric transport (metro and tram), traffic calming and the facilitation of pedestrian mobility.

The commitment to sustainable mobility in Seville is based on the existence of multiple transport systems, with priority given to decarbonised public transport and non-motorised mobility, with the development of pedestrian axes and the expansion of the bike lane. Also committed to innovative mobility.





We have been pointing out, in unison with the rest of the Mission cities, that a city without agile and sustainable mobility is not a modern city and that **mobility is a priority in the urban transformation** we are undertaking. In Seville, we have 6 main projects underway in terms of mobility: the construction of **line 3 of the Metro**, whose works began in April 2024, will involve a total investment of 1,300 million euros, after 15 years of inactivity in this area. The second is **line 2 of the Metro**, whose first studies have already begun, which is an absolute priority for Seville, maintaining the commitment to public transport.

In May 2025, the procurement of **70 new urban buses was tendered**, with an investment of 29.4 million euros (without European funding), recently put into service. The improvement of the service provided by Tussam is the third major mobility project for the Seville City Council.

The fourth is the **extension of the tram** to the Santa Justa Railway and High-Speed Station, and the development of platforms reserved for electric buses (the so-called trambus, which already reaches East Seville).

The fifth major mobility project resides in the Cartuja Technology Park, the venue that hosted Expo 92 and which is attended every day by 30,000 employees and 10,000 university students. It is our **laboratory for the mobility of the future**. The eCitySevilla project plans to implement new **zero-emission and high-tech mobility systems** in Cartuja that will respond to the demand of a venue whose occupancy has skyrocketed in recent years.

As a sixth point to highlight, in terms of mobility, a project that, under the Public **Procurement of Innovation** (CPI) formula, will study the most modern advances in the sector, from the use of buses with or without a driver and with different degrees of autonomy that circulate throughout the enclosure, to conveyor belts or other systems for the rapid transfer of pedestrians; autonomous and electric vehicles or *carsharing systems*.

To sum up, there are nine projects with works underway (or tendered) in Seville in March 2026, including the extensions of the Seville Metro (line 3 North Pino Montano-Prado) and the Centennial Bridge, the completion of the second round of the SE-40 ring road, the modernisation of the Madrid-Seville high-speed line and the construction of the *bypass* to shorten the distance by train with Malaga and Granada, without forgetting the fast bus lines (BTR, baptized as Trambus): one between Santa Justa Station and the neighborhoods of Sevilla Este and Torreblanca, and the other that will extend from Santa Justa to the historic center.

And, finally, in the central Aljarafe and in the North Aljarafe, the two platforms reserved (HOV Bus Lane) for public transport and vehicles with two or more occupants from Mairena to San Juan de Aznalfarache and from Camas to Castilleja de Guzmán.

These are projects dependent on different administrations: the Ministry of Transport, the Junta de Andalucía and the Seville City Council, and they have received European funds that complete their financing.

As for the **built site**, its contribution to CO<sub>2</sub> emissions due to electricity consumption is of particular concern. We rely, among others, on the technical and scientific experience of the **Higher Technical School of Architecture and the University Institute of Architecture and Construction Sciences**, both of the University of Seville. They tell us that most cities in Spain have a residential





fabric supported by neighborhoods that were built mainly throughout the decades of the 50s, 60s and 70s, which today are in a process of **urban and social obsolescence**, so it is necessary to stop and study them from a holistic perspective. beyond the shortcomings they currently present.

Throughout the twentieth century, the construction of numerous residential complexes in Seville was faced, such as cheap houses, company housing, or large industrial estates, mainly for the most vulnerable population, located mainly in the peripheries.

Currently, these neighborhoods reflect urban obsolescence, and at the same time, a growth of the elderly population, who were originally the most active population, and who provided social vitality to these peripheries during the periods in which the neighborhoods began to be inhabited.

Through a heritage reading, official institutions such as the World Heritage Committee, as well as ICOMOS, the Iberian DOCOMOMO and, in the case of Andalusia, the Andalusian Institute of Historical Heritage, recognize that the development of this housing typology responds mostly to the urban and functional principles of the Modern Movement. However, today, these residential estates show a clear building obsolescence: the typology of the dwellings differs from the needs of contemporary living.

In Seville, with the Ibero-American Exhibition of 1929, the city underwent a series of transformations that still endure today. In 1930 two-thirds of the population lived in neighbors' corrals and another large part in suburbs and slums. Given that the residential model of *cheap houses* had not borne fruit, the Decree on the Protection Regime for Low-Income Housing was approved and the National Housing Institute was created to encourage the promotion of new housing, given that most of the existing ones had unacceptable characteristics (in 1950 52.74% of households had one or two rooms, 59% have no water and 53% have no toilets).

The most outstanding actions of the Cheap Houses Board are the neighborhoods of La Candelaria (which includes just over 1000 homes), the Pío XII neighborhood (with approximately 2000 homes) and the El Carmen neighborhood (about 650 homes built). Especially relevant is the development of the city of Seville with the project of the Polígono de San Pablo, in which more than 11,000 housing units were planned, most of them of a social nature.

From a contemporary perspective, the problems that can be identified in these complexes of the 50s/60s/70s, usually built for social purposes, are numerous and of a very different nature. They are usually characterised by a certain isolation from the rest of the city, by the scarcity of facilities and by the deterioration of their public spaces. From a social perspective, many of them have been classified as **vulnerable neighbourhoods**, with significant unemployment rates and low levels of education. Similarly, architectural deficiencies are reflected in **construction problems, low energy efficiency and lack of maintenance of the building**.

The **urban obsolescence of social neighbourhoods** in general is one of the new challenges that we must face in cities in their contemporary condition: betting on health and recovery-recycling-rehabilitation with innovative criteria of regenerative development, **energy efficiency and sustainable management**.

This does not mean renouncing the alternative of urban expansion that is required by the needs due to the natural growth of the City, and that has the due planning through the **public-private**





**platform Seville City One Metropolis of Southern Europe**<sup>10</sup>, under the framework of the General Urban Planning Plan and the Territorial Planning Plan of the Urban Agglomeration of Seville.

According to the above and in the current framework of a post-industrial scenario, what is intended is a **comprehensive rehabilitation/regeneration of obsolete social neighborhoods**; this work should be undertaken from methodological criteria such that the transformation of buildings is allowed, based on the conservation and reuse of the existing urban fabric.

In short, the actions cannot be considered in terms of demolition and/or new creation, but always taking into account the architectural regeneration of buildings and the surrounding urban habitat on the site already built. We understand that this should be the fundamental intervention criterion for a truly sustainable, regenerative action, attentive to the cultural identity of these neighbourhoods...

This approach can be made compatible with demolition actions and also those that generate new constructions, explicitly reducing the carbon footprint of the construction process of the intervention. Thus, the work system should make it possible to transform and expand housing units, resolve accessibility, rehabilitate construction and structural systems, incorporate **bioclimatic conditioning criteria and systems for improving energy efficiency and consumption**, and taking into account the embedded carbon process.

In this regenerative scenario, four main lines of action could be established:

- **Social, cultural and heritage identity.** Recognise and enhance the attributes of each neighbourhood, ensuring that actions respect and reinforce local values and residents' ways of living.
- **Building and urban materiality.** Optimize the attributes of buildings and their environment, prioritizing conservation, reuse of resources and adaptation of construction systems based on sustainability and efficiency criteria.
- **Energy and bioclimatic conditioning.** Incorporate strategies that reduce energy vulnerability and improve the environmental performance of homes and their urban environment.
- **Comfort and health conditions.** Guarantee optimal living conditions, understanding that the well-being of residents depends on both environmental quality and the functional and social adequacy of the habitat.

In this way, the **comprehensive action** involves the requalification of the social, material and energy identity, seeking an effective improvement in the comfort and health of the inhabitants in obsolete neighborhoods, resulting in an increase in the quality of life from four intersecting parameters that would respond to the following graphic representation:

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<sup>10</sup> Sevilla City One has been presented as an initiative for the promotion and transformation of the city and the metropolitan region into an example of sustainable urban development. It is developed through a cluster that already has 91 member entities, more than 450 companies involved from different fields and more than 3,000 citizens actively participating in the different proposals. The initiative has the collaboration of the three administrations, the Seville City Council, the Provincial Council of Seville and the Junta de Andalucía.

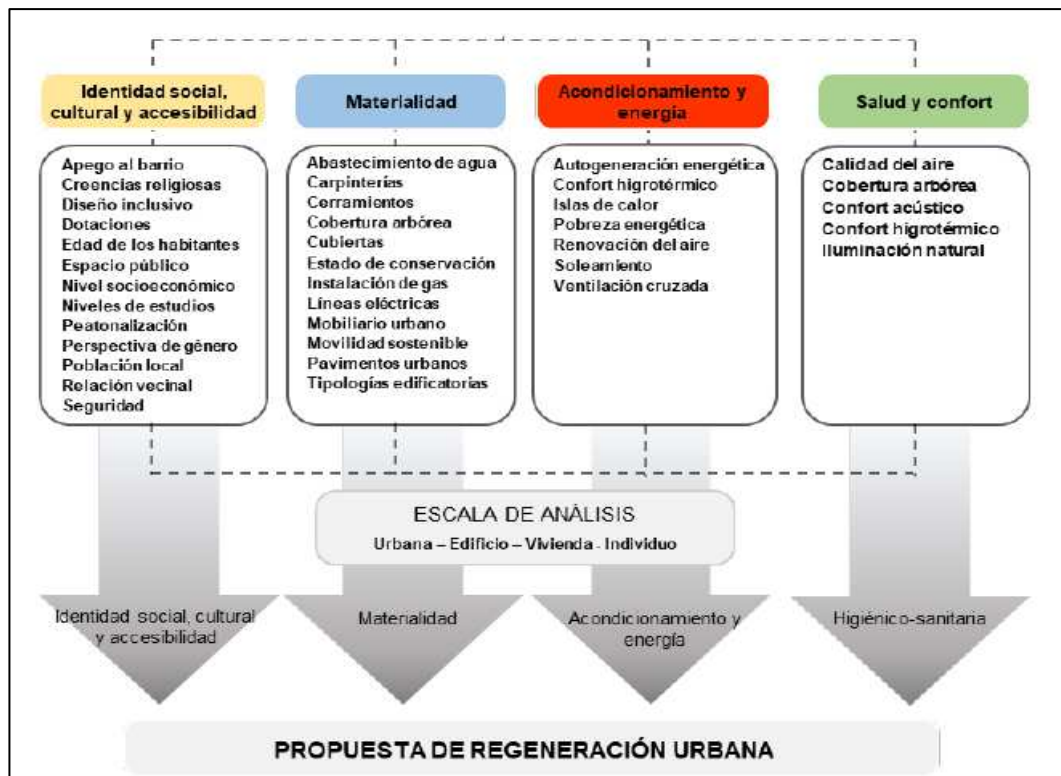


Illustration 5. Proposal for urban regeneration.

Mission Cities in Spain are enthusiastically following the progress that is taking place in each of the cases. In the energy rehabilitation of buildings we have the example of the City of Valencia, which has promoted various publications on the subject, making the resources available to its citizens, coinciding with our climate neutrality objectives.

In any case, without the proposed attention to the built sector, it will be impossible to achieve the objectives of the Mission. And without doubt, without the **EU's financial support**, it will be equally unaffordable.

The Valencia City Council's Guide to Efficient Housing and Decarbonised Rehabilitation is a *practical tool* that aims to promote the energy rehabilitation of the building stock. It provides design and construction tools with biomaterials such as wood, to promote a more sustainable and resilient built environment. It seeks to address the technical and economic challenges associated with improving the energy performance of buildings, and to promote a cultural shift towards more environmentally responsible practices.

It is aimed at both technical professionals and administrations in the management of public contracts, as well as citizens and communities of owners interested in sustainable rehabilitation and it is intended to become a useful and accessible tool for all its recipients.

Clear guidelines, recommendations and practical tools are presented to guide energy rehabilitation interventions in building in accordance with the latest technical and regulatory standards of the EU adapted to the climatic, social and economic specificities of Valencia.



This guide has been developed by the *Valencia Climate and Energy Foundation, Cese for Foundation and EU CINCO 2.0*, within the framework of the European URBANEW project. The project focuses on finding and testing solutions to decarbonise the built environment in Valencia, Barcelona, Madrid, Seville, Valladolid, Vitoria-Gasteiz and Zaragoza by accelerating the urban transition towards climate neutrality.

From Urbanew first, and now with EMC<sup>3</sup>, the aim is to promote the energy rehabilitation of the building stock of the Spanish Mission cities. Both projects provide design and construction tools with biomaterials such as wood, to promote a more sustainable and resilient built environment. It seeks to contribute to climate neutrality, addressing the technical and economic challenges associated with improving the energy performance of buildings, and to promote a cultural shift towards more environmentally responsible practices.

These actions are aimed at both technical professionals and administrations in the management of public contracts, as well as citizens and communities of owners interested in sustainable rehabilitation, and it is intended that the conclusions become a useful and accessible tool for all their recipients.

Clear guidelines, recommendations and practical tools are presented to guide energy rehabilitation interventions in building in accordance with the latest technical and regulatory standards of the EU adapted to the climatic, social and economic specificities of Valencia.

The **Urbanew project** also showed the benefits of comprehensive rehabilitation:

1. They improve health by improving air quality, thermal, acoustic and light comfort.
2. They improve the livability and functionality of the building.
3. They save costs by improving the domestic economy.
4. They contribute to improving the sustainability of cities and the environment by reducing CO<sub>2</sub> emissions.

In addition, cities have seen that the energy rehabilitation of homes generates positive externalities, such as **economic recovery**, the **strengthening of energy sovereignty and job creation**, among others.

Seville will proceed to adapt all these recommendations to its reality, within the framework of the EMC3 project, which is a continuation of the URBANEW project. Our work packages are focused on the generation of a system of indicators that helps to establish priorities to undertake massive energy rehabilitation (WP1), and on identifying the most appropriate ways for the regulatory regulation of rehabilitation (at local, regional, state or European level; or through sectoral regulation).

Seville is also committed to complying with the principles of the **circular economy**, another climate neutrality objective, incorporating the sustainable use of resources, compliance with the **waste management hierarchy** emanating from the European Union and the promotion of **public procurement of green products into its strategy**.

The **Seville Circular Economy Charter** (better known technically as the **Seville Declaration**) is a historic and strategic document signed in **March 2017**. Its main objective is to commit Spanish





and European cities to abandon the linear economic model of *take, manufacture, use and throw away* to adopt a **circular** one, where waste is converted into resources.

The declaration was born within the framework of the conference "*Circular Economy: The commitment of cities*", promoted by the Seville City Council and the Spanish Network of Cities for Climate of the FEMP. It was initially signed by some **60 municipalities**, although hundreds more have since joined.

The document sets out a roadmap with specific commitments for local governments:

- **Waste Management:** prioritise the reduction, reuse and recycling of materials.
- **Green Public Procurement:** that municipalities buy products and services that are sustainable and circular.
- **Local Governance:** involving local citizens and companies in the change of model.
- **Transversality:** applying circular economy criteria in all areas of the city council (urban planning, water, energy, etc.).

It was the first major formal step in which cities recognised that, as the largest consumers of resources and generators of waste, they hold the key to solving the climate crisis through circularity.

Since the signing of this letter, Seville has promoted specific projects to set an example, such as:

- **The Chair of Circular Economy:** in collaboration with the University of Seville.
- **Biomethane projects:** transforming organic waste and sewage sludge into fuel for TUSSAM buses.
- **Water Management (EMASESA):** models for the recovery of nutrients from wastewater for agricultural use.

And for all this, it is necessary to act from instruments of **awareness, sensitization and participation**, promoting R+D+i and the generation of public-private alliances and partnerships.

Although with a metropolitan dimension, the water company (EMASESA) is responsible for the management of the **integral water cycle**. The attention to energy efficiency, with the consequent reduction of GHG emissions and its actions for adaptation to risk scenarios have been exemplary, as we will highlight in this iteration of the SCCC. Suffice it to say now that, in the Climate Emergency Plan, fifty actions aimed at adapting to the new scenarios are included, and the need to have adequate climate information is recognised to allow us to continue defining the objectives and addressing this phenomenon from a **comprehensive perspective**.

In accordance with the objectives of the Mission, the decarbonisation of the City of Seville will be carried out through intervention in the four main sectors of CO<sub>2</sub> emissions generation, all of which are incorporated into the different planning instruments mentioned: **mobility, electricity consumption, consumption of other fuels, and MSW and AC management. RR.**

Another key concept that has been taken into account in this iteration is that of **just transition**. To this end, we rely on the Institute for Just Transition (ITJ), which aims to identify and adopt measures that guarantee workers and territories affected by the transition to a greener, low-





carbon economy, equitable and supportive treatment, minimising the negative impacts on employment and the development of the territories.

The ITJ is an autonomous body of the Ministry for the Ecological Transition and the Demographic Challenge (MITECO) created on 28 April 2020 (Royal Decree 500/2020).

We then address the main actions planned in each of the sectors covered by the SCCC, now summarizing the situation as of March 2026, and the priorities and strategic interventions planned, with an estimate (in the absence of precise determinations) of their contribution to climate neutrality.

#### 4.2.1. Mobility

Mobility has always been one of the intrinsic elements of daily life in cities. Economic and social development has always been linked to the possibilities that citizens have had to get around. Nowadays, cities are spaces of freedom and coexistence that concentrate more and more population. They are not isolated cities, they are being configured as authentic cities whose limits exceed the administrative boundaries themselves. This population structure conditions the development and organisation of mobility and transport and how we face the challenges of movement in cities will depend to a large extent on whether we have spaces for coexistence, habitable, healthy and sustainable.

Building the cities of the present and the future so that they are a space of freedom, culture and progress is a collective task so that the activities carried out in their area offer opportunities to the entire population. And in this sense, the mobility of any city and the correct integration with metropolitan and territorial environments is an urgent need. The interrelations of mobility with the urban structure and comprehensive planning are evident. Strategies towards sustainable mobility contribute to eleven of the seventeen Sustainable Development Goals established by the United Nations (SDGs). We must therefore consider the movement of people and goods as an **easy, safe and ecologically, economically and socially sustainable** organisation within the framework of strategic planning and the organisation and transformation of the city to reaffirm its universality for people and its vocation as a common and public space.

All efforts are focused on achieving a more sustainable city by adopting a mobility model that is more efficient from an economic and functional point of view, more equitable from a social point of view and more protective from an environmental point of view. The main objective of the Sustainable Mobility Strategy will therefore be to improve the modal distribution of the city, reducing the participation of private vehicles in favour of public transport and soft modes (bicycle and walking), recovering public space for people.

To address this situation, a large part of the priorities for intervention are established in the following specific objectives in the **Sustainable Urban Mobility Plan of Seville** (SUMP):

- The City of Seville will become a large Low Emission Zone in which 2/3 of journeys are made in more sustainable modes and only 1/3 in private vehicles. This would imply that the participation of private vehicles in the city's modal distribution would decrease to 33.33%, and that the transport system would be more efficient, improving the average travel times of each mode.





- In this sense, the objective is that the average travel time is not more than 20 minutes, and that in no case does it exceed 25 minutes per mode, that is, that no trip in the different modes of transport involves an average time greater than 25% of the average travel time.
- Given the significant volume of journeys between Seville and the Metropolitan Area, which accounts for 46% of the total number of vehicles supported by the urban centre, integration elements will be established to improve the transport system between Seville and the Metropolitan Area. The share of ZERO EMISSIONS private vehicles must reach 10% by 2030, and will adopt measures to promote electric vehicles, as well as the necessary infrastructures for the evolution of the electric vehicle fleet itself, with aid and incentives for this type of mobility.
- Within this line of action, it is established as a specific objective that 100% of the trips made on public transport will be made in ZERO EMISSION vehicles.

These objectives establish specific values that will make it possible to monitor the impact of the Plan's measures and that will have a direct impact on the reduction of the city's emissions derived from the transfer of private vehicle users towards more sustainable modes, of a more efficient transport system by reducing average travel times, and improving the transportation system with the metropolitan area.

The measures contemplated for the improvement of internal mobility in the SUMP are developed in 8 chapters, organized by theme, according to the following scheme:

1. Mobility management
2. Proposals for pedestrian mobility
3. Proposals for cycling mobility
4. Public Transport
5. Distribution of Goods
6. Road and Traffic
7. Parking
8. Measures to Support Decarbonisation in Transport

In addition, and as we have already advanced in the previous chapter, Seville will continue and strengthen its commitment to **sustainable urban mobility**, which it has been developing since the last decade, with relevant milestones such as the development of the bike lane, new means of electric transport (metro and tram), traffic calming and the facilitation of pedestrian mobility. The SUMP has also introduced new pedestrianised sectors.

There are 6 main projects in the field of mobility, as mentioned above:

- The construction of Metro line 3.
- Line 2 of the Metro, whose first studies have already begun.
- Purchase of 70 new city buses.





- Extension of the tram to the Santa Justa Railway and High-Speed Station, and the development of platforms reserved for electric buses (the so-called trambus, which will reach Seville East), and from Santa Justa to Plaza del Duque.
- Laboratory for the mobility of the future.
- Reserved platforms (HOV Bus Lane) for public transport and vehicles with two or more occupants.

Undoubtedly, **the SUMP will be decisive for the achievement of climate neutrality in Seville.** This is a reference document for the SCCC.

The set of planned actions in the field of mobility could achieve a reduction in GHG emissions, which have been estimated at 55% for passenger cars; 65% for vans; and 80% in trucks. Thus, Seville would go from emitting 828,211.32 tCO<sub>2</sub>e to 374,526.97 tCO<sub>2</sub>e, this being the resulting gap in terms of mobility by 2030, according to the data with which this 2026 iteration is built.

#### 4.2.2. Electrical power consumption

The reduction of emissions in this sector, as we have shown in the reference inventory, **shows the City's remarkable effort to mitigate emissions.** Citizen awareness, the adoption of measures in public and private buildings, in the trade and hospitality sector, ... Let us remember that the Seville City Council had initiated the actions to make a more Sustainable City with the adherence to the European Campaign for Sustainable Cities and Towns in 1998, assuming the Aalborg Commitments and preparing the first Sustainability Diagnosis and System of Monitoring Indicators in 2001. In 2007 the City hosted the V European Conference on Sustainable Cities, where the Seville City Council presented its Action Plan. The City would not lose that path in the following years, until today.

The high consumption for refrigeration in the city of Seville explains that the data, far from improving, may worsen year after year due to the increasingly warm conditions in a context of accelerated climate change. This circumstance should impose on us a more decisive planning, if possible.

On the other hand, we must emphasize that the reduction of electricity consumption is not always associated with the reduction of emissions, as it depends on the equivalent energy mix.

The measures contemplated by the Seville City Council for the reduction of electricity consumption are developed in 7 chapters, organized by theme, according to the following scheme:

1. Municipal buildings and facilities
2. Buildings and equipment/ Tertiary sector facilities
3. Residential Buildings
4. Street lighting
5. Local electricity production
6. Local heating/cooling production
7. Afforestation and bioclimatic urbanism.





Seville has 2,898 hours of sunshine per year, which makes it an ideal space for the **implementation of solar energy**. Photovoltaic generation on roofs, pergolas, roads or car parks will be connected in energy communities, which will enable self-consumption networks in each of the city's districts. In addition, large-scale storage facilities will be developed to regulate generation and manage the load curve as an integrating element of all this, the constitution of a smart grid will be possible through the automation and control of the current distribution network.

Regarding the **residential sector**, Seville has a stock of about 300,000 homes in which the energy rehabilitation of buildings together with the cooling networks, will improve energy efficiency by offering more efficient air conditioning systems and greater reduction in energy demand, and on the other hand the use of renewable energies and energy generation. They are two complementary measures in processes of new urbanization and in processes of urban regeneration. In this sense, the rehabilitation offices will constitute platforms of actors that will connect some actions with others, mostly in areas of greater degradation and with worse levels of efficiency and energy poverty.

**Afforestation and bioclimatic urbanism** would be the third major action to reduce energy demand in the city. The progressive elimination of shiny smooth surfaces by draining pavement with a rainwater storage system, and the increase of plant elements as a fundamental pillar of shading to three-storey buildings are part of the healthy city model, which mitigates the heat island effect.

The determination of strategic priorities and interventions involves identifying, classifying and documenting actions applied or applicable both to the planning, design and execution processes of the City and its architecture as well as to the spaces already urbanized or built. The incorporation of actions covers a **wide range** of activities ranging from research initiatives to projects or built and inhabited spaces, with other diverse actions ranging from the registration of industrial patents to citizen participation processes.

According to the IUACC experts, this process must take into account the local climatic characteristics – high summer temperatures, high solar radiation and water scarcity – as well as the historical heritage and urban morphology. The inventory must include actions ranging from extensive urban and landscape regeneration projects to proposals that aim to turn public libraries and other spaces in the city into climate shelters<sup>11</sup>, including the development of specific and innovative construction systems for protected housing with almost zero energy consumption, with the implementation of green and reflective roofs, installation of photovoltaic systems, recovery of interior courtyards for ventilation and shade, permeable pavements, sustainable drainage solutions, improvement of insulation on facades, recovery of rooftops as spaces for recreation for residents and a place to dry clothes, or the integration of vegetation into the built environment.

In addition to all this, it is key to pay attention to data on current urban planning policies, renovations carried out, local energy regulations and citizen participation processes, such as the municipal initiatives of the Climate and Sustainable Energy Action Plan (PACES), and other viable proposals from other administrations, academia, civil society or the business fabric.

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<sup>11</sup> The planning for the location of climate refuges is attached as Attached Document 2.





The inventory will serve as a diagnosis, but also as a strategic tool to guide future interventions in the ecological transformation of the existing urban fabric and prepare for the next formal iteration of the Mission in 2026.

The current analysis follows the following scheme:

### **A. Territorial and urban development**

Actions and initiatives for urban or territorial development and transformation, at different scales and executed or not.

#### **A.1. Territorial and urban planning**

Plans and proposals highlighting measures aimed at:

- Rationalizing urban sprawl to protect ecosystems and reduce displacement.
- Urban renaturation: urban garden infrastructures, creation of green corridors, green roofs, and parks to absorb CO<sub>2</sub> and reduce the heat island effect.
- Mixed zoning: promoting areas that integrate housing, commerce and services to avoid long journeys.
- The design of walkable and cyclable cities: pedestrian infrastructures and connected bike lanes.
- The reuse of degraded urban land in the face of expansion policies

#### **A.2. Urbanization**

Exemplary urbanization processes. Attenuation of the Heat Island effect:

- Construction solutions
- Plant species
- SUDS
- Photocatalytic pavements
- Use of recycled materials from the construction site
- Resource and Waste Management
- Selective collection and efficient recycling in the urban environment.
- Rainwater collection and reuse systems.
- Reduction of irrigation water consumption through efficient devices
- Community composting in urban gardens.

### **B. Treatment of public space**

Sustainable urban or territorial planning actions and initiatives:

#### **B.1. Design of public space**

Bioclimatic design and passive measures: design adapted to the local climate to improve urban thermal comfort. Orientation and ventilation.

#### **B.2. Construction solutions**

- Plant species
- Photocatalytic pavements
- Promotion of the circular economy in construction: reuse of rubble and recycled demolition materials.





### **B.3. Facilities**

- Photovoltaic pergolas
- SUDS

### **C. Built spaces**

Actions and initiatives:

#### **C.1. Architectural Design**

- Bioclimatic architecture and passive measures: design adapted to the local climate to reduce the need for heating/cooling. Orientation and natural ventilation in building design.
- Use of sustainable materials: certified wood, recycled materials or materials with low environmental impact.
- Improvement of thermal and acoustic insulation of buildings.
- Use of natural light to reduce electricity consumption.

#### **C.2. Construction processes**

- Reduction of water consumption through efficient devices (taps, dual cisterns).

#### **C.3. Energy and Efficiency in Buildings**

- Integration of renewable energies: photovoltaic or thermal solar panels, mini-wind farms.
- LED lighting and motion sensors.
- Automation and home automation for efficient energy management.
- Environmental certifications (LEED, BREEAM, EDGE, etc.) as a guide for sustainable constructions.
- Nearly Zero Energy Building Design (nZEB).

### **D. Urban Management and Policies**

#### **D.1. Public initiatives**

- Green building and energy efficiency regulations.
- Tax incentives for sustainable renovations in existing buildings.
- Energy rehabilitation plans for neighbourhoods.
- Urban environmental education and citizen participation.
- Urban carbon monitoring and the use of open data for decision-making.

#### **D.2. Development of Citizen Initiatives**

In this area of the built site that concerns us, the Ministry of Housing and Urban Agenda has promoted the **ARCE 2050: Zero Emissions Architecture** project, an initiative whose purpose is to lead and accelerate the decarbonization of the Spanish real estate stock and its cities. This project puts at the centre the improvement of the quality of life of people and cities, and responds to the most urgent environmental and social challenges through a sustainable energy transition from a quality architecture that leaves no one behind. It also establishes the roadmap for the **modification of the Technical Building Code** and the drafting of the **National Building Renovation Plan**, within the framework of the **transposition of the new Directive on Energy Efficiency in Buildings**.





The initiative is aligned with the principles of the **Spanish Urban Agenda**, sharing the same path to achieve more humane towns and cities, promoting their equitable, fair and sustainable development, all through quality architecture<sup>12</sup>.

Our purpose must also be ascribed to **Directive 2024/1975, on the Energy Performance of Buildings**, which will apply in 2030 to all new buildings, and in 2050 to the entire built stock.

Also in the National Building Renovation Plan, which represents a paradigm shift. We will now highlight the so-called **Building Renovation Passport**.

In this case, the forecast for reducing emissions with the planned actions (considering the potential in terms of generation for supply) has been estimated according to the following values: 25% for the residential sector; 50% for commerce; 30% in administrative buildings; 30% in industry; and 40% in the rest. This would mean avoiding 202,495.8 tCO<sub>2</sub>e in the electricity consumption sector, resulting in a **gap** of 417,672.63 tCO<sub>2</sub>e by 2030.

#### 4.2.3. Consumption of various fuels, MSW and AA.RR management

The **consumption of other fuels** (LPG, diesel, natural gas, butane, propane, fuel oil and coal) together with waste and wastewater treatment represent the third sector of GHG emissions in Seville.

The use of these fuels in Seville is expected to decrease as the consumption of electricity for cooling, domestic hot water and other domestic uses, and uses in small industry, increases. Natural gas and butane consumption is more commonly used in domestic hot water and kitchens.

The production of renewable energy using solar energy (domestic hot water and PV) will be the determining element for the minimisation of residual consumption of other fuels.

As for municipal waste in Seville, it is managed by the Metropolitan Consortium at the Montemarta-Cónica Waste Treatment Centre, which is located in the municipality of Alcalá de Guadaíra. The Centre, owned by the company ABORGASE, has an area of around 100 ha, and the distribution of areas and facilities is as follows:

- Recycling Plant: 10 Has.
- Rejection and surplus treatment area: 60 hectares.
- Biogas Recovery Plant.
- Reserve for extensions and cultivation and recreation area: 30 hectares.
- Used Tire Recycling Plant: 0.5 Has.
- Hospital Waste Treatment Unit: 0.02 hectares.

The management of MSW in the City of Seville responds to the following scheme and contents:

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<sup>12</sup> In this regard, the reference of Peris Blanes is necessary; Cerezo Peco; López Rodríguez: **Integrating Urban Agenda and Climate Mission to accelerate the urban transition to sustainability: the strategy of the city of Valencia**. In CIUDAD Y TERRITORIO ESTUDIOS TERRITORIALES ISSN(P): 1133-4762; ISSN(E): 2659-3254. Vol. LVII, No. 223, Spring 2025. Pp. 69-90



Illustration 6. Volumes of waste managed.

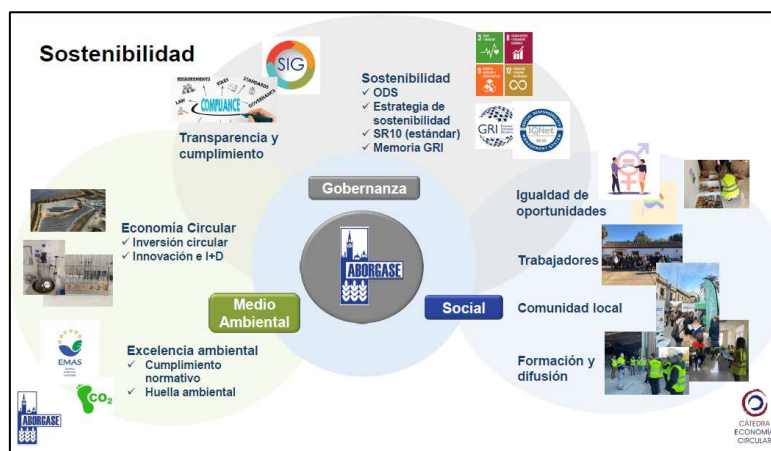


Illustration 7. ESG in Seville.

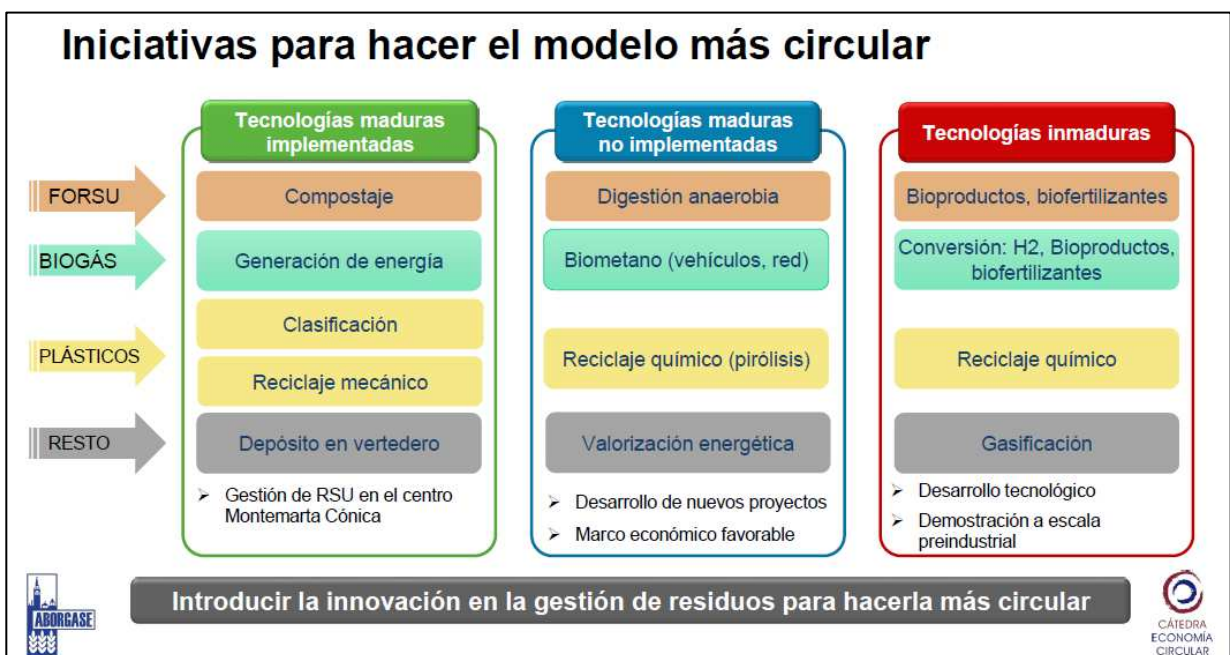
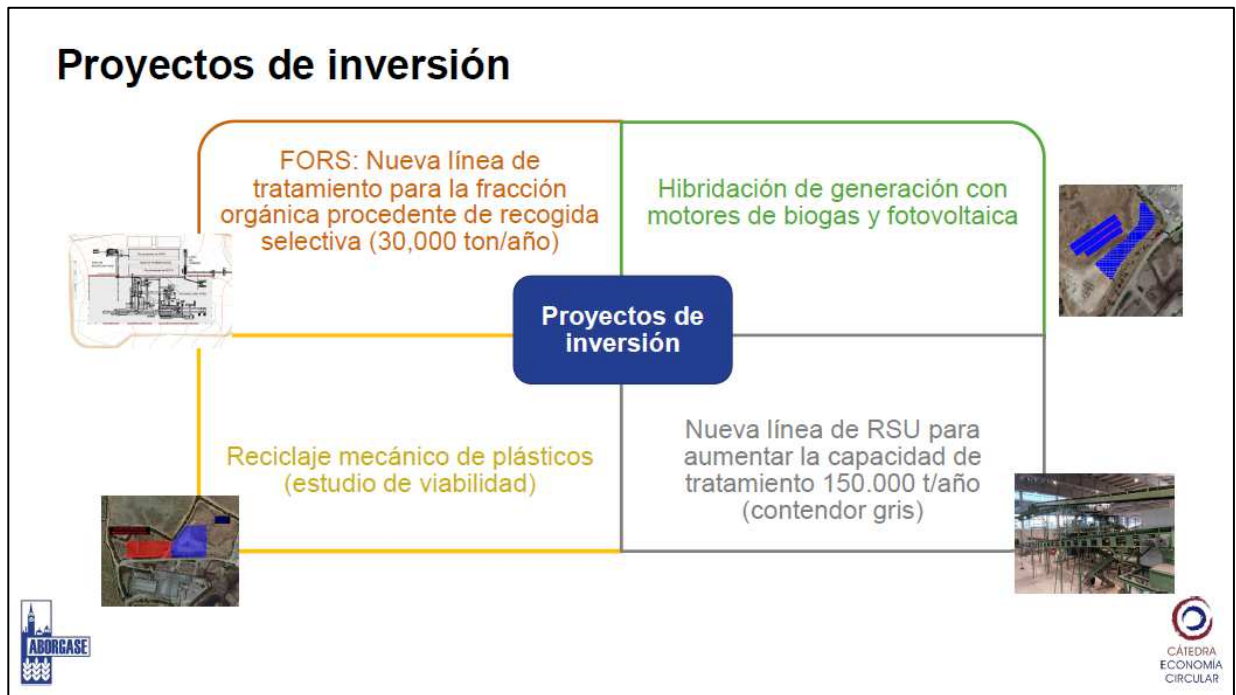


Illustration 8. Initiatives to make the model more circular.





*Illustration 9. Investment projects.*

The main actions planned to improve MSW management are the following:

- Treatment of the Selective Organic Fraction: reduction of 45,000 tCO<sub>2</sub>e/year
- Hybridization of generation with biogas and photovoltaic engines: reduction of 1,020 tCO<sub>2</sub>e/year
- New MSW treatment line: reduction of 21,000 tCO<sub>2</sub>e/year
- Biomethane grid injection: reduction of 1,786 tCO<sub>2</sub>e/year
- Recovery of non-recyclable plastics: expected reduction of 4,546 tCO<sub>2</sub>e/year
- Energy recovery from non-recyclable waste: expected reduction of 140,000 tCO<sub>2</sub>e/year

The Good Practices to be implemented in Seville are the *Plan for minimization in the production of waste* (commercial, residential, tourist) implemented by Vitoria-Gasteiz. And also the *ZERO Waste Plan*, in Barcelona.

Finally, in terms **of wastewater management** EMASESA, the Metropolitan Water Supply and Sanitation Company of Seville, implements various actions to improve wastewater management, focusing on efficiency, sustainability and technological innovation. The City of Seville represents more than two thirds of the activity of this metropolitan entity.

Some of EMASESA's actions to improve the management of the integral water cycle are the following:





- **Digitalisation and technology:** EMASESA is carrying out a digital transformation to optimise water use and improve the capacity to respond to extreme weather events, such as droughts and floods.
- **Digital twins:** uses digital twins of the sanitation network and treatment plants for better treatment management, thus reducing environmental impacts.
- **Energy efficiency:** improves energy efficiency by optimising the production of own energy (hydraulic, photovoltaic and biogas) and reducing the carbon footprint.
- **Wastewater treatment:** implements advanced technologies in its treatment plants, such as biological reactors and filtration systems, to improve the quality of the treated water.
- **Control and monitoring:** it carries out rigorous analyses and controls of the quality of drinking water and wastewater, as well as discharges.
- **Sanitation and rainfall management:** it has rainwater retention tanks to regulate the flow and prevent flooding and pollution of the receiving channel.
- **Education and awareness:** it conducts environmental education and awareness campaigns on responsible water use, including the efficient use of water at home and the recycling of grey water.
- **Research programmes:** participates in research and innovation projects to improve efficiency and sustainability in water management, such as the "Digital Reservoir 5.0" project and "CREANDO".
- **Collaboration and alliances:** collaborates with other entities and organisations to promote sustainable water management, such as the EMASESA Water Observatory.

These actions demonstrate EMASESA's commitment to sustainable water management, seeking innovative and efficient solutions to protect this vital resource and ensure its availability for future generations.

Wastewater Treatment Plants (WWTPs) are the facilities in which a series of processes are applied to wastewater so that it can be returned to the environment in physical, chemical and biological conditions similar to those it presented in its natural state.

In WWTPs, pollutants are removed from the water so that, when it is discharged back into the river or reused, it does not have any negative impact on the health and well-being of people or ecosystems. The Wastewater Laboratory monitors the final discharge of the WWTPs into the riverbed, to ensure its protection, and is accredited under the UNE-EN ISO 17025 Standard.

At EMASESA we have 5 treatment plants distributed in the province of Seville: Copero, El Ronquillo, Mairena – Viso de Alcor, Ranilla and Tablada. Since 2021, the year that we have taken





as a reference for our SCCC, EMASESA has implemented numerous actions for the management of wastewater that have achieved a very significant reduction in its emissions; therefore, it is foreseeable that in the next iteration of the AC the results of all these actions can be counted, following the data of the HC of the Junta de Andalucía.

Some large numbers in terms of environmental commitment and social contribution are the following:



Illustration 10. Environmental commitment.



Illustration 11. Social contribution.

The set of actions planned for this sector has been estimated with the following reductions:

- Consumption of other fuels: we expect a reduction of 65%.
- MSW management: an 80% reduction could be made, taking into account the set of actions planned.
- AARR Management: An estimated 70% reduction in emissions.

This would achieve a reduction in emissions of 290,901.8 tCO<sub>2</sub>e, thus leaving a pending gap of 135,554.59 tCO<sub>2</sub>e. by 2030.

#### 4.2.4. Other issuers

In the 2026 iteration, no specific actions have been defined for the mitigation of these sectors.





And as for the **F-gas** sector, a comprehensive approach is key to reducing its use: opting for more sustainable alternatives, such as natural refrigerants (propane, ammonia, carbon dioxide), carrying out regular maintenance of refrigeration and air conditioning equipment to prevent leaks, and promoting the replacement of equipment that uses F-gases with greener options. In addition, it is important to promote awareness of the importance of reducing these gases and the adoption of sustainable practices in industry and at home.

The specific measures planned to be proposed by our SCCC to reduce the use of fluorinated gases are the following:

- Substitution with other alternatives, such as using natural refrigerants such as propane (R-290), ammonia (R-717) or carbon dioxide (R-744), instead of fluorinated gases in refrigeration and air conditioning equipment.
- Preventive maintenance, carrying out periodic checks and maintenance of refrigeration and air conditioning equipment to detect and repair leaks, ensuring their efficiency and minimising the release of fluorinated gases.
- Phasing out HFCs, as the European Union is implementing a substitution of hydrofluorocarbons (HFCs), with the aim of banning them altogether by 2050, including banning products and equipment containing them.
- Transition to clean technologies, encouraging the transition to cleaner technologies, such as heat pumps and air conditioning systems that do not use fluorinated gases, especially in the phasing out of equipment containing them from 2027, with a complete ban in 2035.
- Awareness and education, promoting awareness of the environmental impacts of fluorinated gases and educating the population on sustainable alternatives and good practices to reduce their use.
- Implement measures to reduce emissions of fluorinated gases in industry, such as recycling and destruction of these gases, the optimization of production processes to minimize emissions and the substitution of fluorinated gases with more environmentally friendly alternatives.
- Encourage the recycling and recovery of fluorinated gases from end-of-life equipment and systems, thus preventing their release into the atmosphere.
- Choose products with a lower content of fluorinated gases and reduce LP gas leaks, as well as opt for fresh and local products, reducing the carbon footprint in the transport of goods.

The result of this set of actions will mean that Seville will minimise tCO<sub>2</sub>e emissions from the use of fluorinated gases and other emissions by 65%, which would leave the inventory for this sector at 26,224 tCO<sub>2</sub>e, resulting in a gap of 22,478.5 tCO<sub>2</sub>e.





#### 4.2.5. Emissions Offsetting

According to the Inventory of the Junta de Andalucía, Seville has an **absorption capacity of 526.2 tCO<sub>2</sub>e**. We must remember the small size of the municipality (141.4 km<sup>2</sup>) and its high degree of urbanization. The resulting population density is 4,887 inhabitants per km<sup>2</sup>.

The development of **the City's Green Belt** is planned, through the creation and/or adaptation of a green infrastructure of about 42 km, which will serve as an ecological corridor and link a high set of green spaces and existing parks.

Also, the **recovery of areas of high ecological potential** that, belonging to the existing Public Hydraulic Domain on the left bank of the Guadalquivir River, currently lack access, or have been devoid of riparian vegetation that allows the development of diverse and enriching ecosystems. These sections would provide a connection to the rest of the paths that run along that bank of the river, and which are of enormous scenic and environmental attraction, as well as frequently used in cycling activities, equestrian, bird watching, and enjoyment of nature in general.

The actions in general will be:

- Creation of an **autochthonous vegetation cover** along its entire length that marks the proposed route, improves environmental conditions and promotes an increase and diversification of biodiversity.
- Construction of several **bridges/footbridges** to save existing infrastructures.
- Defence of the margin of rivers and streams and **regeneration of primitive gallery forests** in the Hydraulic Public Domain and in the areas affected by the new green ring/corridor
- **Conditioning of roads for public use**, so as to enhance the use of the new space by citizens.
- Improvement and promotion of **accessibility**.
- Installation of **viewpoints for bird watching** in strategic places, mainly wetlands and the Guadalquivir River.

The collaboration of various companies (local, national and international) is also planned for **the offsetting of emissions**, such as the initiative being promoted with Iberia for the compensation of the operations of its aircraft at airports. The inventory of actions in this regard, for compensation, is expected to be available in the iteration of the SCCC in 2026.

Both at the municipal level and among the business sector, work is being done to find effective alternatives to maximise the possibilities of **offsetting the City's carbon footprint** . An example of this is represented by the Real Betis Balompié Football Club, which already officially registers its calculated emissions, is in the reduction phase and in actions to offset the GHG emissions due to its activities.

Currently, some 50 companies operating in Seville are incorporated into the Carbon Footprint, compensation and absorption projects registry of the Government of Spain or the Junta de Andalucía. The aim is to cement collaboration strategies from the local level to integrate these actions within the framework of the Mission process, which will undoubtedly contribute very significantly to increasing the CO<sub>2</sub> sink capacities of the City of Seville.





At the same time, all these member companies will be able to make use of a municipal badge that accredits their status as a Mission Entity, which recognizes their commitment to the City and the Planet to their customers, partners, suppliers, etc. All the information in this regard is included in Annex III.

#### 4.2.6. Strategic interventions

At the municipal level, some of the actions planned and being implemented are included in the Action Plan for Sustainable Climate and Energy of Seville (rev. 2020), as a result of the participation of the Seville City Council in the EU Covenant of Mayors. This work, which began in 2009, proposed an estimated reduction of 54.28% in GHG emissions compared to the 2005 Inventory, by 2050. We have already pointed out that these forecasts have been far exceeded.

We now address the strategic interventions that we consider appropriate to compensate for the emissions gap that we have identified in the previous section. Some of these actions will be scarcely intensive in reducing emissions, although they involve demonstration initiatives that, if they find replication niches in the City, may be of interest for climate neutrality.

**In terms of transport, the main interventions should focus on passenger cars, which are responsible for 73% of road traffic emissions in Seville. And in freight transport, which accounts for almost 22% of emissions. We must be aware that the electrification of these modes of transport will cause an increase in the city's electricity consumption, so in the design of measures it is necessary to achieve a net reduction for each sector that enables the neutrality that is sought. In this analysis, the national energy mix and the PV generation distributed in the City will be a key factor.**

It is essential to continue working together with the populations of the metropolitan area (and multilevel institutional collaboration) to **reduce journeys in private vehicles from the peripheral area to the centre**, represented by a large part of the city of Seville, and not only the historic centre. The transport of goods from logistics centres to the city (last mile) must also be managed effectively to avoid their significant impact on road traffic emissions.

In terms of **electricity consumption**, intervention **in the residential sector is key**, which accounts for 34.4% of total consumption in Seville. And in commerce, with 31.5%. Not forgetting the impact of administration and public service buildings, with annual emissions of 14.8% of total electricity consumption.

We reiterate that it must be taken into account that the Spanish energy mix notoriously penalises emissions from electricity consumption; A reduction in this mix could contribute to the reduction of emissions significantly. Also, the optimisation for the reception of the implementation of PV throughout the City, favouring self-consumption, as we have already mentioned.

Reducing 1°C on public roads could avoid, according to some unofficial studies, up to 2% of consumption in building cooling. For this reason, it is necessary to intervene on public roads with a **shade plan** capable of minimizing the temperature in the summer season, and especially in the face of heat waves, which are increasingly frequent and intense. In commerce, immediate interventions are needed to inform about the significant impact on GHG emissions due to certain open-door commercial practices, with outdoor/indoor temperature differences that can





sometimes exceed 20°C in the summer season. All this, in addition to the implementation of other alternatives.

For its part, just over 10% of the city's total emissions are mainly due to the consumption of **natural gas and LPG**. Intervention will be needed in these subsectors to reduce their consumption in fixed installations, which are mainly linked to the residential sector and small and medium-sized industry.

Finally, further progress must be made in a change in the municipal **waste management** model . It is **necessary to reduce as much as possible the CH<sub>4</sub> generated** by the deposit of waste in landfill, either by avoiding the arrival of organic matter or by implementing **new management alternatives**.

**Embedded carbon** or embodied carbon refers to the greenhouse gas (GHG) emissions associated with a building throughout its life cycle, from the extraction of raw materials to its disposal or decommissioning. It includes both manufacturing and construction emissions, as well as those from rehabilitation, use and end of life.

The different actions foreseen in this SCCC for the built sector address embedded carbon.

Some basic concepts for the consideration of embedded carbon to take into account are the following:

- Initial or embedded carbon: is the carbon emitted during the manufacture of the materials and the construction of the building, before the building is used.
- Embodied or residual carbon: this is the carbon associated with the phases of use, rehabilitation and end of life of the building.
- Importance: Embedded carbon is a significant part of a building's carbon footprint, and it can account for a large portion of total emissions.
- Impact: Carbon embedded in buildings is a major contributor to the climate crisis and accounts for a significant portion of global CO<sub>2</sub> emissions.
- Reduction: to reduce embedded carbon, measures can be taken such as optimising the manufacture of materials, using recycled and recyclable materials, minimising transport distances and committing to a circular and local economy.

Embedded carbon is therefore a crucial indicator of a building's sustainability and its impact on climate change. Reducing the carbon embedded in construction is essential to achieve climate neutrality, and it should be understood that this indicator will be the subject of the different strategic actions to be undertaken within the framework of this SCCC.

In line with the key aspects indicated, we reproduce below some other **strategic interventions planned or in execution**, which we understand to be clearly transversal.

➤ **IE.01.**

The **eCitySevilla project** proposes the development of an open, digital, decarbonised and sustainable city model on the Isla de la Cartuja ecosystem, bringing forward the energy and climate objectives established for 2050. The project is fully aligned with all the forecasts





contained in the Mission's Climate Neutrality Agreement, so at different scales, they will have very similar paths.



*Illustration 12. Seville eCity Project.*

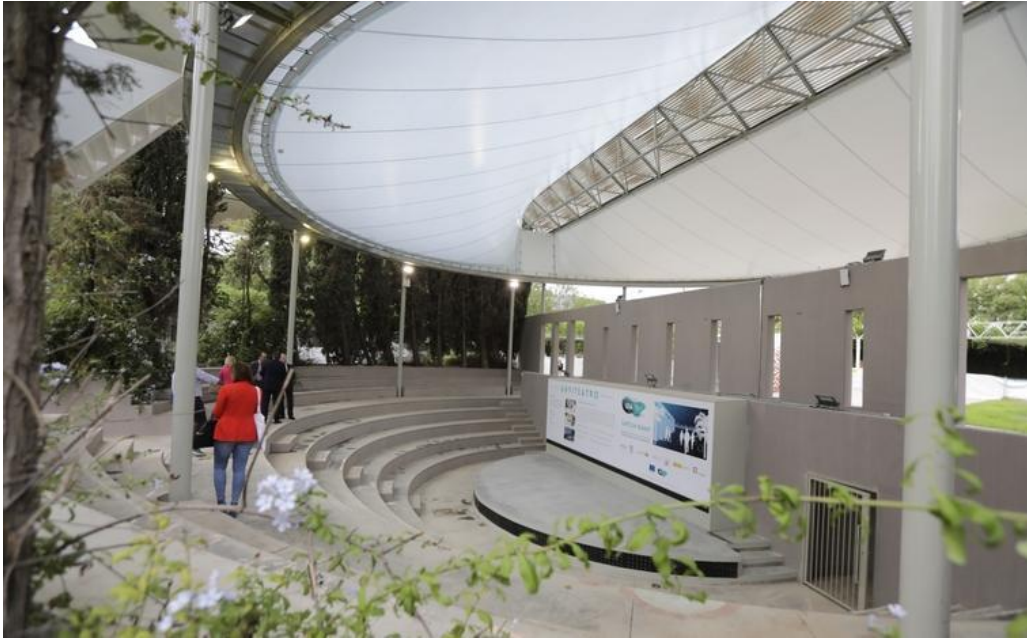
With eCitySevilla, we are leading the way for the sustainable cities of the future. In the field of energy, the objective is to ensure that the PCT Cartuja has a **100% renewable electricity supply**, generated on the Isla de la Cartuja itself and with more efficient buildings. In addition, from the point of view of mobility, sustainable models will be encouraged, with more space for pedestrians and cyclists and promoting the use **of electric vehicles** thanks to a new network **of charging infrastructures**. All this, supported by a firm commitment to digitalisation, with a connected and autonomous system, through a **smart grid** that will also allow an open data platform for the intelligent management of the park. It is a pioneering Smart City project on an international scale to ensure that an urban space as large as Isla de la Cartuja, which is a real city in itself of 200 hectares, where 523 companies and entities coexist and nearly 23,000 people work, becomes 100% self-sufficient in terms of energy and free of emissions.

The project is an example of public-private and multilevel collaboration, in which the Seville City Council participates.

➤ **IE.02.**

**Cartuja Qanat** is the natural continuation of the climate control work that began on the occasion of EXPO'92, expanding and updating the concepts and procedures carried out in the original work.





*Illustration 13. Qanat Charterhouse.*

Without losing the work spirit of that time, the more than 30 years that have elapsed since then have allowed the incorporation of ICTs in aspects such as **remote sensing** or artificial intelligence for the optimal management of facilities using presence control, user preferences, weather prediction, etc. Likewise, innovative components and strategies such as variable solar control, night dissipation to the sky, dissipation to the ground with night evaporative regeneration, thermal storage in Qanats or solar electricity production. All this will contribute to the result of the project constituting a pioneering experience of installing zero energy consumption and zero emissions on an annual basis, proposing new business models that combine with scientific knowledge for change, through eco-innovation and adaptation to new solutions for microclimatic improvement. Cartuja Qanat is developed through an innovative system of **public-private-citizen** governance, based on the principles of Good Governance and Open Government, through the co-responsibility of all actors through the application of urban care rights.

As in the previous case, the Seville City Council participates in the initiative as a promoter. The involvement of the Academy (Higher Technical School of Engineering of the University of Seville) has been decisive for the success of the project, which is now intended to be replicated in other spaces of the City.



*Illustration 14. Encounter Cartuja Qnat.*

➤ **IE.03.**

**Life WaterCool** is finalizing the process of transforming the Avenida de la Cruz Roja, contributing to a significant improvement of the urban environment. This avenue and the surrounding streets are undergoing an innovative transformation that will improve the urban environment, as well as contribute to the fight against climate change. This transformation will be possible thanks to the LifeWatercool project, which, 55% financed by European funds, is turning this area of the city of Seville into a replicable space with cutting-edge technology and sustainability.

The system uses the urban water network to promote the development of sustainable solutions in three areas of action classified as short, medium and long stay, which are a **bioclimatic bus stop**, facilities of the **Arias Montano School Center** and an adjoining square.

The aim of the Life Watercool project is **to provide solutions to cope with the high temperatures of the city**, thanks to an underground water collection and cooling system through sustainable energy.

The installation of the sensorization of the infiltration wells located on Avenida de la Cruz Roja aims to **improve rainwater management**, by reducing the flow peaks in the sanitation network and reintegrating the water into the ground, favoring the recharge of the aquifers and the water table of the city. This sensorization has consisted of the placement of level meters in two of the infiltration wells that collect rainwater from the draining paving of these streets, to later infiltrate it into the ground.

The WaterCool project has the generic objective of demonstrating the **efficiency of an integrated and systemic concept of urban water management** with buffering effects relevant to stochastic events, improving the quality of life of citizens. The current urban water system will be reinforced





with a structural matrix of elements to accumulate, drain and interconnect untreated water (from rainwater and rivers), to be tested on a small scale (street).

The urban water network will act as the basic structure for the development of urban green solutions that will be implemented in specific places called **comfort rooms**. Therefore, the water network will act as a cohesive and integrated matrix that sustains and optimizes the urban environment, ultimately maximizing the sustainability of the city and the well-being of citizens.

The WATERCOOL project is made up of two complementary actions. The first includes all the infrastructure necessary for the development of the project and which runs within the scope of the **urban remodelling works and renovation of networks and services** on La Cruz Roja Avenue, while the second action contemplates the expansion of the necessary infrastructures, outside the previous area, as well as the equipment of all the necessary elements for the generation of comfort conditions in the different rooms selected.

It is a demonstration project that tests a **systemic perspective in the integration of urban adaptation to climate change**, both from a public and private point of view. With the realization of actions and elements in 3 specific streets that will be a reference for future interventions at the neighborhood level and replicable at different levels in the City.

The activity encompasses the different specific micro-climatic actions, which will be carried out in the stays (*COMFORT STAY*), and will be coordinated by the Higher Technical School of Engineering of the University of Seville, in collaboration with the Seville City Council. Different models of adaptation systems will be installed in it to improve temperature conditions.

3 types of stays (*COMFORT STAY*) have been defined:

- Short-occupancy-STREET (bus stop), which will combine different shading solutions, plant cover, cold air generation, etc. So that citizens who spend time in it do so in much more pleasant conditions than outside.
- Of medium occupancy-BUILDINGS (school playground), various solutions will also be combined to provide the outside of the center with favorable conditions, in addition it is intended to take advantage of the cold water generated for savings in the cooling of the center.
- High occupancy-PUBLIC PLACES (outdoor square), at the confluence of the 3 streets and at the entrance to the school, specific measures will be implemented for open areas, of larger size and that have the capacity to keep the citizen longer in them. They will be shelters from high temperatures.

ESTANCIA Plaza: in the new square that is created at the gates of the Arias Montano School, three different techniques are combined:

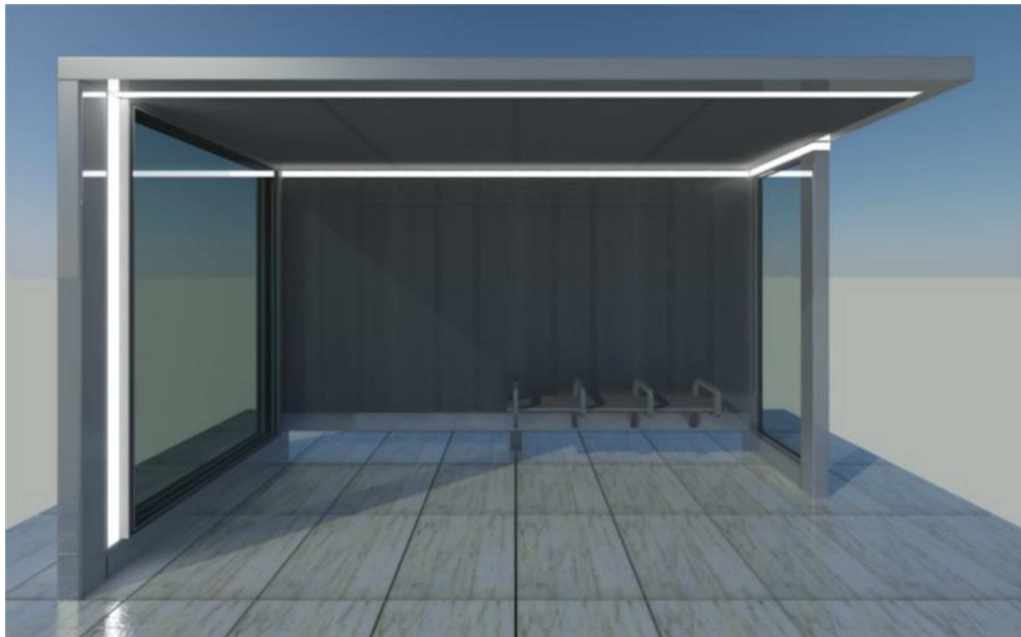
- Temporary cover.
- Bioclimatic bank.
- Aerodynamic source as a passive and active element of confinement through its evaporative barrier.





**Illustration 15.** Estancia Plaza at Colegio Arias Montano.

The water to be recirculated comes from the tanks buried in the square and will have a cut-off valve and purger housed in a manhole, which will connect with the two collectors mentioned above.



**Illustration 16.** Climate bench design.

The upper face exposed to solar radiation is made up of an adjustable shade plane (motorised slat system), while the lower face, in contact with the air to be cooled and which makes up the living space, will be made up of an inclined plane through which a sheet of water previously cooled will be made to slide. To build this plan, a system of compact polycarbonate sheets with an inclination of 5° supported on metal straps is used. Finally, and located between both planes, a system of air ducts and nozzles is integrated that will drive previously cooled air into the room.





Among the factors considered for the development of the concept, the ability to replicability and adapt the element to diverse environments prevailed. In such a way that the whole has been designed from a unitary element capable of multiplying to cover larger surfaces. All the elements designed expressly for this action have been designed on the premise of their ability to replicate, their easy handling, maintenance and affordability in the market.

In relation to the cold roof system, it has also been decided to use standardized dimensions and sections of polycarbonate panels while using the panel connection systems designed by the manufacturer.

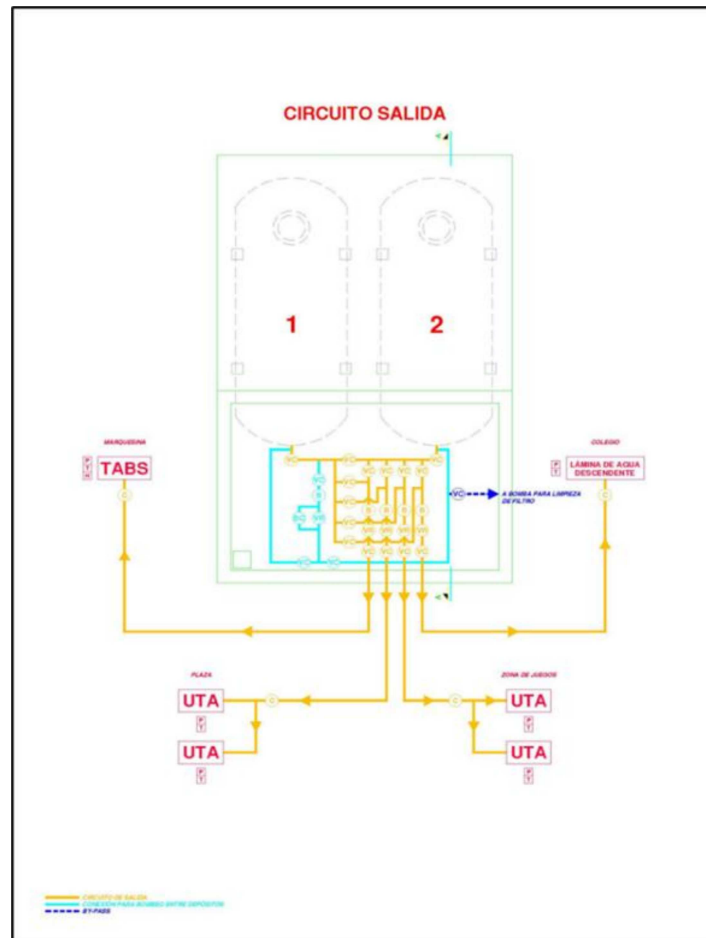
For the roof, prefabricated panels of motorized slats have been designed to guarantee its installation, as well as its synchronous and controlled movement, either manually or automatically.

To supply the water to the biocool system, as well as to the micronisation system, an intake is planned from the EMASESA distribution network, which will be equipped with a meter and cut-off valve housed in a manhole to be built outside the courtyard. The micronization system will be equipped with a disinfection system for legionella that will be located prior to the high-pressure pump that will supply the necessary flow to the projected nozzles, whose location can be seen in the corresponding plans.



**Illustration 17.** Biocool system design.

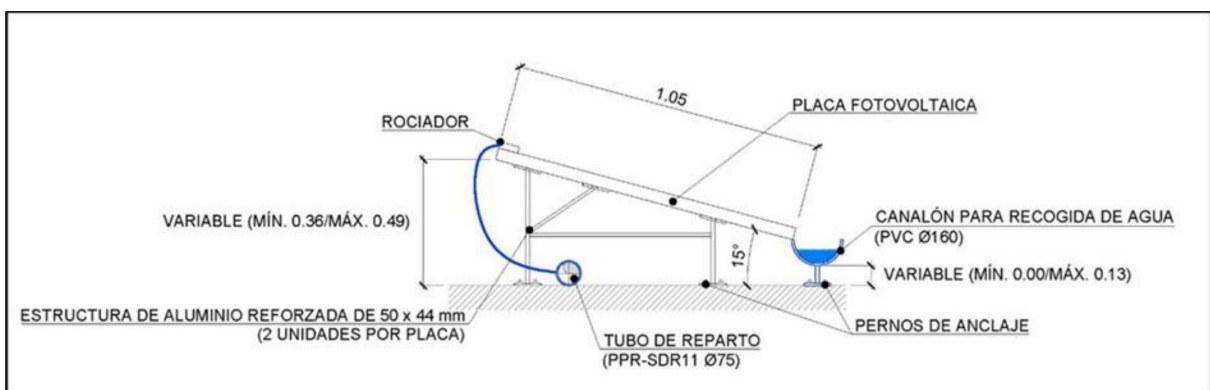
Schematically, the installation of the inlet manifold is as follows:



**Illustration 18.** Inlet collector installation design.

To reduce electricity consumption, a production system is planned, using photovoltaic panels that is also used to cool the water in the tanks during the night.

5 independent beaches are planned with 24 panels each, which represents a total of 120 panels with a peak power of 400 W, which means a total power of 48 kW. The panels are connected to 3 inverters, two of 25 kW and one of 15 kW.



**Illustration 19.** Design for the installation of plates.

➤ IE.04.





On the other hand, the **fleet of TUSSAM**, the transport company of the Seville City Council, continues to undergo an outstanding transformation; first towards LNG, and now towards an electrified fleet.

➤ **IE.05.**

Green **offices** are spaces that implement principles of sustainability and green transition, from responsible energy consumption to proper waste management and the use of recycled products. The aim is to adapt in Seville the initiative promoted by the Fundació València Clima i Energia, together with the Valencia City Council, to promote the development of green offices and the exchange of experiences between different entities. We have also been working on this initiative since the URBANEW project and EMC<sup>3</sup>.

- Spaces that promote sustainability: through environmental management, resource saving and energy efficiency.
- Initiatives for the green transition: involving different actors and entities in the construction of a more sustainable future.
- Spaces for exchange and collaboration: where knowledge and experiences in the field of green offices are shared.
- A commitment to the future: through the implementation of sustainable practices and the pursuit of energy efficiency.

In Seville, the aim is to extend the Green Spaces initiative to **shops and hospitality**: commerce towards climate neutrality or establishment adhering to climate neutrality 2030.

It has already been mentioned that for these purposes the implementation of a Mission Label **or Badge** by the Seville City Council is intended, which will be awarded each year in a solemn act to the establishments that are incorporated into the process.

➤ **IE.06.**

The future **desalination plant of Seville** and its metropolitan area of EMASESA consists of a preliminary project presented in February 2025. With a budget of 60 million euros and an execution period of two years, this future infrastructure consists of the collection of water in the Guadalquivir estuary, downstream of the Alcalá del Río dam. From that point, the water will be pumped to the Gergal-Carambolo pipeline and will be taken to the Carambolo DWTP, where it will be treated in an advanced treatment plant with reverse osmosis membranes and nanofiltration, which will provide Seville and its metropolitan area with a new source of water supply alternative to the traditional reservoir resources. **stretching stocks and guaranteeing supply even in the worst case scenario.**

This project maximises the use of existing infrastructures, such as the reuse of disused tanks and minimises the space required and the initial investment, facilitating compliance with future regulatory requirements and the ability to adapt to the evolution of inlet water conditions.

The main objective is to provide an alternative source of water supply to the reservoir resources for the supply of Seville and its metropolitan area. This is an action of enormous importance for





the fight against one of the most important climate scenarios, droughts, as we have already seen in the diagnosis of the Adaptation Plan.

➤ **IE.07.**

Another strategic line of action is made up of **Sustainable Protected Housing**. The Seville City Council, through the municipal housing company EMVISESA, builds subsidized housing with sustainability criteria. In the Palmas Altas neighbourhood, works have been awarded for the construction of 415 homes, with the aim of promoting affordable and sustainable housing.

➤ **IE.08.**

The Seville City Council has completed the project for the largest implementation of **charging points for electric vehicles** in a Spanish city, with 350 double points (700 spaces) on public roads. This network has several peculiarities:

- 1st. It is designed to bring each charging point as close as possible to the citizen through a geographically homogeneous network in each of the 11 districts of the City, in such a way that it does not matter which neighbourhood or district you live in, you have access to the network in any district or neighbourhood of the City.
- 2nd. All districts will have semi-fast charging points with a minimum of 44KW, fast charging with a minimum of 100Kw and ultra-fast charging with a minimum of 350Kw.
- 3rd. Electric mobility is equally promoted throughout the city, avoiding increasing vehicle movements between districts or neighborhoods of the City.
- 4th. Four different operators have been established in order to guarantee free competition and the improvement of tariffs for citizens.
- 5th. The implementation in La Cartuja, where the first Low Emission Zone in Seville is being developed, is also favoured, where electric mobility and its infrastructure will play an important role in achieving its objectives.

➤ **IE.09.**

Within the framework of the actions undertaken by the **business sector to combat climate change**, some key actions can be highlighted:

**HEINEKEN Spain** has presented its five environmental and social objectives for 2025, including **zero net emissions in production, a 30% reduction in emissions throughout the value chain and a neutral water footprint**.

It has presented its sustainability commitments to 2025, becoming a global example for the company by achieving many of its goals five years ahead of schedule. Specifically, to become zero net emissions in production before 2025 and, already this year, to have a neutral water footprint in the production of its beers or that its four Spanish factories have the **zero waste to landfill certificate**.

All this, following a roadmap that is supported by collaboration and includes its entire value chain, from the field to the consumer (production, distribution and consumption), to achieve a **zero impact on carbon footprint, water and waste** and, in parallel, a **positive impact on the community**. Specifically, in addition to its environmental advances, through its contribution to the Spanish economy with almost 1,500 direct jobs and 110,000 indirect jobs, the use of 92% of local raw materials, support for the hospitality industry with nearly 340 million euros in the last two years





or the training of more than 16,000 people through the Cruzcampo Foundation, the oldest beer foundation in Spain.

It is a medium- and long-term path based on cooperation and partnerships, with five ambitious goals for 2025:

- 1. Zero net emissions in production.** With a clear commitment to renewable energies, HEINEKEN Spain has reduced its CO<sub>2</sub> emissions by 19% since 2018 and more than 45% of the energy it uses in its factories is already renewable, which allows it to brew all its beers exclusively with 100% renewable electricity since 2020. Now it is moving forward to make all its factories work only with this type of energy, as is already happening in Jaén, and with initiatives such as the solar thermal project it is developing with Engie, a pioneer for the agri-food industry worldwide, which will allow it to reduce its carbon footprint by almost 7,000 tons of CO<sub>2</sub> per year.
- 2. 30% fewer emissions across the value chain.** Aware that its production accounts for only 9% of the CO<sub>2</sub> emissions represented by its activity, the brewery sets itself this intermediate target and collaborates with its partners to be carbon neutral throughout its value chain by 2040. It concentrates its efforts on the areas that represent the greatest impact, packaging and agriculture, with a firm commitment to sustainability that allows it to brew its beers with 78% of ingredients from certified sustainable crops, and the ambition to reach 100% by 2025. In addition, it promotes the production of green fertilisers and collaborates with InterMalta on an innovative precision fertilisation project. All this without forgetting distribution, where it is a pioneer in sustainable last-mile logistics projects; or the 227,000 eco-efficient refrigeration systems that it has implemented in bars throughout Spain.
- 3. Zero water footprint in factories.** A commitment that HEINEKEN Spain already achieved in 2022, almost a decade ahead of the date that the company has set itself globally, thanks to its water treatment and regeneration and water balance programmes, with which it treats 100% of its wastewater and returns 1,900 million litres of water to the environment per year. more than 100% of the water contained in its beers, thanks to the projects developed in Doñana, the Valencian Albufera or the banks of the Jarama River. With the ambition to use less and less water and be more efficient, by 2025 it aims to use only 2.6 litres of water per litre of brewed beer, i.e. less than half (-51%) of the water it used in 2008. A path on which it has already made great progress in recent years, managing to reduce its consumption by 33% since 2008.
- 4. Zero waste in factories and maximise the circularity of your packaging.** In the production area, HEINEKEN will achieve its goal this year 2025 by certifying all its factories in Spain as "0 waste to landfill", as is already the case in Jaén. In addition, the company has already given a second life to 220 thousand tons of by-products, such as yeast, bagasse and hydroalcoholic mixtures. Likewise, in terms of packaging, the brewery is working to eliminate 1,600 tons of plastic and have packaging made with 100% recycled materials, with the aim of ensuring the best solution to **reduce emissions and waste**, giving them more lives. Thus, it works to ensure that all the elements of its packaging are made from 100% recycled material and come from sustainable sources (such as all the cardboard it uses, which comes from responsibly managed forests to avoid deforestation);





eliminating 1,300 tonnes of single-use plastic per year and 300 tonnes of plastic rings, replacing them with recycled cardboard rings; it maximises the use of returnable formats in the hospitality industry (with the ambition to go from the current 74% to 81% by 2025), in addition to continuing to be committed to the recycling of bottles and cans as a partner of Ecodrio and Ecoembes. Likewise, aware of the importance of involving the consumer in this journey, its first products will arrive in supermarkets with the COMMITMENT BEERS WITHOUT FOOTPRINT seal, which reflects the progress and ambitions that the brewery has set itself in a didactic way.

5. **1000% social: for youth employment.** Its **Cruzcampo Foundation** has channelled a large part of HEINEKEN's social commitment for more than 25 years. The more than 38 million euros of social contribution it has provided during this time, the 16,000 people it has trained in the hospitality industry and the 95% of labor insertion that the young participants in its Cruzcampo Talent Scholarships program have are the best proof of this. All this without forgetting its value chain, as this is where the brewery can have the most positive impact: on its farmers and suppliers, as 92% of its purchases are local; in the nearly 1,500 people who make up their families in Spain, their almost 110,000 indirect jobs; in their consumers, encouraging moderate consumption of their products; and on its hospitality customers, to whom it has allocated 340 million euros in the last two years to boost its competitiveness.

**AIRBUS** is working on an innovative vegetation humidity control project. In a **pioneering step towards sustainability in the aerospace industry**, Savener has initiated the innovative GREEN FACTORY pilot project in collaboration with Airbus. This project, located in the H3 hall of the Airbus SPS factory in Seville, explores the use of specially selected vegetation to control humidity in production areas, where specific environmental conditions are required for the application of sealants in aircraft manufacturing.

After several feasibility studies carried out by Savener, which demonstrated the potential of the plants to naturally regulate humidity in the production environment, the GREEN FACTORY project is launched with the aim of testing the results in real conditions. This approach is not only innovative for its application in aircraft manufacturing, but also represents significant **energy and water savings** compared to traditional mechanical humidification systems.

The pilot study aims to collect data that corroborate initial estimates of the contribution of moisture from plants to the environment. This project is not only aimed at **improving efficiency in the use of resources**, but also at creating a healthier and more sustainable work environment for employees.

The *GREEN FACTORY* initiative stands out as a pioneering project worldwide in the aeronautical sector, demonstrating Savener and Airbus' ongoing commitment to innovation and environmental responsibility in their operations.

**ENDESA** and its Climate Action arises from the collaboration at COP25, and is born from its firm involvement in the fight against climate change. On the road to decarbonisation, Endesa is committed to renewable energies, the circular economy and sustainable mobility to achieve a new **emission-free energy model**.





Its strategic plan includes an annual investment of 1,500 million euros in **renewable energy**. A commitment that will transform our country with development opportunities for especially sensitive areas. Environmental investments have grown by 4.3% to 1,705 million euros. And **CO<sub>2</sub> emissions have been reduced by almost 40%** compared to 2015.

The pillars of Endesa's fight against climate change are **electric mobility, renewable and clean energy sources and technological innovation**, both in distribution networks and in solutions for homes and businesses.

**PORT OF SEVILLE** is actively promoting its energy transition and sustainability, seeking to become a national benchmark in energy efficiency and emission reduction. This includes implementing measures such as installing LED luminaires to improve efficiency, developing green hydrogen projects, and adopting renewable energy. In addition, the Port has adhered to the 2030 Agenda of the International Association of Cities and Ports (AIVP), committing to **adaptation to climate change, energy transition and social integration**.

AIVP's 2030 Agenda is the first global initiative to adapt the UN's 17 Sustainable Development Goals to the specific context of City-Port relations. This document, prepared jointly with AIVP members at the Quebec Conference in 2018.

The main milestones for the energy transition and sustainability in the Port of Seville are the following:

- **Commitment to sustainability:**

The Port of Seville is working to reduce its environmental impact and promote sustainable development through various initiatives, already mentioned.

- **Energy transition:**

Measures are being implemented to reduce greenhouse gas emissions and move towards a cleaner and more efficient energy system.

- **Renewable energies:**

Projects related to renewable energies, such as the installation of photovoltaic solar plants, are being explored and developed.

- **Green hydrogen:**

The HYDEA project seeks to promote the use of green hydrogen as an energy alternative in the port environment, including its production and distribution.

- **Energy efficiency:**

Measures are being taken to improve energy efficiency in various areas of the Port, such as the renovation of public lighting with LED technology.

- **Collaboration with Endesa:**

The Port Authority of Seville and Endesa have signed a collaboration protocol to design a roadmap to promote the energy transition in the Port.

- **Digitalization:**





The digitalisation of processes is also part of the Port's energy transition strategy, seeking more efficient and sustainable management.

- **2030 Agenda:**

The signing of AIVP's 2030 Agenda reflects the Port's commitment to sustainability and integration with the city, addressing challenges such as adaptation to climate change and the energy transition.

- **SR.10.**

**SEVILLE CITY ONE** has established itself as an initiative for the promotion and transformation of the City of Seville and the metropolitan region into an example of sustainable urban development. The project has been shaped thanks to the addition of synergies to a cluster that has 91 member entities, more than 450 companies involved from different fields and more than 3,000 citizens actively participating in the construction of the Seville of the future.

From the beginning, he has always been guided by the spirit of joining forces, experience and creativity to build this project together. The initiative has the collaboration of the three administrations, the **Seville City Council**, the **Provincial Council of Seville** and the **Junta de Andalucía**.



*Illustration 20. Cover document Present and future of sustainable development in metropolitan Seville. An X-ray.*





*Illustration 21. One hundred climate-neutral cities.*

➤ **IE.11.**

The **Joint Research Centre (JRC) in Seville** (also known in Seville as the Institute for Technological and Social Foresight) plays an important role in climate change research, especially in supporting European Union policies. The JRC's current headquarters in Seville is located in the PCT Cartuja and is based on a sustainability approach, seeking to offset more CO<sub>2</sub> than is generated during its construction and useful life.

- The JRC is the European Commission's scientific service, tasked with providing scientific support for EU policies, including those related to climate change.
- **One of the JRC units in Seville is dedicated to climate change research and supports the European Green Deal.**
- The JRC works on issues such as energy transition, changing production patterns and developing policies for a successful green transition.

**Inspired by the principles of the New European Bauhaus**, the new construction will be a benchmark in sustainability and innovation and will be carried out in the Cartuja Science and Technology Park, on the plot formerly occupied by the Discoveries pavilion of Expo 92. The project is the result of collaboration between the European Commission, Seville City Council, Andalusian Regional Government, and the Government of Spain to consolidate the presence of the JRC in the city.





*Illustration 22. Design Joint Research Centre (JRC) of Seville.*

➤ **IE.12.**

The **SDG Centre**, declared by the Municipal Government Board of Seville as a project of General and Strategic Interest, puts the different spaces set up at its headquarters at the service of public-private collaboration and citizens.

With the aim of diversifying its actions, **in 2021 Fundación MAS aligned its programs and activities with the 17 Sustainable Development Goals**. As a result, the Foundation presented to the Seville City Council the Project of the first Sustainable Development Goals Activity Center of Andalusia aimed at disseminating information about the SDGs and sustainability.

Declared of General Interest by the Governing Board of the Seville City Council in March 2022, the General Directorate of Municipal Heritage granted in September of the same year the Demanial Concession of the property to Fundación MAS for its conversion into an SDG Center.

The **activities that take place in the Center are free of charge** and are aimed at all audiences. They must also be related to the SDGs and their promotion among citizens. Both the activities promoted by the Foundation itself and by the collaborating entities that participate in the Centre are aligned with one of the 17 SDGs and the goals with which Fundación MAS is linked to the 2030 Agenda

➤ **SR.13.**

For its part, the **Academy and Research Institutes** can highlight the following actions:

Some of the projects developed by the University Institute of Architecture and Construction Sciences (IUACC) linked to the SCCC are the following:

- Implications for the mitigation of climate change and energy poverty through a new model of adaptive comfort for social housing.





- Energy rehabilitation of Andalusian social housing. Optimization of passive solutions in residential parks with a high vulnerability index.
- Creafab: methodologies for a creative reindustrialization of historic centers. Creative industries, industrial heritage and new sustainable ways of living.
- Direct application of the "AURA Strategy" of the decathlon solar equipment- u.s., in the rehabilitation of obsolete Andalusian neighborhoods.

➤ **IE.14.**

We must also highlight the consideration during the process of the Mission of the **Urban Observatory of Seville (OBUS)**.



**Illustration 23.** Seville Urban Observatory Project (OBUS).

The **knowledge** section is the main axis of the OBUS. In this segment, the system of indicators is developed that allows knowledge to be generated about the territorial reality, providing a comprehensive vision of the process of transformation of the city.

It is a meeting space **for exchange**. This segment collects different contributions that share ideas, experiences and debates around the process of transformation of the city. Forums, seminars, congresses and different events and activities that promote participation and dissemination on local development.

Presentation and development of works, research and projects that account for different aspects in the **urban analysis of the City of Seville**. With specific characteristics and a thematic criterion linked to prominent axes, in this space various studies of Seville and its interrelation with other territories dialogue and converge in a comprehensive idea of the city.

The project **will CityLab\_Sevilla** be developed within the framework of the **Urban Observatory of Seville**. This project consists of applying the CityLab methodology, developed by the **JRC** to be applied by European cities. This methodology is based on the so-called **approach based on data and scientific evidence** to promote informed decision-making (*science for policy*), proposing the use of research and knowledge at the service of its application in the design and implementation of public policies.





➤ **SR.15.**

The four municipal companies, in charge of the management of the integral water cycle (EMASESA), public cleaning (LIPASAM), public transport (TUSSAM) and municipal public housing (EMVISESA) are grouped together through the Corporation of Municipal Companies (CEMS). From this management body, the complete accounting of the HC of all companies is promoted, with their different management plans, thus extending the model already implemented in EMASESA.

In this way, the CEMS will be part of the management core of this SCCC in three areas of monitoring: built solar (EMVISESA), mobility (TUSSAM), and consumption of various fuels, MSW management and AARR (LIPASAM and EMASESA).

For the sharing of all the relevant aspects that are necessary for the successful completion of the Mission, from the Seville City Council we have promoted the **Mission 2026 Meetings**, which we include in Attached Document 3.





## 5. Monitoring indicators and co-benefits

The transition to climate neutrality not only involves a direct reduction in GHG emissions, but also generates a wide range of **additional indirect benefits (co-benefits)** in crucial areas such as **public health, the economy, social justice or biodiversity**. Measuring and communicating these co-benefits is essential to strengthen political and citizen support and to ensure a just and competitive transition in our cities.

NZC has a guide whose main objective is to support Spanish cities in the selection and inclusion of co-benefit indicators within their Climate Agreements.

It is important to note that monitoring co-benefits, unlike direct GHG emissions, is **optional** within the framework of the European Cities Mission. The list of indicators is indicative and has been drawn up on the basis of dialogue and the needs expressed in the meetings held with the cities. An attempt has been made to establish a **list of minimums**, with the aim that, as far as possible, all cities have a set of shared indicators that facilitate mutual learning and comparability of progress.

However, the diversity of local contexts and the variable availability of data are notorious. Therefore, each city can incorporate additional or alternative indicators that it considers relevant to its specific priorities and strategies. Similarly, cities can omit those indicators for which they do not have data or whose measurement would impose a disproportionate burden.

We are therefore facing an open and evolving list, being possible to propose any suggestion for improvement, new indicators or comments on the applicability of those proposed to enrich future versions. The only limit is the availability of data to measure the indicator and the needs for its periodic monitoring.

The starting point for the selection of indicators was the framework developed by NetZeroCities in its "*Comprehensive Indicator Framework*" document. The detailed methodology for each indicator has been extracted directly from this document.

We are working on the integration of new indicators, including those proposed by the Pathfinder Initiative Project, such as the following:

- Local food production
- Quality of public spaces
- Structural connectivity of green spaces
- Urban Heat Island Effect

We then develop the system, in its current state, accompanying the data collected for the current 2026 Iteration of the SCCC. All system indicators are being edited for the next iteration.

### 5.1. PM<sub>2.5</sub> concentration levels

- **Unit of Measure:** µg/m<sup>3</sup>





- **Definition:** This indicator corresponds to the average annual value of PM<sub>2.5</sub> concentration recorded in a particular year in urban and suburban stations.
- **Source:** European Commission (2022), Green City Accord, Clean and Healthy Cities for Europe, GCA Mandatory Indicators Guidebook, Version of 29 April 2022.
- **Calculation Formula / Methodology:** It is obtained from: 1) Air quality monitoring reports in different stations at the municipal or regional level and 2) Measurements made in urban and suburban locations established for this purpose. If a city is unable to report this value due to a lack of monitoring stations within its boundaries, it may report PM<sub>2.5</sub> values from the nearest regional/national station where concentration values are available. The minimum requirements according to the EU and WHO are: EU limit: 25µg/m<sup>3</sup>; WHO guidelines: 5µg/m<sup>3</sup>.



**Table 18.** PM<sub>2.5</sub> concentration levels for the period 2014-2024 in Seville and its Metropolitan area.

Year	Príncipes Station		Torneo Station		Santa Clara Station		Ranilla Station		La Liebre 2 Station (Alcalá de Guadaíra)	
	Prom.	V. Max.	Prom.	V. Max.	Prom.	V. Max.	Prom.	V. Max.	Prom.	V. Max.
2014	12		16							
2015	19		19							
2016	9,7		13							
2017	14		25							
2018	11		22							
2019	8		15							
2020	7		14							
2021	8	32	11	36	8	33	9	36		
2022	22	7,3	9,8	26	10	30	10	45		
2023	8	23	11	28	11	55	12	44		
2024	8,1	20	13	64	9,5	36	11	44	9,9	38



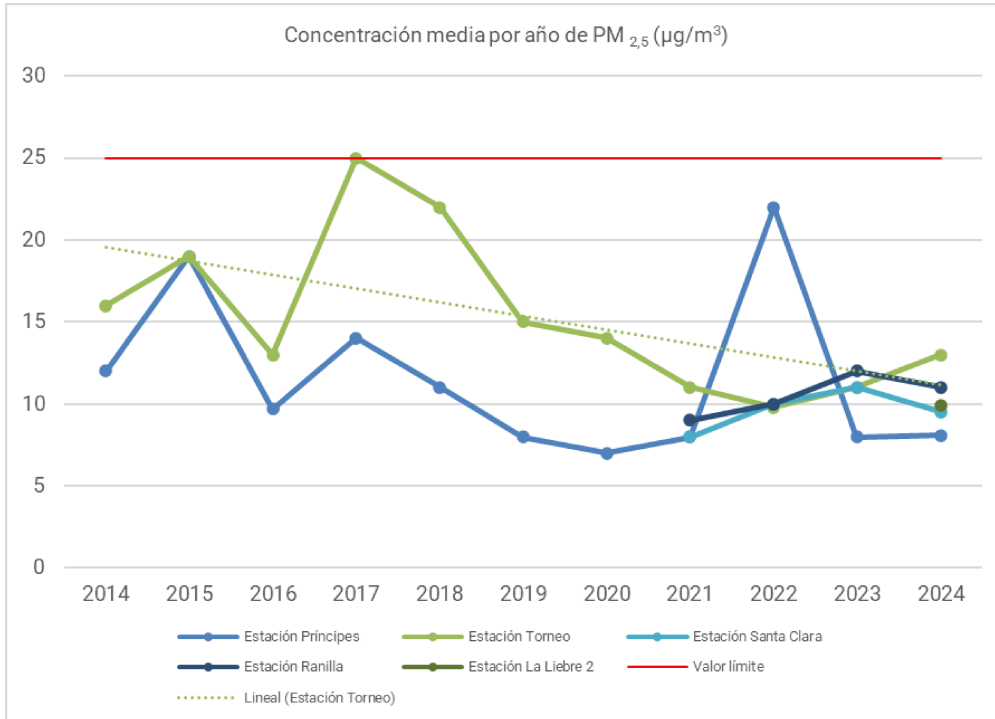


Figure 22. History of PM2.5 concentration for the period 2014-2024 in Seville and its metropolitan area.

## 5.2. PM<sub>10</sub> concentration levels

- **Unit of Measurement:**  $\mu\text{g}/\text{m}^3$  (Note: the NetZeroCities document proposes to measure for this indicator the number of days that the limit is exceeded. For simplicity, we propose to take the average annual value in  $\mu\text{g}/\text{m}^3$  for the three air quality indicators.)
- **Definition:** This indicator corresponds to the average annual value of PM<sub>10</sub> concentration recorded in a particular year in urban and suburban background stations. (Note: modified for simplicity, the NZC document referred to the number of days over the limit.)
- **Source:** European Commission (2022), Green City Accord, Clean and Healthy Cities for Europe, GCA Mandatory Indicators Guidebook, Version of 29 April 2022.
- **Calculation Formula / Methodology:** It is obtained from: 1) Air quality monitoring reports in different stations at the municipal or regional level; and 2) Measurements made in urban and suburban locations established for this purpose. The minimum requirements for daily concentrations observed according to the EU and WHO are: EU limit:  $50\mu\text{g}/\text{m}^3$ ; WHO guidelines:  $45\mu\text{g}/\text{m}^3$  (24h average).



**Table 19.** PM<sub>10</sub> concentration levels for the period 2014-2024 in Seville.

Year	Torneo Station				Santa Clara Station				Príncipes Station				Bermejales Station			
	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)
2014	43	33	23	0	33	26	18	0	45	32	23	0	56	2	22	0
2015	62	37	27	0	61	33	21	0	56	41	29	0	87	27	31	0
2016	37	32	22	0	38	28	17	0	39	35	23	0	164	14	26	0
2017	54	44	33	0	49	33	23	0	56	48	28	0	61	6	32	0
2018	72	41	28	0	26	38	24	0								
2019	51	32	23	0	52	32	21	0	59	35	24	0				
2020	52	35	23	0	43	33	20	0	49	37	22	0				
2021	48	0	21	0	54	4	19	0	55	1	22	0	79	2	19	0
2022	70	2	24	0	57	3	22	0	61	2	23	0	73	2	21	0
2023	48	0	23	0	63	4	21	0	48	0	22	0	63	6	23	0
2024	73	2	25	0	54	2	17	0	51	1	20	0	49	0	19	0





**Table 20.** PM<sub>10</sub> concentration levels for the period 2014-2024 in the metropolitan area of Seville.

Year	Aljarafe Station				La Liebre 2 Station (Dos Hermanas)				Alcalá de Guadaíra Station			
	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. 24 h	Human Health (24h)	V. Calendar year	Human Health (Annual)
2014									45	29	19	0
2015	72	7	26	0					68	35	22	0
2016	199	3	22	0					46	29	18	0
2017	56	2	23	0					61	37	24	0
2018									50	30	19	0
2019	52	2	20	0					49	29	19	0
2020	80	2	19	0					47	28	18	0
2021	49	0	18	0					46	0	20	0
2022	54	2	18	0					50	0	21	0
2023	44	0	18	0					51	1	21	0
2024	49	0	19	0	90	11	25	0	48	0	22	0



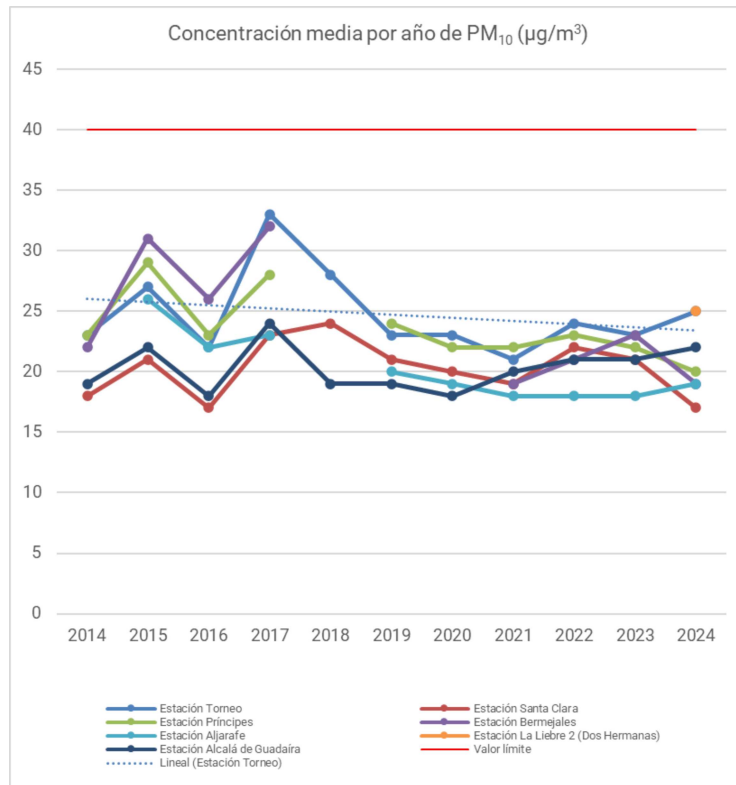


Figure 23. History of average concentration levels in Seville and its metropolitan area for the period 2014-2024.

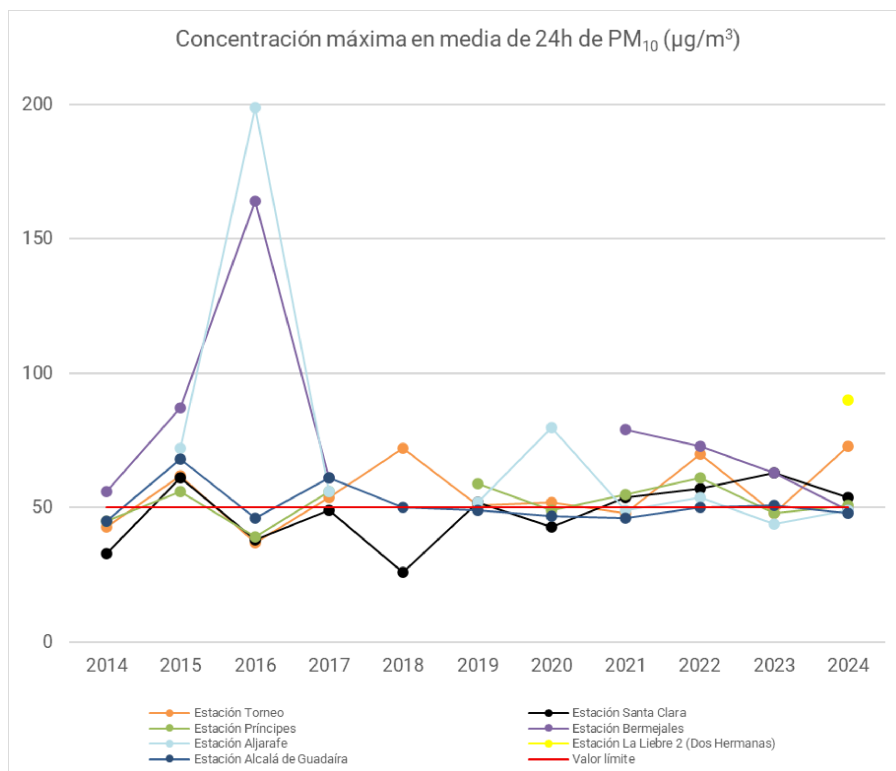
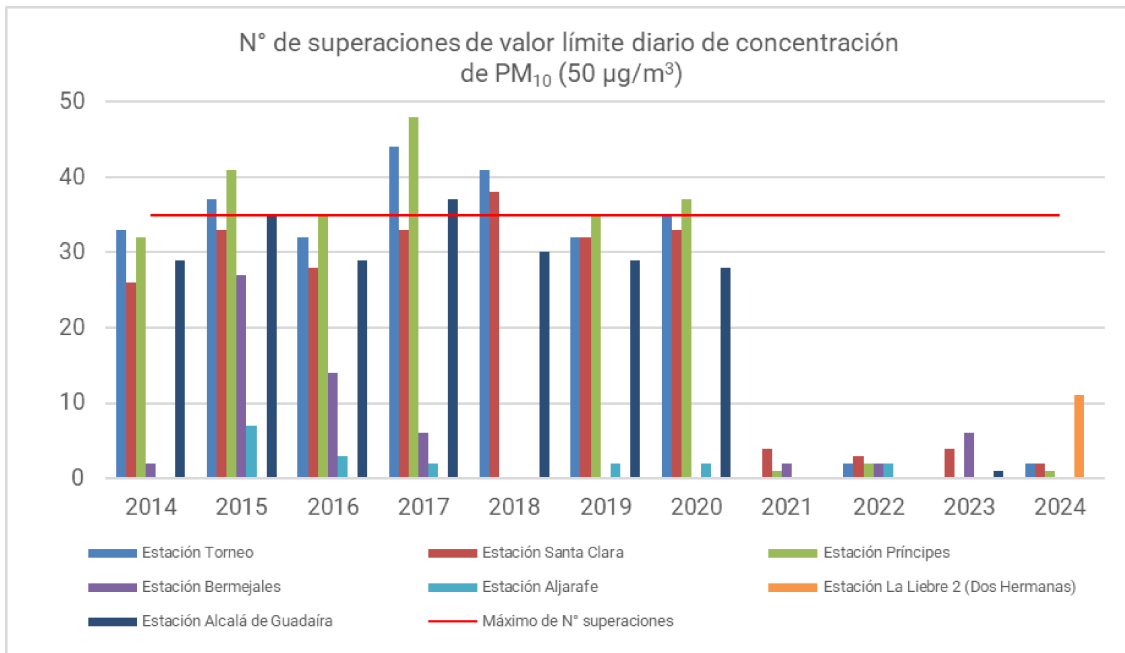


Figure 24. History of maximum concentration levels in Seville and its metropolitan area for the period 2014-2024.





**Figure 25.** Number of exceedances of the daily limit value for PM concentration<sub>10</sub> in Seville and its metropolitan area.

### 5.3. NO<sub>2</sub> concentration levels

- **Unit of Measure:** µg/m<sup>3</sup>
- **Definition:** This indicator corresponds to the average annual value of nitrogen dioxide (NO<sub>2</sub>) concentrations recorded in a particular year at traffic stations. (Note: the NetZeroCities document proposes to measure the highest value for this indicator. For simplicity, we propose to take the average annual value in µg/m<sup>3</sup> for the three air quality indicators.)
- **Source:** European Commission (2022), Green City Accord, Clean and Healthy Cities for Europe, GCA Mandatory Indicators Guidebook, Version of 29 April 2022.
- **Calculation Formula / Methodology:** It is obtained from air quality monitoring reports at different stations at the municipal and regional level, and from measurements made in traffic locations established for this purpose. The minimum requirements according to the EU and WHO are: EU limit: 40µg/m<sup>3</sup>; WHO guidelines: 10µg/m<sup>3</sup>.



**Table 21.** NO<sub>2</sub> concentration levels in Seville in the period 2014-2024.

Year	Torneo Station				Santa Clara Station				Príncipes Station				Bermejales Station			
	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)
2014	151	0	37	0	124	0	21	0	159	0	24	0	164	0	26	0
2015	216	1	40	0	227	1	21	0	148	0	28	0	282	8	27	0
2016	181	0	39	0	116	0	22	0	168	0	25	0	159	0	27	0
2017	188	0	39	0	169	0	24	0	157	0	28	0	239	2	31	0
2018	154	0	35	0	160	0	20	0	131	0	24	0	156	0	26	0
2019	174	0	31	0	129	0	19	0	154	0	21	0	159	0	23	0
2020	123	0	25	0	90	0	16	0	108	0	16	0	319	4	21	0
2021	187	0	27	0	104	0	15	0	110	0	17	0	129	0	18	0
2022	115	0	25	0	100	0	16	0	112	0	20	0	133	0	20	0
2023	157	0	26	0	105	0	16	0	126	0	19	0	133	0	21	0
2024	130	0	24	0	84	0	15	0	104	0	17	0	110	0	20	0





**Table 22.** NO<sub>2</sub> concentration levels in Seville in the period 2014-2024.

Year	San Jerónimo Station				Ranilla Station				Centro Station			
	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)
2014	164	0	25	0	175	0	26	0	123	0	20	0
2015	162	0	25	0	236	9	31	0	124	0	28	0
2016	139	0	25	0	173	0	29	0	144	0	19	0
2017	178	0	27	0	272	11	33	0	149	0	24	0
2018	119	0	21	0	191	0	29	0	143	0	16	0
2019	119	0	19	0	192	0	35	0	122	0	13	0
2020	132	0	16	0	158	0	23	0	110	0	13	0
2021	118	0	17	0	166	0	23	0	105	0	12	0
2022	102	0	18	0	135	0	22	0	94	0	14	0
2023	132	0	16	0	161	0	23	0	93	0	13	0
2024	81	0	14	0	113	0	23	0	199	0	15	0

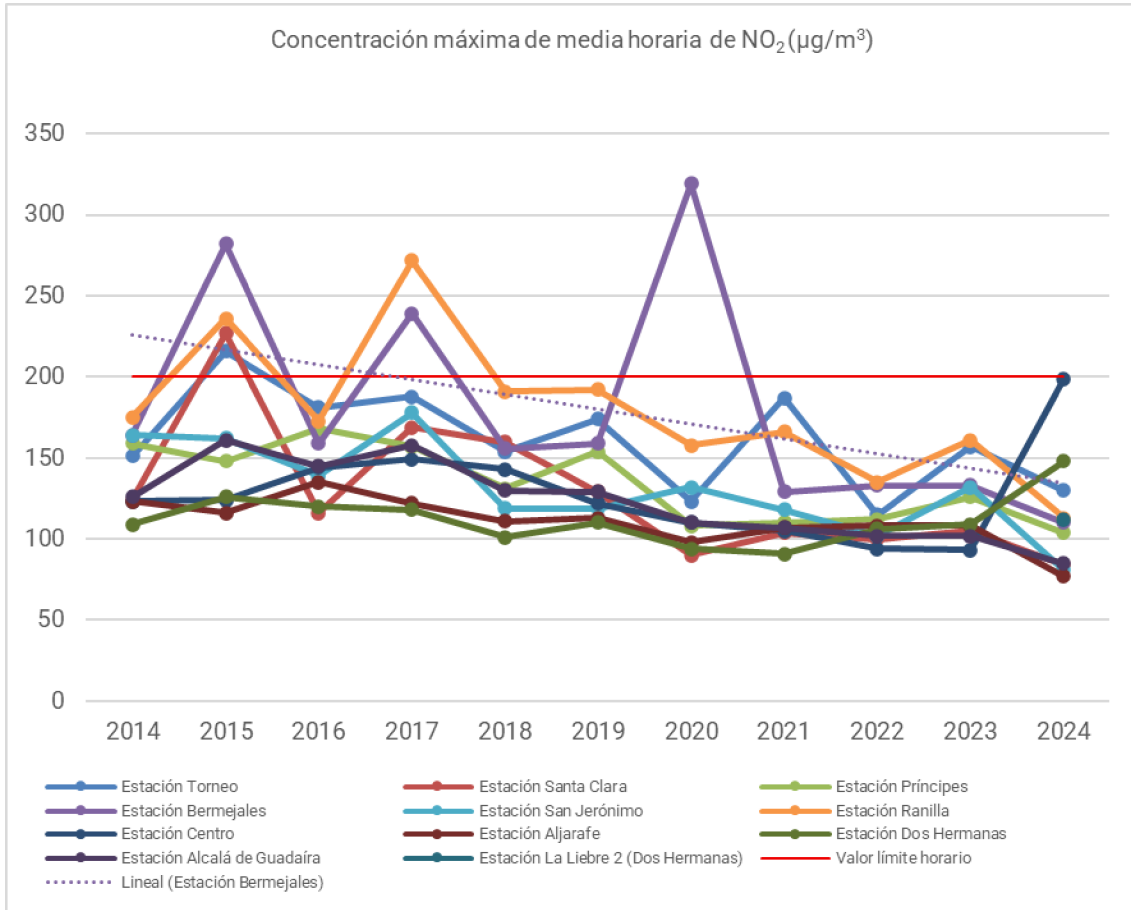




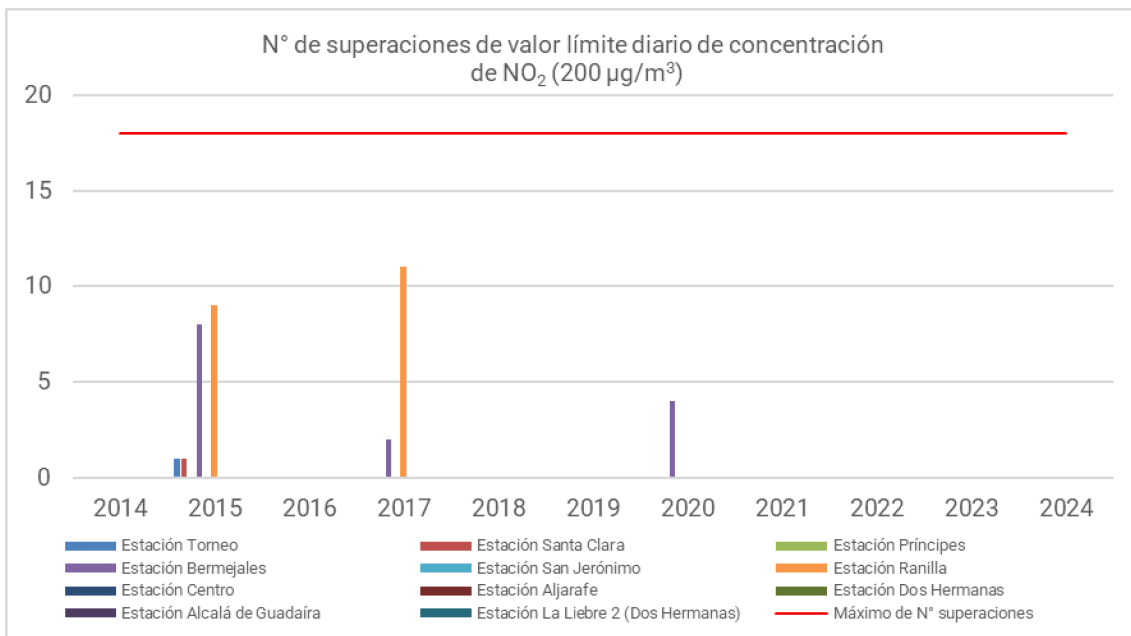
**Table 23.** NO<sub>2</sub> concentration levels in the metropolitan area of Seville in the period 2014-2024.

Year	Aljarafe Station				Dos Hermanas Station				Alcalá de Guadaíra Station				La Liebre 2 Station (Dos Hermanas)			
	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)	V. Max. average 1 h	Human Health (24h)	V. Calendar year	Human Health (Annual)
2014	123	0	13	0	109	0	19	0	126	0	16	0				
2015	116	0	18	0	126	0	19	0	161	0	19	0				
2016	135	0	15	0	120	0	18	0	145	0	18	0				
2017	122	0	16	0	118	0	19	0	158	0	19	0				
2018	111	0	13	0	101	0	16	0	130	0	17	0				
2019	113	0	13	0	110	0	15	0	129	0	17	0				
2020	98	0	12	0	94	0	14	0	110	0	13	0				
2021	107	0	11	0	91	0	14	0	107	0	13	0				
2022	108	0	11	0	106	0	14	0	102	0	12	0				
2023	108	0	10	0	109	0	15	0	102	0	11	0				
2024	77	0	9	0	148	0	13	0	85	0	10	0	112	0	19	0





**Figure 26.** History of maximum NO<sub>2</sub> concentration levels.



**Figure 27.** History of Number of Exceeding the Daily Limit Value of NO<sub>2</sub> Concentration.



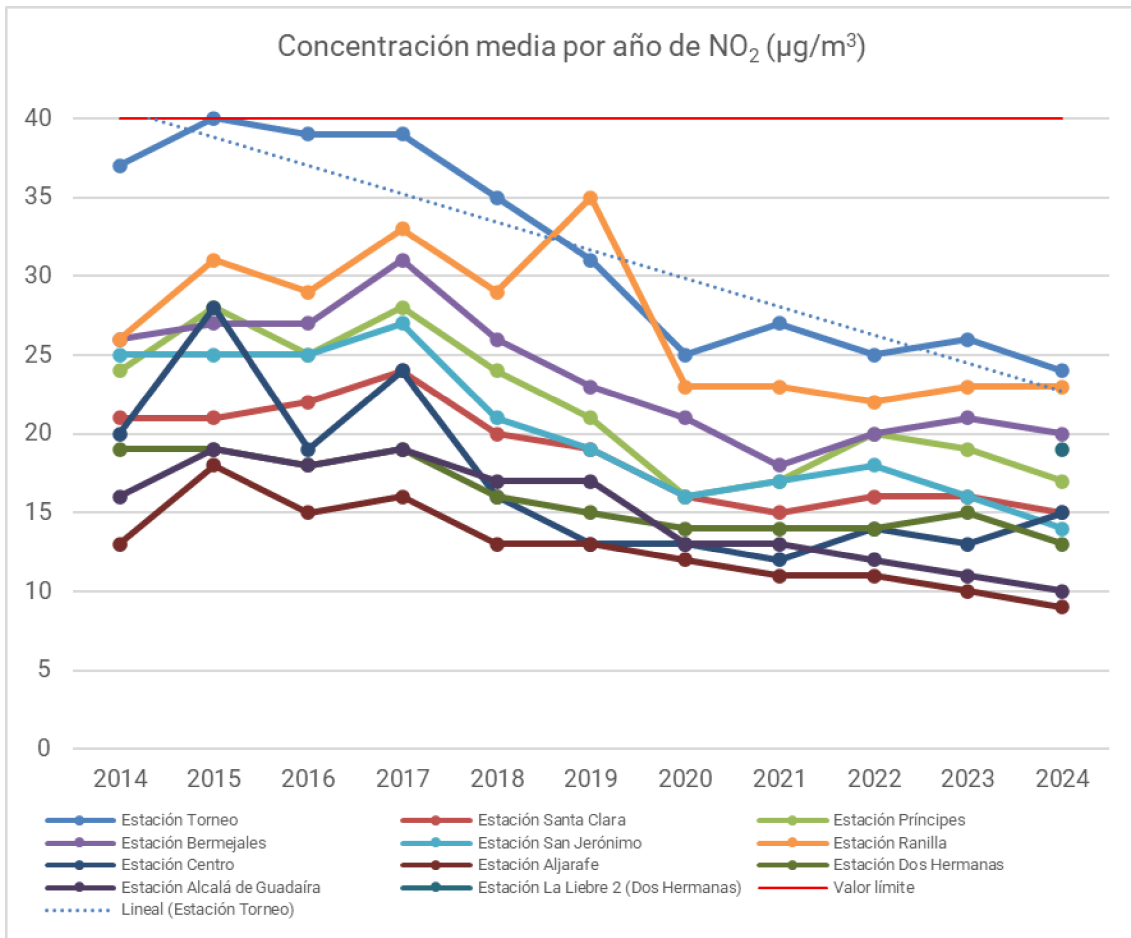


Figure 28. Historical average concentration per year of NO<sub>2</sub>.

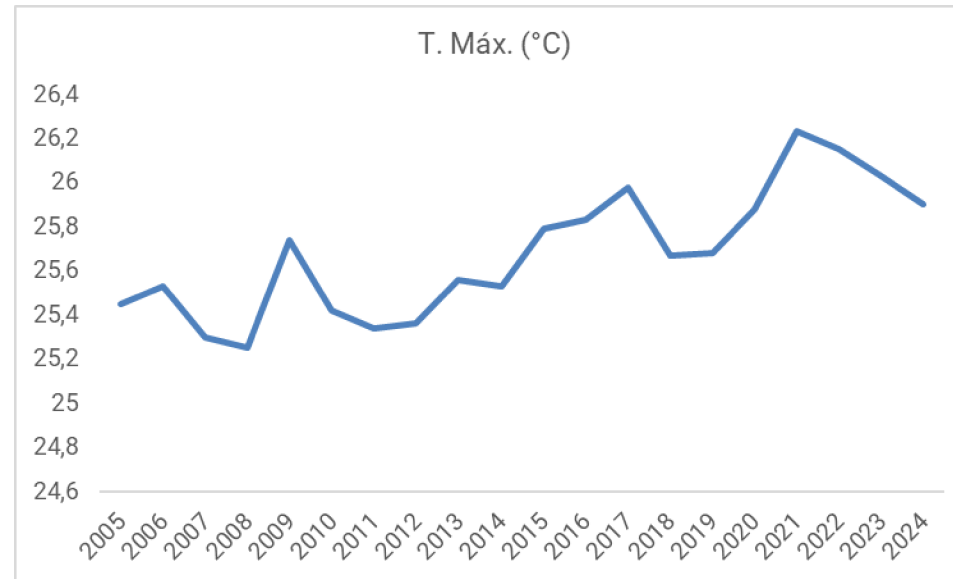
## 5.4. Average Maximum Temperature Value (Tmax)

- **Unit of Measurement:** °C Tmax
- **Definition:** Average of the maximum daily temperatures (Tmax) observed during a specific period of time in the municipality of Seville, to detect the increase in temperature.
- **Source:** AdapteCCa Viewer.
- **Calculation Formula/Methodology:** Measure the maximum temperatures recorded in the City of Seville, using the CMIP6 grid method (statistical methods) and choosing the historical scenario for the data from 2005 to 2014 and the average emissions scenario (ssp2-4.5) for the data from 2015 to 2024.
- **Example of Use:** Calculate the average daily Tmax for a period. Compare this value with historical data to observe trends.



**Table 24.** History of Average value of the maximum temperature (Tmax).

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
T. Max. (°C)	25,45	25,53	25,3	25,25	25,74	25,42	25,34	25,36	25,56	25,53	25,64	25,91	25,59	25,76	26,22	26,31	26,08	26,23	25,71	25,87



**Figure 29.** History of T. Max. (°C) for the period 2014-2024.





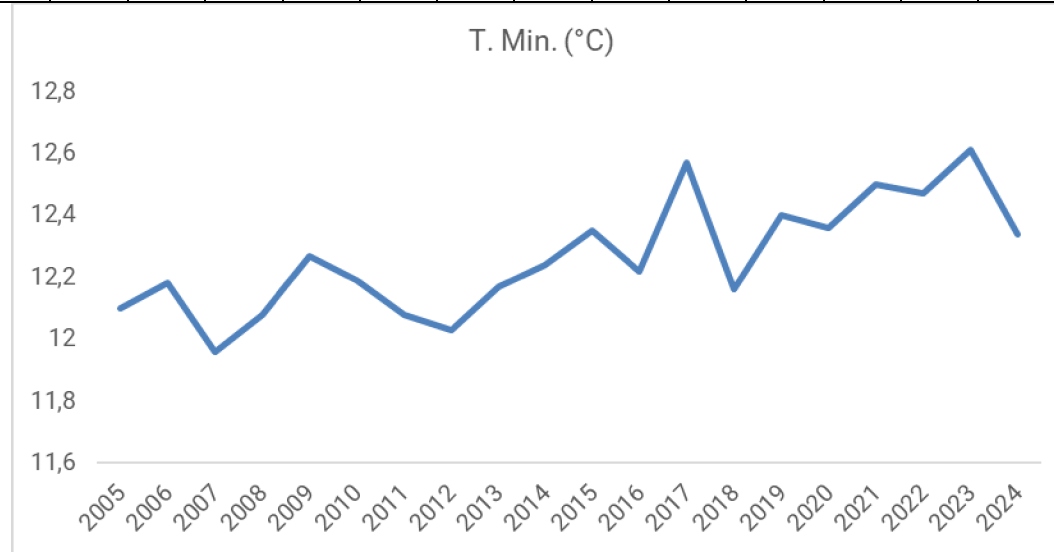
## 5.5. Average Minimum Daily Temperature (Min.T.)

- **Unit of Measurement:** °C Tmin.
- **Definition:** Average of the maximum daily temperatures (Tmax) observed during a specific period of time in the municipality of Seville, to detect the increase in temperature.
- **Source:** AdapteCCa Viewer.
- **Calculation Formula/Methodology:** Measure the minimum temperatures recorded in the City of Seville, using the CMIP6 grid method (statistical methods) and choosing the historical scenario for the data from 2005 to 2014 and the average emissions scenario (ssp2-4.5) for the data from 2015 to 2024.
- **Example of Use:** Calculate the average of the daily Tmin. for a period. Compare this value with historical data to observe trends.



**Table 25.** Average values of the minimum daily temperature (Min.T.).

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
T. Min. (°C)	12,10	12,18	11,96	12,08	12,27	12,19	12,08	12,03	12,17	12,24	12,27	12,34	12,42	12,26	12,53	12,72	12,68	12,75	12,46	12,49



**Figure 30.** History of Average value of the minimum daily temperature (Min.T.).





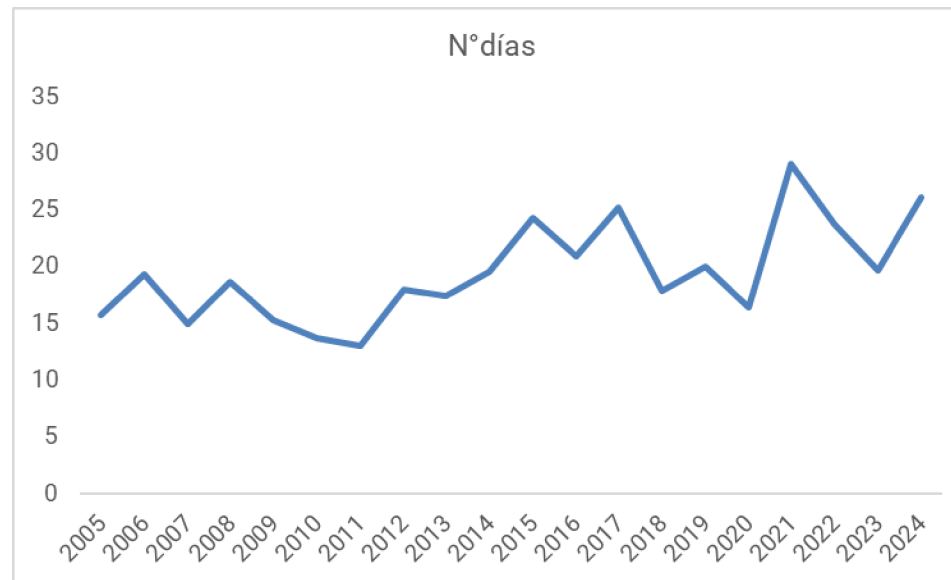
## 5.6. Maximum duration of heat waves

- **Unit of Measure:** number of consecutive warm days
- **Definition:** Period of consecutive days with high temperatures where both length and maximum temperature are important.
- **Source:** AdapteCCa Viewer.
- **Calculation Formula / Methodology:** Measure the number of consecutive warm days recorded in the City of Seville, using the CMIP6 grid method (statistical methods) and choosing the historical scenario for the data from 2005 to 2014 and the average emissions scenario (ssp2-4.5) for the data from 2015 to 2024.



**Table 26.** Maximum duration of heat waves in the period 2005-2024 in Seville.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
N°days	15,75	19,29	14,96	18,65	15,27	13,65	13	17,93	17,38	19,55	17,35	20,18	17,44	22,76	21,18	25,65	15,98	23,07	22,98	19,31



**Figure 31.** History of maximum duration of heat waves for the period 2005-2024 in Seville.



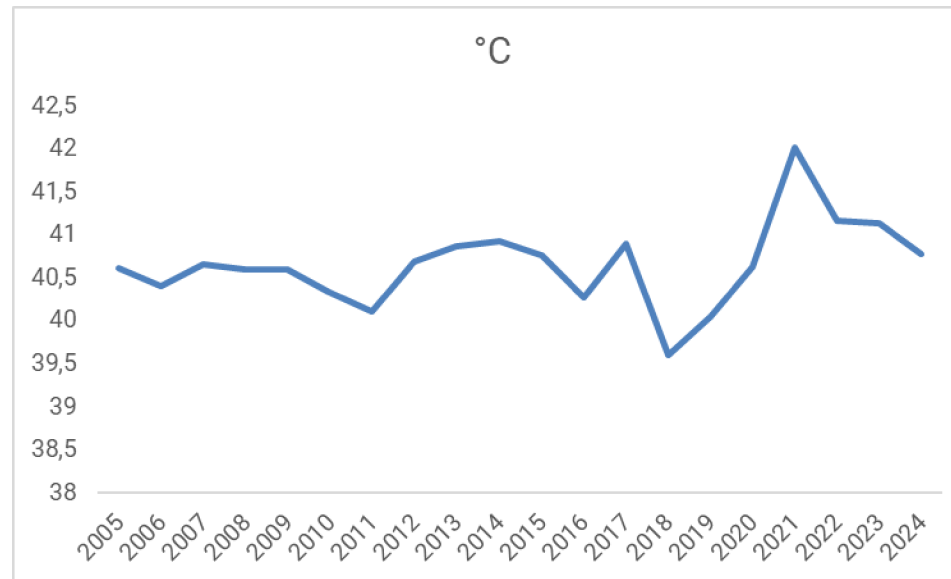
## 5.7. 99th percentile of daily maximum temperature

- **Unit of Measurement:** °C
- **Definition:** A daily maximum temperature value that is only exceeded on 1% of the warmest days in the period analysed. It represents the most extreme heat episodes and is a direct indicator of the thermal intensity associated with heat waves.
- **Source:** AdapteCCa Viewer.
- **Calculation Formula / Methodology:** All the maximum daily temperatures recorded in the City of Seville during the study period are ordered. From this distribution, the value corresponding to the 99th percentile is identified, using data from the CMIP6 grid method (statistical methods) and choosing the historical scenario for the data from 2005 to 2014 and the average emissions scenario (ssp2-4.5) for the data from 2015 to 2024.



**Table 27.** 99th percentile of the maximum daily temperature in Seville in the period 2005-2024.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
°C	40,61	40,40	40,66	40,60	40,60	40,33	40,11	40,68	40,87	40,92	40,56	40,61	41,01	41,09	41,49	41,32	41,01	41,72	40,99	41,16



**Figure 32.** History of the 99th percentile of the maximum daily temperature in Seville in the period 2005-2024.





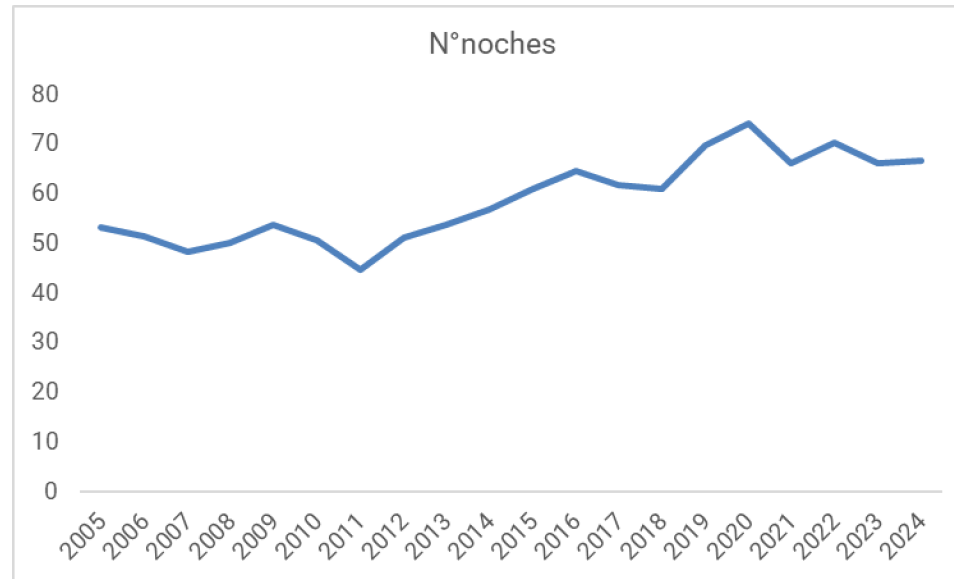
## 5.8. Number of warm nights

- **Unit of Measurement:** number of nights per year with minimum temperature above the defined threshold (usually  $> 20$  °C).
- **Definition:** Total number of nights in which the daily minimum temperature exceeds the threshold considered as "warm night". This indicator reflects the persistence of night-time heat, a key factor in assessing heat stress, lack of recovery at night and the intensity of prolonged warm episodes, including heatwaves.
- **Source:** AdapteCCa Viewer.
- **Calculation Formula / Methodology:** All the warm nights recorded in the City of Seville during the study period are ordered. The calculation is made using data from the CMIP6 grid method (statistical methods) and choosing the average emissions scenario (ssp2-4.5) for the data from 2015 to 2024.



**Table 28.** Number of warm nights in Seville in the period 2005-2024.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
N° nights	53,24	51,36	48,31	50,25	53,80	50,64	44,82	51,13	53,84	56,71	60,84	64,47	61,73	60,96	69,80	74,07	66,02	70,25	66,11	66,62



**Figure 33.** History of Number of warm nights in Seville in the period 2005-2024.



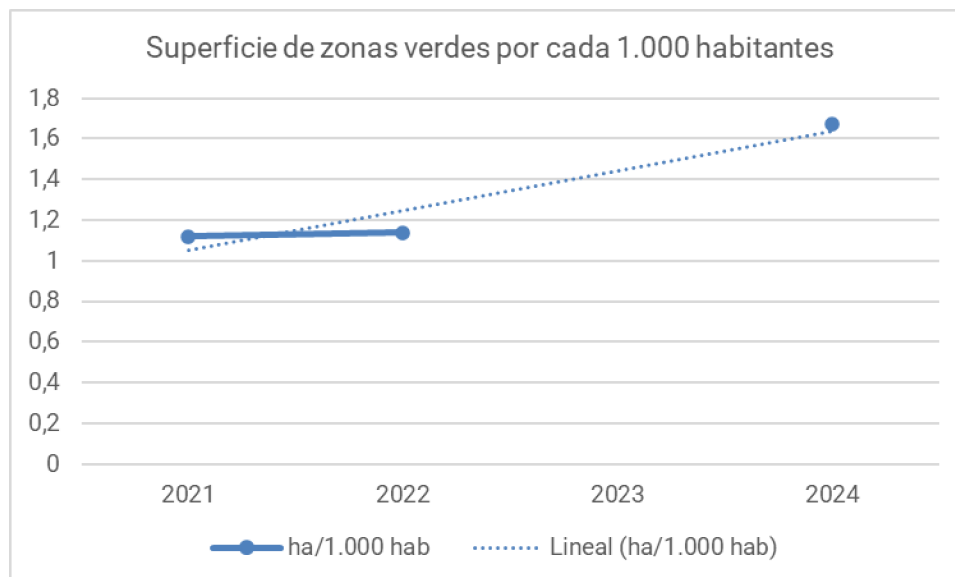


## 5.9. Green spaces (hectares / 1,000 inhabitants)

- **Unit of Measure:** hectares/1,000 inhabitants
- **Definition:** The amount of green space in a city per 1,000 inhabitants.
- **Source:** Bosch, P., Jongeneel, S., Rovers, V., Neumann, H.-M., Airaksinen, M., & Huovila, A. et al. (2017) CITYkeys list of city indicators.
- **Calculation Formula:** Total area of green spaces in hectares \* 1,000) / Total number of inhabitants.
- **Example Use:** For a city of 170,000 inhabitants with 65 hectares of green space:  $(65 \times 100,000) / 170,000 = 38.24$  hectares / 100,000 inhabitants.

**Table 29.** Green spaces (hectares/1,000 inhabitants) in Seville for the period 2021, 2022 and 2024.

Year	2021	2022	2023	2024
Value (ha)	1,12	1,14		1,67



**Figure 34.** Evolution and trend of green spaces (hectares/1,000 inhabitants) in Seville for the period 2021, 2022 and 2024.

## 5.10. Energy consumption per household

- Total residential electricity consumption (MWh) (IECA/SIMA) / Census / Continuous register (main dwellings) (INE data).
- **Unit of Measure:** kWh
- **Definition:** Measured trend of the energy consumed by a household in kWh. Quarterly or annual comparisons can be made. (Note: for the purposes of monitoring climate agreements, we propose a minimum annual frequency).



- **Source:** NetZeroCities
- **Calculation Formula/Methodology:** A formula (Power in kW \* hours of use) can be used, but it is assumed that cities will have access to microcensus type data (small-scale detailed surveys) or administrative records. Alternatively, it can be obtained from metered data, energy bills, or directly from energy companies.

## 5.11. Modal share of green modes of transport and public transport

- **Unit of Measure:** %
- **Definition:** It is defined as the average number of trips per day that an inhabitant makes on foot, by bicycle or by public transport, with respect to the average total number of trips per inhabitant per day. The increase in the modal shares of walking, cycling and public transport indicates a change in mobility behaviour and a preference for more sustainable options. These modes of transport are known as green modes because they cause zero or significantly fewer GHG emissions than journeys in private cars or motorcycles.
- **Source:** NetZeroCities
- **Calculation Formula:**  $MS_{green} = T_{total} \times (T_w + T_b + T_{train} + T_{bus} + T_{tram}) \times 100$ . Where:  $T_w$  = Walking trips per capita per day,  $T_b$  = Bike trips per capita per day,  $T_{train}$  = Train trips per capita per day,  $T_{bus}$  = Bus trips per capita per day,  $T_{tram}$  = Tram trips per capita per day,  $T_{total}$  = Total trips per capita per day.
- **Example of Use:** In 2019, the inhabitants of Ciudad X made 3.2 trips/day. 40% car/motorcycle, 15% public bus, 10% walking, 10% bike, 25% multimodal (15% included car/motorcycle, 10% only green modes). 2019 calculation: Public Weather (15%) + Walking (10%) + Bicycle (10%) + Green Multimodal (10%) = Green Mode Share (45%). In 2024, public t. rises to 17%, cycling to 13%. Green modes odds = 50% (+5% vs baseline). In 2026, walking and green multimodal will rise 5% each. Green modes quota = 60% (+15% vs baseline).

## 5.12. Percentage of municipal buildings equipped with energy management systems

- **Unit of Measure:** % of public buildings
- **Definition:** The indicator counts the number of municipal buildings equipped with Building Energy Management Systems (BEMS). It takes into account public buildings are defined as non-residential buildings (e.g. office buildings, schools, fire stations, etc.) that are owned by the city. BEMS are defined as "integrated building automation and energy management systems, using IT or holistic approach to controls and provide adaptive operational optimization."



- **Source:** Yang, T., Clements-Croome, D., Marson, M., 2017. Building Energy Management Systems. In: Abraham, M.A. (Ed.), Encyclopedia of Sustainable Technologies. Elsevier, pp.291–309.
- **Calculation Formula:** (Total number of municipal buildings equipped with building energy management systems / Total number of municipal buildings)\* 100.
- **Example of Use:** Objective: to track and improve the energy management of municipal buildings. Adoption of the indicator "Percentage of Municipal Buildings Equipped with Energy Management Systems" to measure progress. Data collection: Base year (e.g. 2018) for the starting point, counting total municipal buildings. Year of evaluation: have buildings with BEMS. Example: Base year = 100 municipal buildings. Current year = 25 buildings with BEMS. Calculation:  $(25/100) * 100 = 25\%$ . It means that 25% have adopted energy management systems. Tracking this indicator allows us to evaluate progress in the adoption of efficient technologies. An increasing percentage indicates a positive trend.

### 5.13. GDP per capita

- **Unit of Measure:** €/cap
- **Definition:** Gross domestic product of the city per capita.
- **Source:** Bosch, P., Jongeneel, S., Rovers, V., Neumann, H.-M., Airaksinen, M., & Huovila, A. et al. (2017) CITYkeys list of city indicators.
- **Calculation Formula:** (Total household consumption (C) + public expenditure (G) + investments in fixed capital, inventories and residential construction (I) + net exports (NX = total exports – total imports)) / city population. (Note: if the data is not available or if it is not possible to make the calculation at the municipal level, it is recommended to use the data at the provincial or regional level and estimate the percentage corresponding to the city, taking into account the population and other relevant factors.)
- **Example of Use:** Example city: Population=500,000. C=€10bn, G=€5bn, I=€12bn, NX=€15bn(exp)-€5bn(imp)=€10bn. Total = €42bn. GDP per capita =  $€42,000,000,000 / 500,000 = €84,000$ .

### 5.14. Budget allocated to climate action projects

- **Unit of Measure:** % of the Municipal Budget
- **Definition:** Allocation of the municipal budget to climate action actions and projects as a percentage of the overall municipal budget. (Note: we understand climate action projects as those municipal projects whose main objective is the mitigation of climate change (reduction of emissions) or adaptation to its impacts. It includes, for example, initiatives for energy efficiency, renewable energy, sustainable mobility, rehabilitation of extreme weather events.)





- **Source:** NetZeroCities
- **Calculation Formula:** Annual budget allocated to projects specifically dedicated to climate action / Annual municipal budget.
- **Example Use:** If the city invested EUR 139m in climate projects in 2023, and the total municipal budget is EUR 942m, then  $139 / 942 = 14.7\%$ . The idea is to track this over time and that the percentage increases.

## 5.15. Recycling percentage of municipal waste

- **Unit of Measure:** %
- **Definition:** The indicator measures the proportion of recycled municipal waste over the total generation of municipal waste.
- **Source:** European Commission (2022), Green City Accord, Clean and Healthy Cities for Europe, GCA Mandatory Indicators Guidebook, Version of 29 April 2022.
- **Calculation Formula:** Proportion of recycled municipal waste of the total generation of municipal waste.
- **Example of Use:** Hypothetical scenario: city produces 20 metric tons of municipal waste in 2024, 2 t are recycled. Calculation:  $2/20 = 0.1 \times 100 = 10\%$ . 10% was recycled in 2024. The recycling rate indicates the quality of the overall waste management system.

## 5.16. Percentage of tree cover within the city

- **Unit of Measure:** % of municipal area
- **Definition:** The indicator assesses the proportion of adult trees (with the potential to grow to full maturity) in relation to the municipal area.
- **Source:** European Commission (2022), Green City Accord, Clean and Healthy Cities for Europe, GCA Mandatory Indicators Guidebook, Version of 29 April 2022.
- **Calculation Formula:** (Total area (m<sup>2</sup>/ha/km<sup>2</sup>) of tree cover within the municipal limit / total area of the municipal limit (m<sup>2</sup>/ha/km<sup>2</sup>)) \* 100.
- **Example of Use:** If the area of tree cover in a City is 20km<sup>2</sup> and the total area of the City is 100km<sup>2</sup>, the calculation would be:  $20\text{km}^2 / 100\text{km}^2 = 0.2 * 100 = 20\%$ . That is, 20% of the area of the City has tree cover. It is recommended to use tree cover density maps at a resolution of 10m or 100m, applying the relevant base year.

In the 2026 iteration, this City Council intends to have the entire accounting system applied to the set of proposed indicators. We are working on the possible incorporation of others, which we also consider to be of particular relevance:





- Number of working hours/year affected by climatic episodes.
- No. of hours/year affected by power cuts attributable to climatic causes.
- Number of hospital admissions/heat waves.



## 6. Process to achieve a more sustainable and climate-neutral Seville

We believe that it is essential to strengthen the process towards climate neutrality in the City, as is the case in many other Mission cities, to resort to multilevel governance.

Multilevel **governance** (also known as *multilevel governance*) is a system in which the responsibilities for designing and implementing public policies are shared between different levels of government (local, regional, national, European, etc.). This model implies that the different levels of government do not act in isolation, but coordinate and collaborate to make decisions and implement policies that affect society as a whole.

In other words, multilevel governance is a form of management in which:

- Responsibilities are distributed: instead of a single level of government making all the decisions, responsibility is shared and coordinated with other levels.
- Cooperation is promoted: collaboration between different levels of government is encouraged to achieve common goals.
- Efficiency is sought: by distributing responsibilities and promoting cooperation, the efficiency of public management can be improved.
- The perspective of citizens is considered: it seeks that public policies are designed and applied taking into account the needs and perspectives of citizens.

Multilevel governance is especially relevant in contexts where work is being done on the **management of complex public policies**, where the participation of various actors is required to address uniquely complicated problems.

In summary, multilevel governance is an approach to public management that promotes cooperation, participation, and shared responsibility between different levels of government.

To all this we must add the need to concur in public-private governance.

We have already referred to the diagnosis and situation of Seville in terms of the forecasts and commitments in its planning for the fight against climate change, as well as the role that we understand should prevail in the work to achieve the objectives of the Climate Mission. We now complete the situation to clarify the existing reality as to the **principles and process that must govern future actions** to achieve those purposes.

The **Seville 2030 Strategic Plan** establishes in its fourth objective the strategy to develop **governance and citizen participation**, stating that, in order to fulfil the central objective, it is essential to articulate in the city renewed **forms of good governance** based on transparency, consensus and equity.

The strategy that guarantees the objective of climate neutrality is born from the following sectoral plans approved by the Plenary of the Seville City Council:

- Climate and Sustainable Energy Action Plan
- General Urban Development Plan





- Sustainable Urban Mobility Plan
- Master Plan for the Trees of Seville
- Bike Plan
- Seville Digital Agenda
- Municipal Plan for Housing, Land and Rehabilitation
- 2030 AGENDA
- Climate Emergency Plans

All of them make up Objective Three of the Strategic Plan to create a sustainable city, which mitigates and adapts to climate change. Seville aims to **reduce the vulnerability of its economic, social and natural systems**, focusing on the creation of a green, sustainable city adapted to climate change, seeking an improvement in the quality of life.

These strategies must in turn be an economic and social engine for Seville and its metropolitan area. At a global level, the Seville Urban Agenda must be the governance instrument that will guarantee compliance with the Climate Agreement, by integrating all sectors of society and the rest of the provincial, regional and state territorial administrations.

Thus, the **Seville Urban Agenda** is made up of 10 strategic axes, 30 specific challenges and 291 lines of action to achieve a more liveable, sustainable, innovative city, with a new economic model and better public services. The ten strategic axes on which the Urban Agenda is based are:

- Axis 1. A sustainable and connected territorial model
- Axis 2. A compact, accessible and quality urban organisation
- Axis 3. Building adaptive capacity and resilience to climate change
- Axis 4. Promotion of responsible management of urban resources and commitment to the circular economy
- Axis 5. Promoting sustainable mobility
- Axis 6. Strengthening social cohesion, integration and equity
- Axis 7. Boosting the economy and skills for job creation
- Axis 8. System that facilitates access to housing
- Axis 9. Increasing the capacity for digital innovation and urban intelligence
- Axis 10. Strengthening governance and participation.

Under these ten axes, each of the climate actions that incorporate all social visions for their final formulation will be studied, analyzed and reflected.

Municipal citizen participation mechanisms have been established through which the work of the Urban Agenda will be nurtured.

Within the framework of the specific planning that directly concerns this Climate Neutrality Agreement, social participation has been articulated through the **Advisory and Public Participation Council of the Energy and Sustainability Agency of Seville** (regulated by the Municipal Ordinance on Energy Management, Climate Change and Sustainability), in which the participation of the quintuple helix must be guaranteed: administrations, companies, civil society, academia, and social media.

This participation council, constituted in 2014 and periodically renewed, meets regularly in four sessions a year, and has been in charge of evaluating the degree of progress of the PACES. Therefore, it is





foreseeable that it will be in charge of evaluating the degree of progress of the commitments made in the Sevilla Climate City Contract, depending on what is finally established in the PMCC. Likewise, it must intervene in the iterative and co-creation process that characterizes the Climate Mission, intervening in the diagnoses and giving its opinion on the action plans annually. It would therefore have a consultative nature for the positions of the highest municipal decision-making body, the Plenary, in the process.

In conclusion, the process in the new Climate Neutrality Agreement that is formalised should make it possible to increase the objectives initially set out in the Climate Action Plan (PACES, Rev. 2020), with a 54.28% reduction in GHG emissions compared to the reference year (2005), to achieve at least an 80% reduction by 2030. This margin to the climate-neutral city could be achieved through local absorption capacities, as well as by public and private compensation actions that are developed in and/or from the City.

Therefore, in successive iterations, **the SCCC will end up integrating the PMCC (due to the Regional Law 8/2018), the PACES and the climate forecasts established in the 2030 Agenda**, mainly as a result of SDGs 11 and 13.

This process should enable the decarbonisation of the city of Seville in this period, **without affecting its aspirations for economic growth and social welfare**, which will place us in the group of the 100 climate-neutral cities in the EU.

The process should demonstrate that the expected co-benefits can result in a net result greater than the necessary investments, especially in terms of **health benefits**, employment, savings in **energy costs**, and **ecosystem services** (local, regional and global). Some medium-sized cities have assessed the co-benefits for mobility actions at more than €400 million.

The process will be conducted through collaboration **between the Seville City Council** (Energy and Sustainability Agency) and the Academy, supported by **civil society** and the **business fabric**, also highlighting the relevant role that the **Corporation of Municipal Companies** must play. We can now highlight the decisive cooperation in the training and internship programs with the numerous teaching and research activities of different research institutes. To this end, the Seville City Council has signed express collaboration agreements within the framework of the Mission with the **University of Seville** and with the **Pablo de Olavide University**.

The **University Institute of Architecture and Construction Sciences** (IUACC) is a research and teaching centre of the highest humanistic, scientific, technical and artistic creation level, whose main objectives are the planning, promotion, implementation and dissemination of research, development and technological innovation activities in the humanistic, scientific, technological and artistic creation areas corresponding to the **Architecture, Urban Planning and Territorial Planning, Environment and Construction Sciences**. Postgraduate and doctoral training and highly qualified specialised personnel are also objective.

The collaboration and participation of these training programmes in the Seville Mission will undoubtedly lead **to an enrichment of the process until 2030**, with the highest levels of talent through the involvement of the teaching staff and during the curricular practices of the students in the process, as we have agreed with the Universities.

However, this Climate Agreement with the EU is a proposal for a process to achieve the objectives of the EU Mission established for the 100 climate-neutral cities, rather than a formal commitment, which





will only be possible after the stages of the final formation of local alliances, multi-level cooperation, coordination and co-creation between the twinned cities (iterative process). and the configuration of financing systems.

The European Mission, like all the cities that are part of it, is aware that the challenge will not be possible without the **participation of the private sector**. But it happens, as on so many other occasions, that the business sector is moving more firmly towards the purpose of decarbonisation than the public sector, which is an advantage for that alliance. We will also advance in the process hand in hand with the initiative already described, **SevillaCityOne**, together with the rest of the companies adhering to the initiative, which can represent all the sectors that are needed to achieve the climate neutrality established by the Mission.

Everything indicates that the EU Climate Mission will generate a significant *investment appetite* in the participating cities, and will also have to be the subject of numerous demonstration projects and consolidated applications for mitigation. All this will come with the gradual consolidation of the **European Seal as a Mission City**, which will give confidence and technical, legal and institutional security to the private sector for its investments.

Throughout the **process, it will be necessary to avoid *greenwashing*** processes, and to apply tools to measure the achievements achieved. In this regard, despite its complexity, it will be necessary to resort to the most appropriate techniques, such as the green taxonomy, promoted by the EU, an area in which the joint work between Mission cities to harmonize criteria and take advantage of existing synergies is particularly welcome.

In any scenario, everything points to the fact that a paradigm shift will be essential to face the new challenges and achieve decarbonisation from the municipalities, making it essential **to reconcile the mitigation of GHG emissions, adaptation to climate phenomena, economic development, and social protection and welfare**. And all this, without anyone being left out of the results of the intended improvements, for which the Seville City Council will formalize with **Caritas Seville and the Red Cross** (in accordance with the work that has already been carried out for years) the necessary agreements that guarantee that the most disadvantaged are part of the diagnosis and that they will be attended to within the framework of the climate emergency; among other resources, through the provision and provision of the necessary climate shelters.

Seville will launch the **Ambassadors of the Climate Mission 2030** initiative, in line with those undertaken in other cities such as Valladolid. Climate Mission Ambassadors are individuals or groups who are actively engaged in spreading the word about the importance of climate action and promoting the transition to a low-carbon economy. These ambassadors can play a key role in the implementation of climate neutrality plans in cities, regions or even at the national level. It will also be screened in accordance with the initiative of the **Climate Ambassadors of the European Green Deal**, of which we already have several members in Seville.

Local Green Deals, also known as **Local Green Deals**, are initiatives that promote the green transition at the municipal and regional level. These agreements seek to integrate sustainability policies into the daily life of cities, involving various local actors in the creation of concrete action plans.

The **UN Global Compact** (also known as the Global Compact) is a United Nations initiative that promotes business sustainability. In Seville, several actions and events related to the Global Compact have been carried out, including the presence of Sevillian companies adhering to the initiative and the celebration





of the Fourth International Conference on Financing for Development (FFD4), in Seville from June 30 to July 3, 2025.

The Global Compact seeks to align companies' strategies and operations with ten universal principles on human rights, labour standards, the environment and the fight against corruption. In Seville, there has been a growing commitment by companies to sustainability, as evidenced by the adherence of local companies to the Global Compact.

In addition, the Global Compact has contributed to the promotion of **corporate social responsibility** (CSR) in Seville, supporting companies to implement sustainable practices and contribute to the Sustainable Development Goals (SDGs).

All of these initiatives are being integrated into the SCCC process.

As for the process for **Adaptation to Climate Change**, we must pay attention to the multilevel planning that is developed in the different supra-municipal instances.

For adaptation to climate change in the EU, the **European Adaptation Strategy** (April 2013), the EU adopted the first European Adaptation Strategy, which constitutes the European framework for adaptation to climate change. The Strategy established three objectives materialized in 8 actions, aimed at promoting the establishment of adaptation strategies in member countries, the improvement of decision-making in this area and the promotion of adaptation in the most vulnerable sectors.

The Strategy Communication document was complemented by a series of documents on specific sectors or themes (migration, coastal adaptation, health or infrastructure), as well as on a set of guidelines for the development of adaptation strategies, the integration of adaptation into Cohesion Policy programmes and investments, and the integration of adaptation into Rural Development Programmes.

In February 2021, the European Commission adopted the new **European Strategy for Adaptation to Climate Change**, proposed as an instrument to build a climate-resilient society by improving knowledge of climate impacts and adaptation solutions; intensifying adaptation planning and climate risk assessments; accelerating adaptation measures; and helping to strengthen resilience to change climate on a global scale.

Some of the outstanding initiatives that have been developed within the framework of this new strategy are:

- European Climate and Health Observatory
- **European Adaptation Mission**
- First **European assessment of risks arising from climate change**

The European Commission has published several monitoring documents on climate change adaptation, highlighting *Member States' assessment of progress on climate change adaptation*.

In Spain, the **National Plan for Adaptation to Climate Change (PNACC) 2021-2030** is the basic planning instrument to promote coordinated action against the effects of climate change in Spain. Its main objective is to avoid or reduce present and future damage from climate change and to build a more resilient economy and society. It was the result of a collective process of analysis, reflection and public participation.





In Andalusia, the **Andalusian Climate Action Plan** (PAAC) is the general strategic planning instrument in the region for the fight against climate change, and is derived from Law 8/2018 on climate change in Andalusia.

Its mission is **to integrate climate change into regional and local planning**, while aligning them with the plans of the Spanish government, the European Green Deal and the Paris Agreement, contributing to achieving the Sustainable Development Goals set by the United Nations 2030 Agenda.

European, state and regional planning will be part of the SCCC process within the framework of Adaptation. For this objective, the City Council will go hand in hand with the Junta de Andalucía, as it is a member of the Adaptation Mission.

To complete this chapter, which contains the basic outlines on which the process for the Climate Mission in Seville is developed, and regardless of the companies adhering to the Mission contained in Annex III, we list below the main actors to be involved in the monitoring, which will act under the coordination of the Energy and Sustainability Agency and within the aforementioned framework of the 2030 Agenda:

#### **PUBLIC INSTITUTIONS**

Seville City Council  
Urban Planning Management  
Parks and Gardens  
Mobility  
Municipal Buildings  
IMD  
CEMS (EMASESA, TUSSAM, EMVISESA AND LIPASAM)  
Port of Seville  
PCT Seville  
Regional Government of Andalusia  
Ministry of Development, Articulation of the Territory and Housing  
Housing and Rehabilitation Agency of Andalusia (AVRA)  
IAPH

#### **CORPORATIONS AND FOUNDATIONS**

Official College of Architects of Seville  
Official College of Technical Architecture of Seville  
College of Industrial Engineers of Western Andalusia  
College of Graduates and Industrial Technical Engineers of Seville  
Professional Association of Graduates in Environmental Sciences of Andalusia  
College of Geographers of Andalusia

#### **UNIVERSITIES**

University of Seville  
Pablo Olavide University  
UNIA





CSIC  
JRC of Seville (IPTS)

### SOCIAL AGENTS

CES  
SevillaCityOne Association  
Seville Climate Network  
Ecologists in Action  
FACUA

This relationship will be definitively configured as the iterations of this SCCC progress.

In addition, due to its direct link with the objectives of the SCCC, the **companies registered in eCitySevilla have the participation:**

As promoters:



And as partners:





**zabala**  
INNOVATION

**PRODIEL**

**nynco**  
Consultores, S.L.

**NTT DATA**

**CWT**

**skylife**

**businessgo**

**BABEL**

**Junta de Andalucía**  
Consejería de Economía, Hacienda  
y Fondos Europeos  
Empresa Pública de Gestión de Activos, S.A.

**semic**  
Effective IT Solutions

**Wellness TechGroup**

**POWER ELECTRONICS**

**extravaganza**  
communications

**unei**

**un**  
**i** Universidad  
Internacional  
de Andalucía

**gálgus**

**mp ASCENSORES**

**CEA** Confederación de  
Empresarios de Andalucía

**samu**

**Schneider**  
Electric

**ESUELA POLITÉCNICA SUPERIOR**  
DE SEVILLA

**axión**

**WoodSwallow**

**Educación  
y Deporte**  
CEP Sevilla

**FIDAS**  
FUNDACIÓN PARA LA INVESTIGACIÓN Y  
DIFUSIÓN DE LA ARQUITECTURA, SEVILLA

**CreaFab3d**

**ayesa**

**Club Cámara**  
antares

**Epyme**  
Asociación Provincial  
de Empresas Instaladoras de Sevilla

**Ibermática**  
EMBRACING THE FUTURE

**INERCO**

**Quantec**  
Data Center





Likewise, the participation of the companies attached to the public-private initiative of **Seville CityOne** is foreseeable:





PARTNERS INSTITUCIONALES |



PARTNERS ESTRATÉGICOS |



PARTNERS GOLD |





PARTNERS SILVER |



PARTNERS BRONZE |





PORCELANOSA



quales

SDN



Solvia



The companies finally committed to the SCCC will be included in Annex III, presenting their emissions diagnoses and their mitigation and/or adaptation plans.

The SCCC is made up of companies that represent all the issuing groups in Seville.





## 7. Monitoring and updating the Climate Agreement

This proposal for Iteration 2026 of the Climate Neutrality Agreement of the City of Seville with the EU is configured within the framework of a continuous updating process, as a dynamic and flexible document that is subject to monitoring, updating and modification in order to review and adjust the commitments, actions and/or investments necessary to achieve the City's climate neutrality objectives. It represents a second version of the initial proposal approved in March 2024, which is now complemented and developed, with the former being replaced by the present one.

The Agreement requires monitoring the progress of the proposals assumed in this Agreement and its Annexes and their due updating. This monitoring and updating is without prejudice to the fact that specific methodologies for monitoring, revision and updating are included in the different Annexes proposed by the EU (NZC).

Where necessary for the better achievement of its objective, does not affect its essential purpose, and provided that it involves a specification, improvement or upward revision of the objectives and commitments assumed, amendments may be made to this GATS.

The following iterations will preferably be carried out within the framework of the biennial monitoring, which will correspond to Seville in 2028, and will be sent to the other signatory parties for information purposes.

The municipal organization, as well as its companies, will assume and fully support the commitments included in the revision of this Agreement, making room for its next iteration and compliance with supralocal administrations, the business sector, civil society, academia and the media.

In Seville, March 13, 2026

**José Luis Sanz Ruiz**  
Mayor of Seville



Seville Climate City Contract (Iteration March 15, 2026)

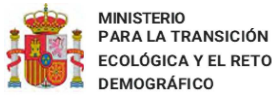
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Firmado Por	Jose Luis Sanz Ruiz	Firmado	16/03/2026 11:11:34
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## 8. Support from the Government of Spain for the climate neutrality of cities Mission



### GOVERNMENT DECLARATION OF SUPPORT FOR THE CLIMATE NEUTRALITY AND RESILIENCE OF SPANISH CITIES

The Government of Spain, through this declaration, reiterates its firm commitment and determination to advancing an environmental and climate agenda that also serves as an agenda for a **Welfare Society**. An agenda that protects ecosystems while guaranteeing health, prosperity, and a just transition for all citizens.

**For decades, science has been warning us** about the accelerating pace of climate change and its increasingly severe and frequent consequences. However, there is still time to act, and we recognize the opportunities presented by the ecological transition: acting sooner increases our adaptive capacity, lowers costs, and reduces inequalities, particularly for the most vulnerable populations. Tackling climate change provides a unique opportunity to transform our cities into more sustainable, resilient, and cohesive spaces. It allows us to build a fairer, safer, and more prosperous future for generations to come.

**Cities** play a key role in this green transition, as they house most of the population and concentrate energy consumption and emissions. Therefore, we emphasize the **transformative value of cities** as hubs for experimentation and innovation, where new forms of governance and citizen participation can drive change against the major urban challenges of our time.

This transformation must run parallel to a significant effort to **adapt cities to new climate scenarios**. We need urban spaces prepared to handle diverse and worsening risks. These include rising temperatures, extreme heat events, droughts, torrential rains, and floods. Furthermore, we need governments and citizens to be more aware and capable of responding effectively to these threats.

**Urban ecosystems** account for 22% of the European Union's land surface, providing vital habitats for biodiversity. Their role is essential in tackling the major challenges of climate change, as they ensure the quality of life and health of their inhabitants.

These urban ecosystems form part of the urban green infrastructure, a strategically planned network consisting of various and diverse-sized natural elements, such as parks, gardens, green corridors, trees, and green roofs and facades. It also includes orchards, agricultural and forest spaces, urban riverbanks, and transition zones to non-urbanized areas. This network enhances green capillarity and ecological connectivity, which in turn improves the biodiversity flows necessary to maintain environmental quality.





**Nature-based solutions** have proven to be both cost-effective and efficient in this process. They drive renaturalization, leading to better air quality, lower urban temperatures, and a reduced urban heat island effect and fire risk. They promote sustainable water management, reduce flooding, and improve infiltration and aquifer recharge. Ultimately, these solutions foster urban biodiversity and ecological resilience while strengthening the physical and mental well-being of citizens.

This Declaration also marks another step toward an urban health agenda, aiming to improve environmental quality in our cities and urban centers, guarantee healthy environments, and advance toward the zero-pollution goal. In this regard, we are working to ensure compliance with the Climate Change Law, particularly concerning Low Emission Zones, and we continue to strengthen the implementation of policies aligned with these goals.

Therefore, **this Government remains committed to the real transformation of our cities.** The National Integrated Energy and Climate Plan 2023-2030 (PNIEC 2023-2030) details this urban transformation, outlining the deployment of pedestrian areas and routes, as well as the promotion of bicycle use. This includes building bike lanes, adapting roads and urban spaces, providing secure parking, rolling out bicycle rental services, and implementing traffic-calming measures.

The updated PNIEC reinforces our commitment to **sustainable mobility** and incorporates the progress Spain has made in recent years through various instruments. These include the Safe, Sustainable and Connected Mobility Strategy 2030, the Recovery Plan, the Sustainable Mobility Bill, and Royal Decree 1052/2022, which regulates the minimum requirements for Low Emission Zones under the Climate Change Law.

We are also reinforcing our commitment to **public and collective transport**. This involves boosting railways and developing digital, sustainable solutions to improve the competitiveness and efficiency of the transport system.

We further commit to continuously promoting the electrification of the vehicle fleet. In December 2025, we launched the Auto+ Plan, allocating 400 million euros in 2026 for direct subsidies to purchase electric vehicles. Additionally, we are launching another Moves Corredores program, providing 200 million euros to deploy charging stations, alongside an additional 580 million euros for the PERTE VEC.

The **energy retrofitting of existing buildings** and the construction of **highly efficient new buildings** are essential for advancing toward climate-neutral cities. The PNIEC 2023-2030 targets an increase in retrofitted homes to **1,377,000**. Improving the built environment reduces emissions, enhances thermal comfort, combats energy poverty, and generates high-quality local jobs. Within this context, we must prioritize accelerating the electrification of heating and cooling, boosting self-consumption and energy communities, promoting renewable energy solutions, and advancing toward positive energy districts.

The PNIEC 2023-2030 reinforces this vision by establishing specific measures to decarbonize the building sector. Transforming the building stock is a key lever in decarbonizing cities and achieving the goals of the European Union's Climate- Neutral and Smart Cities Mission.

Meanwhile, the **National Climate Change Adaptation Plan (PNACC)** identifies cities, urban planning, and buildings as priority areas for intervention. Evidence shows that urban spaces face





specific risks that require proactive policies to anticipate impacts, increase adaptive capacity, and strengthen urban resilience.

The Ministry for the Ecological Transition and the Demographic Challenge supports cities through policies, but also through specific financing instruments. This Government provided **€810,000** to fund the Spanish platform (citiES 2030). We have allocated 218 million euros to urban renaturalization and resilience projects. More specifically, we have approved €16.5 million in grants for Mission cities through public calls, and we are currently developing a new public-private investment initiative dedicated to these cities.

We maintain our commitment to supporting the Mission cities and other municipalities wishing to embark on this path with 1.9 million euros for the **Collaboration Platform for the Climate Neutrality of Spanish Cities**, a public action infrastructure providing technical and strategic services, training, knowledge exchange, and monitoring of Climate City Contracts, with the goal of facilitating and accelerating decarbonization while strengthening urban resilience. With this declaration, we also reaffirm our commitment to helping cities develop and implement Climate City Contracts within the framework of the European Mission.

**We remain committed.** Because at the end of the road lies the most important thing: people's health. Implementing the PNIEC 2023-2030 will reduce premature deaths linked to poor air quality by 49% compared to 2019 levels. Furthermore, the PNACC 2021-2030 will ensure that increasingly intense, long, and frequent heatwaves do not result in a corresponding spike in extreme heat-related mortality. We will achieve cleaner air, better climate-controlled homes, more pleasant urban spaces, and lower energy costs. **That is our commitment.**





## 9. Support for Seville's adherence to the Mission "100 climate-neutral and smart cities before 2030"



Consejería de Sostenibilidad,  
Medio Ambiente y Economía Azul  
Dirección General de Sostenibilidad Ambiental  
y Cambio Climático

### DOCUMENT IN SUPPORT OF SEVILLE'S ACCESSION TO THE MISSION "100 climate-neutral and smart cities by 2030"

Within the framework of the implementation of the European Cities Mission "100 climate-neutral and smart cities before 2030", Seville City Council is committed to promoting the transformation of the City towards climate neutrality with the support of the Ministry for the Ecological Transition and the Demographic Challenge and the Regional Government of Andalusia through the signing of a Climate Agreement.

The Climate Agreement is configured as an iterative process and as a living document that will be subject to monitoring and updating. In particular, all those Administrations, organisations and actors who want to support and contribute to the achievement of the goal of a climate-neutral, inclusive, safe, resilient and sustainable City by 2030 may join it.

In this sense, through this Accession Document, **María López Sanchís**, in her capacity as **Director General of Environmental Sustainability and Climate Change of the Regional Government of Andalusia**, expresses her interest in the possibility of adherence and support to the City of Seville towards climate neutrality, within its scope of action and activity, formalizing that will through this document.

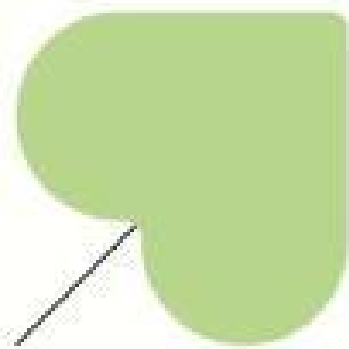
The signing of this support document will be made known to the signatories of the Climate Agreement for consideration of incorporation into it.

In Seville, date of the digital signature.

**THE DIRECTOR GENERAL OF ENVIRONMENTAL SUSTAINABILITY AND CLIMATE CHANGE**

Signed: **María López Sanchís**





*Seville*



***ANNEX 1:***  
*Climate Neutrality*  
*Action Plan*

This Action Plan for Climate Neutrality 2030 of the municipality of Seville is part of the institutional commitment acquired by the city within the framework of the European Union Cities Mission. This document collects and organizes, in the format established by the initiative, the most relevant climate information of the city, structuring the existing and planned actions in terms of mitigation and adaptation to climate change. It is possible that some of the planned actions included in the body of the Agreement Report have not been integrated into this Annex I, due to lack of definitive consolidation as of the closing date of this 2026 iteration.

#### **Territorial scope and coverage of the climate neutrality objective**

The climate neutrality objective established for 2030 covers the entire municipality of Seville, coinciding with its administrative limits and in accordance with the scope defined in the Climate and Sustainable Energy Action Plan (SECAP), approved in plenary session. This version of the Plan does not contemplate areas or sources excluded from the climate neutrality objective, and therefore, all emissions generated within the municipality are included in a comprehensive manner, regardless of their origin or ownership.

#### **Key figures, assets and challenges**

Seville is the fourth most populous city in Spain, with more than 680,000 inhabitants and a consolidated urban structure, characterised by a high density of residential buildings, mobility very focused on private vehicles and a climate with extreme temperatures for much of the year. In this context, the two main emitting sectors – transport and residential – concentrate the main challenges for decarbonisation. In the field of transport, dependence on a large private fleet, metropolitan traffic and urban freight logistics make it difficult to significantly reduce emissions without structural intervention.

As for the residential sector, the construction characteristics of the building stock, mostly prior to current efficiency standards, represent a substantial barrier. However, the city is making progress through rehabilitation processes, improvements in thermal insulation and modernisation of equipment, as well as through the progressive penetration of household appliances and technologies with lower energy consumption. Domestic energy efficiency, coupled with the cultural shift towards more sustainable consumption models, is a relevant asset in this transition.

#### **Relationship to existing planning**

This Action Plan does not constitute a new strategic planning, but an integration and restructuring of the existing official documents within the framework of the Seville City Council. All the information collected here comes from the PACES Seville and other plans formally approved by the municipal corporation, including the Sustainable Urban Mobility Plan (SUMP), climate change adaptation plans, municipal sectoral strategies (water, waste, energy) and investment plans co-financed with European funds. This Action Plan therefore acts as an instrument for planning, visualisation and communication under the Climate City Contract initiative, and not as an additional regulatory tool.

#### **Key actors and governance**

Climate action in Seville requires the active participation of a plural ecosystem of actors. Among them are citizens and their representative organizations, municipal companies, the private business and industrial sector, the education system, the scarce remaining agricultural activity, and the competent administrations in energy, urban planning and transport matters. Local planning against climate change integrates all stakeholders with the capacity to act or that may be affected by the transition process.

### Work process and alignment with the Climate City Contract

The development of this document is linked to Seville's commitment to the Cities Mission, and is articulated as one of the three pieces of the Climate City Contract (CCC), together with the Climate Neutrality Commitment and the Climate Investment Plan. This first version represents the documentary consolidation of the strategies already in force and will allow their iteration, updating and reinforcement in future versions as the deployment of the measures progresses.

### Next Steps and Future Iterations

This Action Plan is a first technical iteration of the strategic framework for climate neutrality. Subsequent versions will incorporate methodological improvements, new indicators, greater sectoral disaggregation of results and detailed monitoring of the effectiveness of the measures implemented. Likewise, progress will be made in the quantification of residual emissions and the definition of complementary compensation mechanisms.

**Table I-1.1: Climate Neutrality Targets for 2030**

Sectors	Scope 1	Scope 2	Scope 3
Stationary Power	Excluded	Excluded	-
Transportation	Includes	Includes	-
	No exclusions	To be defined	-
Waste/wastewater	Includes	Includes	Includes
	For defining exclusions	For defining exclusions	For defining exclusions
Industrial Processes and Product Use	Includes	Not applicable	-
	For defining exclusions	Not applicable	-
Agriculture, forestry and land use	Includes	Not applicable	-
	For defining exclusions	Not applicable	-
Other	-	Tertiary sector	-
Geographical limit	Equal to the administrative boundary of the city	Smaller than the administrative boundary of the city	Larger than the administrative boundary of the city
(Mark with an x the correct option)			
Specifying Excluded/Additional Areas	Not applicable	Not applicable	Not applicable

# PART A - CURRENT STATE OF CLIMATE ACTION

## MODULE A-1

### Baseline inventory of greenhouse gas emissions

The municipality of Seville has officially reported its greenhouse gas (GHG) emissions inventory through the **MyCovenant platform**, within the framework of the **Covenant of Mayors for Climate and Energy**. The current inventory is based on the 2019 accounting year, and is the reference also used in this CCC Action Plan. The corresponding document was approved in the municipal plenary session and is published and accessible on the aforementioned platform. Seville does not participate, to date, in the framework of the CDP (Carbon Disclosure Project) nor has it reported inventories through the ICLEI Tracker.

There is no misalignment between the coverage of the reported inventory and the climate neutrality objective set out in this Plan. The information collected here fully coincides with the official database approved by the City Council and published at regional and European level, complying with the methodological and structural requirements established in the Info Kit for Cities of the Cities Mission.

In the event that specific deviations from the Mission's technical requirements are detected, these should be understood as responding to the fact that an official inventory already validated by the institution is used as a source. Therefore, it is not planned to retroactively modify the information, except within the framework of future iterations and with a methodology consistent with that used by the Junta de Andalucía.

The city of Seville has an official tool for calculating the carbon footprint at the municipal level, developed and managed by the Junta de Andalucía. This tool allows municipal emissions data to be consulted in a structured and transparent way, and generates annual inventories with sectoral disaggregation, by sources, and type of gases, according to IPCC guidelines and recognized methodologies. The municipality does not have relevant data gaps or shortcomings in the coverage of significant sources. The inventory is complete, recent, and updated regularly.

In terms of its strategic utility, the inventory constitutes the fundamental analytical basis for defining and prioritizing mitigation measures in the Plan. The practical implications of this allow us to identify the key sectors on which to intervene (transport, residential energy consumption, waste and water) and to direct municipal resources towards the actions with the greatest potential for reduction.

In addition, the historical analysis of trends and sectoral monitoring make it possible to quantify the impact of the measures already underway, as well as to progressively design transition scenarios compatible with the 2030 climate objectives.

Finally, the strategic priorities of the Seville City Council are derived directly from the analysis carried out within the framework of the PACES and the Mitigation Plan. Through these documents, the council has identified the main sources of issue, evaluated their evolution, and defined a portfolio of prioritized actions based on their mitigation potential, technical viability, and financial opportunity. These priorities guide the development of the impact pathways of this Plan and structure the municipal roadmap towards climate neutrality.

<b>A-1.1: Final Energy Use by Source Sectors</b>				
Base Year	2019			
Unity	MWh/year			
<b>Issuing sector</b>	<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>
Buildings		1.436.712,21 <sup>1</sup>		1.436.712,21
(Type of fuel/energy used)	Natural gas / Diesel C/LPG	Electricity		
Transportation	3.344.466,31			3.344.466,31
(Type of fuel/energy used)	Automotive diesel, petrol	Electricity		
Waste				739.409,59 <sup>2</sup>
(Type of fuel/energy used)	Natural Gas/Diesel/Gasoline	Electricity		
Others (Including IPPU and AFOLU)	1.456.261,79 <sup>3</sup>	993.122,98 <sup>4</sup>		2.449.384,77
(Type of fuel/energy used)	Natural Gas/Coal/Fuel Oil/Non-Automotive Diesel/LPG	Electricity		

<sup>1</sup> Electricity consumption of the residential and municipal sector

<sup>2</sup> There is no disaggregated information by source (electricity or fossil sources)

<sup>3</sup> Fixed installations (according to the HC Tool of the JdA)

<sup>4</sup> Electricity consumption of industry, agriculture, commerce and other sectors (according to the HC Tool of the JdA)

**A-1.2: Emission Factors Applied**

For the calculation in t or MWh of primary energy

Source: MITERD v.31

<b>Primary energy/energy source</b>	<b>Carbon dioxide (CO<sub>2</sub>)</b>	<b>Methane (CH<sub>4</sub>)</b>	<b>Nitrous oxide (N<sub>2</sub>O)</b>	<b>Hydrofluorocarbons and Perfluorocarbons</b>	<b>Sulphur hexafluoride (SF<sub>6</sub>)</b>	<b>Nitrogen Trifluoride (NF<sub>3</sub>)</b>
Diesel C (l)	2,881	0,389	0,023			
Diesel B (l)	2,721	0,367	0,022			
Natural Gas (kWh <sub>PCS</sub> )	0,182	0,016	0,000			
Fuel oil (l)	3,017	0,390	0,012			
LPG(l)	1,541	0,122	0,002			
Propane gas (kg)	2,966	-	-			
Butane gas (kg)	2,996	-	-			
Manufactured gas (kg)	0,878	0,099	0,002			
Biogas (kg)	0,000	0,025	0,003			
Wood biomass (kg)	0,000	4,332	0,058			
Biomass pellets (kg)	0,000	5,424	0,072			
Charcoal (kg)	0,000	6,278	0,031			

**A-1.2: Emission Factors Applied**

For the calculation in t or MWh of primary energy

Source: MITERD v.31

Primary energy/energy source	Carbon dioxide (CO <sub>2</sub> )	Methane (CH <sub>4</sub> )	Nitrous oxide (N <sub>2</sub> O)	Hydrofluorocarbons and Perfluorocarbons	Sulphur hexafluoride (SF <sub>6</sub> )	Nitrogen Trifluoride (NF <sub>3</sub> )
Petroleum coke (kg)	3,169	0,325	0,020			
Coke Coke (kg)	3,017	0,282	0,042			
Coal and anthracite (kg)	3,117	0,303	0,046			

**A-1.3: Activities by source sector (based on economic model input data)<sup>5</sup>**

	2019			
	Base Year	Scope 1	Scope 2	Scope 3
Buildings				
Heating demand (space heating + domestic hot water) (GWh/year)		943		
Electricity				
"Electricity demand within city limits (GWh/year)			2430	
Transportation				

<sup>5</sup> Table according to the information contained in the Net Zero platform.

<b>A-1.3: Activities by source sector (based on economic model input data)<sup>5</sup></b>			
Base Year		2019	
	<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>
Transport needs – cars and motorcycles (million vehiclekm/year)	3021		
Transport need – buses (million vehiclekm/year)	48		
Transport need – trains/metro (million vehiclekm/year)	13		
Transport Requirement – Light Trucks (<3.5 t) (million tonnekm/year)	82		
Transport Requirement – Heavy Duty Trucks (>3.5 t) (million tons/year)	1014		
Waste			
Waste collected within city limits (tonnes)			344.373
Others (including IPPU and AFOLU)			

<b>A-1.4: GHG emissions by source sectors – Base Year<sup>6</sup></b>					
Base Year	2019				
Unity	t CO2 equivalent/year				
	<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>	<b>% of total</b>

<sup>6</sup> Table according to the information contained in the Net Zero platform.

Buildings	18.892	283		19.175	1%
Transportation	777.281	0		777.281	45%
Electricity		539.460		539.460	31%
Waste (and wastewater)			81.138	81.138	5%
Others (Including IPPU and AFOLU)	321.000			321.000	18%
<b>Total</b>	<b>1.117.173</b>	<b>539.743</b>	<b>81.138</b>	<b>1.738.054</b>	<b>100%</b>

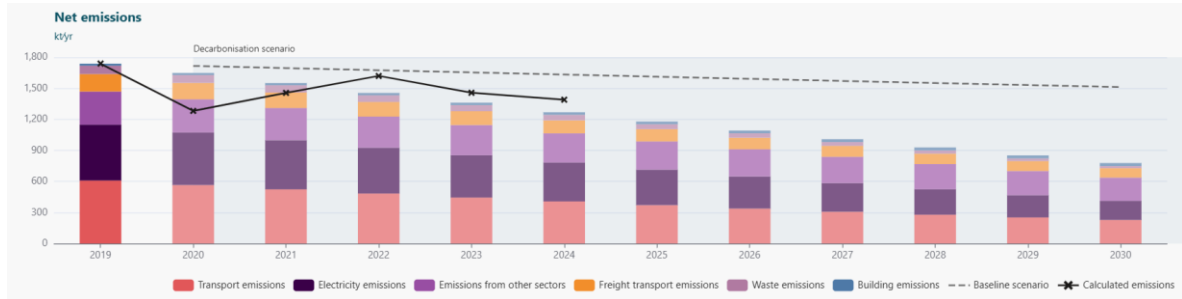
#### A-1.5: GHG emissions by source sectors – BAU 2030<sup>7</sup>

Base Year	BAU 2030				
Unity	t CO2 equivalent/year				
	<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>	<b>% of total</b>
Buildings	22.964	344	0	23.309	2%
Transportation	563.010	0		563.010	37%
Electricity		539.460		539.460	36%
Waste (and wastewater)			65.662	65.662	4%
Others (Including IPPU and AFOLU)	321.000			321.000	21%
<b>Total</b>	<b>906.975</b>	<b>539.804</b>	<b>65.662</b>	<b>1.512.441</b>	<b>100%</b>

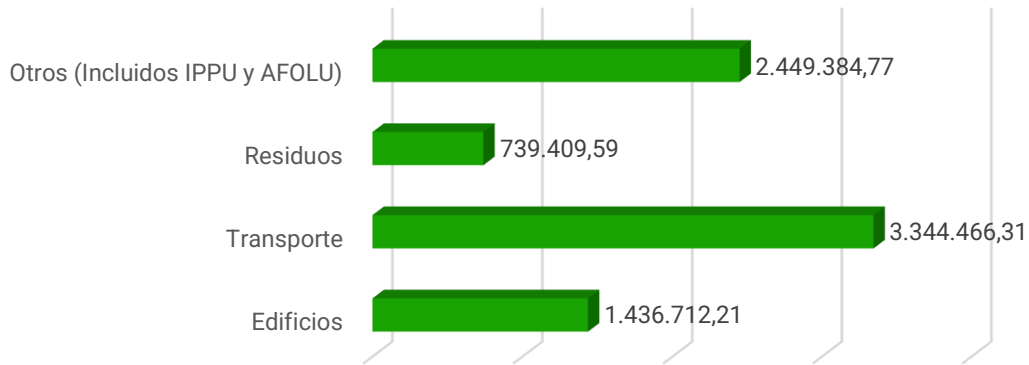
<sup>7</sup> Table according to the information contained in the Net Zero platform.

### A-1.5: Graphs and Tables

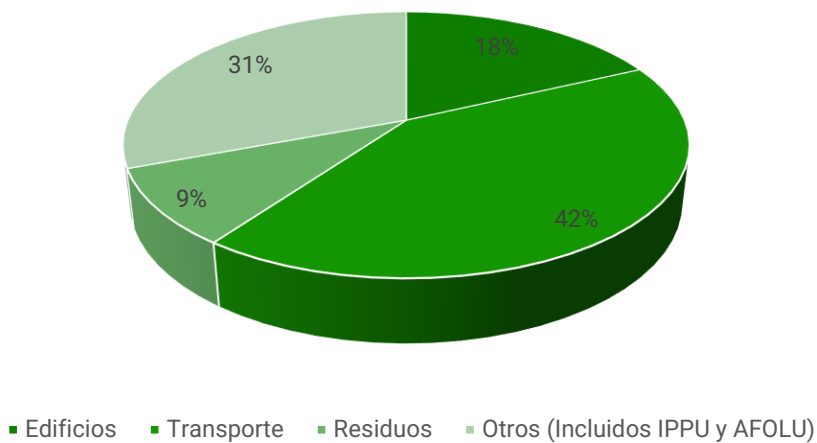
Projection to 2030 according to the base year (2019) and emissions information (2019-2024), taken from the Net Zero platform.



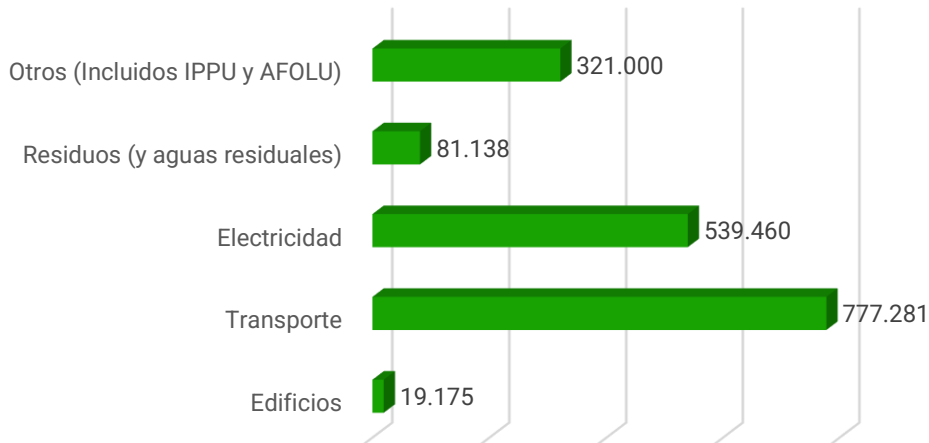
### Uso de la energía final por sectores de origen (2019) en MWh



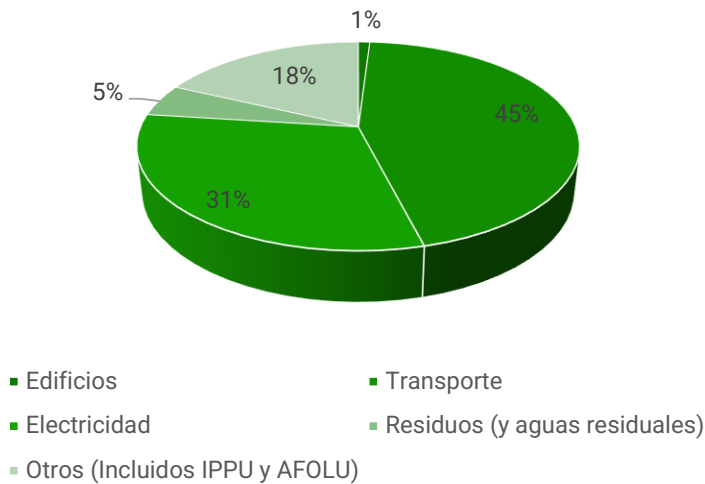
### Uso de la energía final por sectores de origen (2019)



### Emisiones de GEI por sector de origen (2019) en tCO<sub>2</sub>e



### Emisiones de GEI por sector de origen (2019)



#### A-1.6: Description and Assessment of the GHG Baseline Inventory

The reference inventory of greenhouse gases (GHG) of the municipality of Seville corresponds to the base year 2019 and has been prepared in accordance with the methodology proposed by the IPCC and included in the official tool of the Junta de Andalucía for the calculation of the municipal carbon footprint. This inventory is reported on the MyCovenant platform within the framework of the Covenant of Mayors, being the official inventory approved by the Plenary of the Seville City Council.

The inventory covers the entire municipality, without territorial or sectoral exclusions, and presents a complete structure by sectors of origin, scopes 1, 2 and 3, and types of sources. The total reported emissions amount to **1,738,054.09 tonnes of CO<sub>2</sub> equivalent**

##### Breakdown by scope:

- Scope 1: 1,117,172.56 tCO<sub>2</sub>e
- Scope 2: 539,743.40 tCO<sub>2</sub>e
- Scope 3: 81,138.13 tCO<sub>2</sub>e

The inventory shows that the two priority sectors in terms of contribution to total emissions are transport (mainly private and commercial vehicles) and electricity consumption, followed by emissions classified as "other", which encompass industrial processes, product use (IPPU) and land use and change of use (AFOLU). Emissions associated with waste and heating in buildings have a lower relative weight, although not negligible.

From a methodological point of view, the inventory meets the requirements established in the Info Kit for Cities of the Cities Mission. The allocation of emissions by scope is structured in a clear and consistent way. There are no misalignments between the inventory and the climate neutrality objectives defined in the Action Plan, as both are based on the same official data validated institutionally.

This inventory makes it possible to accurately identify the priority sectors for intervention and to structure the impact pathways contemplated in Module B. In particular, it justifies the need to implement transformative measures in the field of urban mobility, energy efficiency in the residential sector, the improvement of industrial processes, and advanced waste and energy management. In addition, it facilitates the monitoring of the impact of measures already in place and lays the groundwork for the regular assessment of progress under the climate contract.

## MODULE A-2

### Evaluation of current policies and strategies

A-2.1: List of relevant policies, strategies and regulations					
Type	Level	Name and/or title	Description	Relevance	Actions needed
Strategy	EU	Mission "100 Climate-Neutral Cities by 2030"	EU initiative to accelerate urban climate neutrality through Climate City Contracts	Main framework of the CCC of Seville and the 2030 objective	CCC governance, annual monitoring, stakeholder coordination
Strategy / Regulations	EU	European Green Deal and Fit for 55 package	Set of policies to reduce emissions by at least 55% by 2030	Aligns local targets with European climate commitments	Align municipal plans and prioritize high-impact projects
Regulations	EU	Energy Performance Directive and Building Directive (revisions 2023–2024)	Energy saving and building rehabilitation obligations reinforced	Key to reducing electricity consumption and emissions in the buildings sector	Rehabilitation programs, green public procurement, consumption control
Regulations	Spain	Law 7/2021 on Climate Change	State legal framework for decarbonisation	Requires Low Emission Zones	Implement LEZs, electrify fleets, local

A-2.1: List of relevant policies, strategies and regulations					
Type	Level	Name and/or title	Description	Relevance	Actions needed
		and Energy Transition	, sustainable mobility and energy	and local mitigation plans	climate planning
Strategy	Spain	PNIEC 2023–2030 (updated)	Integrated National Energy and Climate Plan with reinforced targets	It sets the national path for reducing emissions and renewables	Aligning local renewables, efficiency and electric mobility projects
Regulations / Plan	Andalusia	Law 8/2018 on Climate Change and the Andalusian Climate Action Plan (PAAC)	Regional framework for climate planning and mitigation and adaptation programmes	Direct regional reference for climate action in Seville	Integrate municipal actions into PAAC programs and report progress
Plan	Local	Seville Climate and Sustainable Energy Action Plan (PACC/PACES, up to date)	Municipal mitigation and adaptation instrument aligned with the Covenant of Mayors and the Mission	Main local operational tool for reducing emissions	Update the plan and prioritize measures with a greater climate impact
Plan	Local	Sustainable Urban Mobility Plan (SUMP) of Seville	Strategy to reduce car use and promote sustainable mobility	Key to acting on the main emitting sector: transport	LEZ, electrification of public transport, promotion of bicycles and pedestrians
Strategy Project /	Local	eCitySevilla (Isla de la Cartuja)	Comprehensive urban decarbonization demonstrator project	Urban laboratory to advance neutrality objectives	Scaling energy and mobility solutions to the rest of the city
Strategy	Local	Energy Rehabilitation Strategy for the Built Stock	Programme to improve the energy efficiency of	Direct impact on one of the largest sources of consumption and emissions	Massive rehabilitation programs, neighborhood

### A-2.1: List of relevant policies, strategies and regulations

Type	Level	Name and/or title	Description	Relevance	Actions needed
			homes and buildings		offices, financing
Strategy	Local	Green Infrastructure Strategy and Bioclimatic Urbanism	Urban renaturation to reduce heat island and energy demand	Reduces energy consumption and improves climate resilience	Plan for trees, green corridors, urban shade and cool spaces

### A-2.2: Policy Description and Evaluation

The municipality of Seville has a consolidated ecosystem of strategic planning in climate and energy matters, supported by regulatory, sectoral and programmatic instruments of high technical value that reflect the current state of the European, national, regional and local framework. These policies constitute the basis on which the municipal ambition towards climate neutrality is based, and form the reference framework of this Climate City Contract (CCC) Action Plan.

#### Key policies and plans with a direct impact on climate neutrality 2030

##### 1. Seville Climate and Sustainable Energy Action Plan (PACES)

**Scope:** municipal framework instrument that integrates mitigation (energy, mobility, waste, etc.) and adaptation, and serves as a container for sectoral measures.

**Relevance:** the set of actions underway is included in the climate and energy plan and the review/update of the PACES was planned to comply with Andalusian Law 8/2018 (art. 15) and fully integrate the Mission's commitments.

**Expected impact:** high, because it articulates actions on the dominant sectors of the inventory (electricity, transport, waste/fuels). The CCC stresses that achieving neutrality by 2030 requires intensifying action in these priority areas.

##### 2. Sustainable Urban Mobility Plan of Seville (SUMP).

**Scope:** municipal mobility strategy (demand management, public transport, active mobility, goods, parking, support for decarbonisation). The CCC reflects modal shift and electrification targets linked to the SUMP.

**Relevance:** maximum, because **transport/road traffic** is the largest emitter of the 2019 inventory ( $\approx 38.7\%$ ).

**Expected impact:** high due to the reduction potential in the main emitting sector and its structural effect (modal shift + system efficiency). The CCC stresses that the focus should be especially on passenger cars and freight transport, due to their weight in emissions.

### **3. Low Emission Zones (LEZs) and access/traffic regulation**

**Scope:** municipal regulatory instrument (and its technical deployment) to restrict more polluting vehicles and reorganize urban mobility.

**Relevance:** high because it is a direct regulatory lever on the main issuing sector (traffic). It is aligned with the SUMP approach and with the CCC's objective of "minimising road transport" as one of the four main fronts of action.

**Expected impact:** high if designed with ambition (perimeter, control, transport alternatives and urban logistics). Its contribution is usually enabling: it accelerates modal shift, electrification and reduction of vehicle-kilometers.

### **5. Energy efficiency and rehabilitation plan/strategies (residential, tertiary and municipal buildings)**

**Scope:** municipal programmes and plans (including the Municipal Housing, Land and Rehabilitation Plan cited by the CCC) aimed at reducing energy demand and electrifying/renewing systems.

**Relevance:** very high, because electricity consumption is the second major emitting sector of the 2019 inventory ( $\approx 36.1\%$ ) and the CCC identifies residential and commerce/services as the main focuses.

**Expected impact:** high, especially combined with self-consumption/local production and demand reduction (rehabilitation, efficient cooling, shade/bioclimate).

### **6. Green infrastructure, trees and bioclimatic urbanism (Tree Master Plan / shade actions)**

**Scope:** green urban planning and adaptation actions (shade, heat island reduction), with co-benefits of mitigation due to lower demand for air conditioning. The CCC emphasizes shade and bioclimatic solutions as a way to reduce cooling demand.

**Relevance:** high (adaptation + reduction of electricity demand) and very aligned with local climate risks.

### **7. Waste and wastewater management / circular economy**

**Scope:** policies for prevention, collection, treatment, reduction of methane from landfills and improvements in purification.

**Relevance:** high because "fuels/waste and wastewater" make up a relevant block of the inventory and the CCC identifies it as one of the four strategic fronts ("improving waste and wastewater management").

### **Evaluation and integration into this CCC Action Plan**

All of the above instruments are fully integrated into the transformative action portfolio of Module B-2. Additional reductions with respect to the trend scenario (Business As Usual) have been considered, avoiding any double counting. The reductions already secured by existing plans have been previously discounted in the estimate of the emissions gap by 2030.

The following policies are listed in section B-2 broken down into measures. The total of the measures constitutes a total reduction of 734 tCO<sub>2e</sub> by 2030 (representing 49% of emissions). Therefore, the emissions gap has a value of 476 tCO<sub>2e</sub> (which represents 31%), which corresponds to the difference between the remaining emissions (778 tCO<sub>2e</sub>) and the residual emissions (302 tCO<sub>2e</sub>).

	Baseline/Baseline Emissions <sup>8</sup>	Emission reductions resulting from CNAP <sup>9</sup>		Remaining Emissions <sup>10</sup>		Residual emissions <sup>11</sup>		Emissions gap (amount needed to reach the 2030 target) <sup>12</sup>	
Buildings	23	-6	-26%	29	126%	11	49%	18	77%
Transportation	563	244	43%	319	57%	124	22%	195	35%
Electricity	539	355	66%	184	34%	72	13%	113	21%
Waste	66	46	69%	20	31%	8	12%	12	19%
Others (including IPPU and AFOLU)	321	96	30%	225	70%	87	27%	137	43%
Total	1.512	734	49%	778	51%	302	20%	476	31%
Comments									

<sup>8</sup> Baseline emissions Baseline emissions (corresponding to the year 2019), referring to the inventory used to establish the reduction target and the trajectory towards climate neutrality.

<sup>9</sup> Expected emission reduction: Reduction of emissions resulting from the CNAP for each sector. It includes the combined effect of the measures resulting from the CNAP in the 2030 plan, expressed in absolute value and as a percentage of baseline emissions.

<sup>10</sup> Remaining emissions: Emissions that remain after the reductions are implemented (column 2). They represent the level of emissions that would continue to be produced in 2030 if only the measures envisaged were implemented, without yet considering residual emissions.

<sup>11</sup> Residual emissions: Part of the remaining emissions that are considered technically or economically difficult to eliminate through direct climate action and are therefore treated as residual emissions to be offset. Residual emissions can amount to a maximum of 20% of the reference emissions, according to the guidance of the Mission Info Kit.

<sup>12</sup> Emissions gap (amount needed to achieve climate neutrality): The difference between the remaining emissions (column 3) and the residual emissions that are expected to be reduced.

## MODULE A-3

### Systemic barriers to climate neutrality by 2030

#### A-3.1: Description of systemic barriers and opportunities

The path to climate neutrality in the municipality of Seville requires not only technical mitigation and adaptation measures, but also a deep understanding of the urban systems that interact in this transition. Urban structure, citizen culture, regulatory frameworks, and institutional capacity make up a complex ecosystem in which structural barriers, strategic opportunities, and elements that need to be aligned to maximize the transformative impact of climate policies coexist.

#### Key systems for the climate transition

Among the relevant systems that have a direct impact on the decarbonisation of the municipality are the following:

- **Urban and metropolitan mobility and transport system**, ranging from road and rail infrastructure to public transport network planning, tax and access policies, and citizens' travel habits.
- **Local energy system**, especially with regard to residential and tertiary electricity consumption, thermal installations in buildings and the deployment of renewable energies in self-consumption and energy communities.
- **Urban building and rehabilitation system**, influenced by the age of the building stock, urban and energy regulations, and accessibility to energy rehabilitation programs or generation of Energy Savings Certificates (CAE).
- **Waste and water management system**, where municipal companies such as EMASESA or LIPASAM play a key role in energy efficiency, the circular economy and the energy recovery of waste.
- **Institutional and governance system**, which articulates planning, participation, financing and accountability, as well as the relationships between levels of administration.
- **Social and cultural system**, which conditions the adoption of sustainable habits, receptivity to restrictions and citizen participation in climate transformation projects.

#### Key players and existing links

Key players in these systems include:

- The Seville City Council itself, as the promoter, regulator and coordinator of climate policies.
- Municipal companies (EMASESA, LIPASAM, TUSSAM and EMVISESA), with direct operational capacity in strategic sectors.
- Citizens, as an essential agent both in diffuse emissions (residential, transport) and in the implementation of decentralised solutions.
- The business and industrial fabric, which actively participates in the diagnosis and progressive decarbonisation of production processes.
- The Regional Government of Andalusia and the Government of Spain, as competent entities in energy planning, structural mobility and climate financing.

- Universities, research centres and citizen associations, which provide technical capacity, critical vigilance and support for transformation.

The links between these actors make up the operational network of the system: the public and private sectors interact through public-private collaboration formulas for the development of new infrastructures; the City Council and the University maintain strategic alliances for the transfer of knowledge, piloting of solutions and data analysis; while citizens are linked to the administration through participation processes and their commercial relationship as users of the services of municipal companies.

### **Systemic barriers identified**

Several barriers are detected that limit the acceleration of the transition:

- **Obsolete or insufficient infrastructures:** public transport networks that are still incomplete, limitations on urban roofs for renewables, etc.
- **Institutional and financial constraints:** dependence on external funding, short budget cycles, and lack of technical staff in key areas.
- **Social inequalities and access to resources:** difficulty in accessing rehabilitation aid or electric mobility for vulnerable families.
- **Fragmented regulatory framework:** overlapping competencies and absence of large-scale tax or urban incentives to accelerate climate neutrality.
- **Social and cultural inertia:** resistance to changes in the mobility model, energy consumption or habits of recycling and use of public space.

### **Systemic opportunities and levers available**

- **Institutional infrastructure already active:** Seville has approved climate planning, official emissions inventory, and participation in the Cities Mission.
- **Municipal companies as a technical and operational lever** with a proven capacity to lead energy efficiency, fleet electrification, renewable generation or circular economy projects.
- **Aligned European and state regulatory framework**, which enables ambitious climate financing (ERDF, ESF+, Next Generation Funds, LIFE, etc.).
- **Emerging technologies and digitalisation**, such as sensorisation of urban space, energy monitoring and intelligent water or waste management.
- **Growing social impulse to sustainability**, reflected in community projects, citizen campaigns, environmental education and reputational positioning of the territory.

### **Collective monitoring and understanding of systems**

The tracking and monitoring of these systems is done through multiple layers of information. Firstly, through the **official carbon footprint calculation system for municipalities in Andalusia**, which uses contrasted statistical data multiplied by official emission factors. In addition, there are complementary direct monitoring systems: energy consumption measurements, data from urban sensors, vehicle counting, industrial emissions reports, mobility statistics and energy management platforms in buildings or public infrastructures.

This mixed system (statistical-technological) allows for effective traceability of progress, facilitates informed decision-making and underpins accountability to the different stakeholders. To achieve a collective understanding that manages to integrate the different systemic perspectives,

transparency, structured participation, and the activation of multilevel and multi-stakeholder climate governance spaces are committed.

<b>A-3.2 Mapping Systems and Stakeholders</b>				
<b>System Description</b>	<b>Actors involved</b>	<b>Network</b>	<b>Influence</b>	<b>Interests</b>
Mobility and urban/metropolitan transport	City Council, TUSSAM, Junta de Andalucía and Citizenship	Inter-administrative collaboration for large infrastructures; public-private partnerships for logistics services; relationship of use and payment of citizenship.	High	Decarbonisation, traffic efficiency, improved air quality, accessible mobility
Local energy system	Energy companies, City Council and citizens	Electricity and services market	Very high	Profitability and new markets (companies), savings on the bill
Building and urban rehabilitation	Private sector (construction companies, architecture studios), City Council and citizens	Processing of licenses and subsidies; Private contracts between citizens and companies generation of Energy Savings Certificates (EACs).	Medium-High	Improvement of habitability and thermal comfort, revaluation of properties, reactivation of the construction sector, reduction of energy poverty.
Waste management and water cycle	EMASESA, LIPASAM, private industrial sector, citizens.	Citizen awareness campaigns; Technical collaboration with industries for circular economy.	High	Resource efficiency, reduced operating costs, strict environmental compliance, public health.
Institutional and governance	Seville City Council, Junta de Andalucía	Financing agreements, shared regulatory frameworks, delegation of powers.	Very High	Meeting European milestones, political leadership, attracting investment,
Social and cultural	Universities, research centres,	Knowledge transfer agreements	Medium-High	Technological innovation, climate

A-3.2 Mapping Systems and Stakeholders				
System Description	Actors involved	Network	Influence	Interests
	citizens' associations			justice, improvement of urban health, and environmental education.

A-3.3: Description or visualization of the participatory model for the climate neutrality of the city
<p>The participatory process in the climate field of the Seville City Council has been developed mainly within the framework of the Covenant of Mayors for Climate and Energy, especially during the diagnosis and design phases of the Climate and Sustainable Energy Action Plan (PACES). At that time, between 2017 and 2018, face-to-face participatory workshops were organised aimed at collecting proposals both in terms of adaptation to climate change and the mitigation of greenhouse gas emissions.</p> <p>These workshops had an active methodology based on group work dynamics. The participants – from different social, business and technical sectors – were distributed in tables of between four and six people, and worked collaboratively in the identification, assessment and prioritisation of possible lines of climate action. The proposals that emerged were evaluated according to their feasibility, estimated impact and alignment with municipal strategic priorities, and were subsequently incorporated into current planning.</p> <p>Although a permanent participation structure in climate matters with a comprehensive scope has not been developed to date, the Seville City Council maintains an open and bilateral dialogue with the different key actors identified in its urban ecosystem. In this sense, any technical or citizen contribution that affects the city's climate commitments is collected and valued, either through formal public consultation processes, regulated participation channels or through sectoral initiatives promoted by representative organizations.</p> <p>The City Council's commitment is to progressively move towards a more robust climate governance model, which combines specific participatory approaches with stable mechanisms of public-social collaboration. In future iterations of the CCC Action Plan, it is planned to strengthen stakeholder engagement through new co-creation tools, technical consultation panels, structured citizen listening mechanisms and spaces for collective monitoring of the fulfilment of objectives.</p> <p>The Seville City Council's climate engagement process evolves from one-off workshops to a model structured by districts, designed to achieve climate neutrality through collaboration between municipal companies (such as EMASESA or TUSSAM), the private sector and civil society. During 2026, this strategy will take the form of sectoral working groups on mobility, energy and biodiversity, supported by digital tools and a series of thematic podcasts to collect citizen proposals. The entire</p>

plan guarantees accessibility and gender equity, evaluating its progress weekly through transparency indicators and prioritizing practical solutions to local risks such as heat waves.

Thus, the participatory approach of the municipality of Seville is based on the principles of transparency, accessibility, representativeness and active listening, adapting the degree of involvement to the available capacities and the political and institutional moment of each phase of climate planning.

## PART B - PATHWAYS TO CLIMATE NEUTRALITY BY 2030

### MODULE B-1

#### Climate neutrality scenarios and impact pathways.

B-1.1: Pathways of impact						
Issuing sector	Subsector	Systemic levers	Short-term changes (1-2 years)	Long-term results (3-4 years)	Direct impacts (emission reduction) (ktCO <sub>2e</sub> in 2030)	Indirect impacts (co-benefits)
Transportation	Reduced need for motorized passenger transport	Governance / Policy / Social Innovation	Promotion of urban plans for sustainable mobility and teleworking.	Structural reduction of forced journeys and greater urban proximity.	65	Improved air quality. Noise reduction. More livable cities. Economic savings for households.
	Shift to public and non-motorized transportation	Infrastructure / Governance / Policy	Expansion of bike lanes and improvement of public transport frequencies.	Sustained increase in the use of public transport and bicycles as main modes.	47	Improved public health. Reduced congestion. Urban space recovered.
	Increased carpooling	Social Innovation / Technology	Local carpooling platforms and	Standardisation of car-sharing in work and	24	Reduction of mobility costs. Less congestion. Promotion of

B-1.1: Pathways of impact						
Issuing sector	Subsector	Systemic levers	Short-term changes (1-2 years)	Long-term results (3-4 years)	Direct impacts (emission reduction) (ktCO <sub>2e</sub> in 2030)	Indirect impacts (co-benefits)
			awareness campaigns.	peri-urban journeys.		community networks.
	Electrification of cars and motorcycles	Technology / Infrastructure	Installation of charging points and subsidies for the purchase of electric vehicles.	Progressive replacement of the combustion fleet with electric vehicles.	28	Reduction of noise pollution. Improved air quality. Industrial innovation.
	Electrification of buses	Technology / Infrastructure / Governance	Fleet renewal and deployment of charging infrastructure.	Fully electrified urban fleets and more efficient operation.	14	Improvement of public transport. Noise reduction. Lower operating cost.
	Logistics optimization	Technology / Learning / Training	Digitalisation of routes and training in efficient logistics.	Optimised logistics chains and fewer kilometres travelled.	59	Reduced business costs. Less congestion. Greater competitiveness.
	Truck electrification	Technology / Infrastructure	Electric truck pilots and specific charging points.	Progressive electrification of heavy transport.	5	Noise reduction. Technological innovation. Improved air quality.
Buildings	Building renovation (envelope)	Technology / Infrastructure /	Energy rehabilitation programme	Buildings with lower energy demand and	2	Reduction of energy poverty. Improved

B-1.1: Pathways of impact						
Issuing sector	Subsector	Systemic levers	Short-term changes (1-2 years)	Long-term results (3-4 years)	Direct impacts (emission reduction) (ktCO <sub>2e</sub> in 2030)	Indirect impacts (co-benefits)
		Governance	taxes and subsidies.	greater thermal comfort.		comfort. Revaluation of the real estate stock.
	New energy-efficient buildings	Governance / Technology	Strict application of NZEB building codes.	Generalization of nearly zero-consumption buildings.	1	Economic savings. Greater comfort. Reduction of future energy demand.
	Decarbonization of heat generation	Technology / Infrastructure	Replacement of fossil boilers with heat pumps and renewable heat networks.	Fully decarbonized thermal systems.	-10	Improved air quality. Reduction of energy costs.
Electricity	Efficient lighting and appliances	Technology / Learning	Incentives and campaigns to replace inefficient equipment.	Sustained reduction in electricity demand.	30	Economic savings. Less pressure on the network.
	Decarbonization of electricity generation	Technology / Governance	Acceleration of renewables and closure of fossil generation.	100% renewable electricity system.	432	Energy independence. Pollution reduction. Green job creation.
Waste	Increasing waste recycling	Social Innovation / Governance / Learning	Improvement of selective collection and citizen campaigns.	Consolidated circular economy and reduction of waste sent to landfill.	42	Saving resources. Pollution reduction. Job creation in recycling.

## **B-1.2: Description of the impact routes**

The selected impact pathways represent a set of strategic interventions that allow decisive progress towards climate neutrality by 2030. Its choice is based on three main arguments: its high potential for reducing emissions, the technological maturity that facilitates its immediate implementation and the generation of important social, economic and environmental co-benefits. In addition, these roads have been defined taking into account the systemic barriers identified in Seville – such as the insufficiency of public transport infrastructures, the low energy efficiency of the building stock, regulatory fragmentation or the limited municipal technical capacity – which reinforces their relevance and transformative capacity.

These measures target the most emitting sectors – transport, buildings, electricity and waste – and allow for rapid results without sacrificing medium-term structural transformations. Its design responds to specific limitations of the Seville urban system: the high dependence on private vehicles, the persistence of fossil thermal technologies in buildings, the limited availability of roofs for renewables or the difficulties of access for vulnerable households to energy efficiency solutions. At the same time, they rely on already available technologies, such as the electrification of transport, heat pumps, logistics digitalisation or renewable energies, which reduces risks and accelerates the transition. These interventions provide additional benefits such as improving air quality, reducing noise, saving energy, creating green jobs and increasing the quality of urban life, also helping to overcome social and cultural inertia that hinders changes in mobility, energy consumption or recycling habits.

These impact pathways are directly related to the analysis of the current state of climate action carried out in Part A. They respond to the main barriers identified, such as the high dependence on private vehicles, the low energy efficiency of the building stock, the persistence of fossil electricity generation, limitations in waste management or the lack of technical and financial resources in the local administration. They also take advantage of existing opportunities, including growing public awareness, the availability of European funding, the advancement of sustainable mobility, the digitalisation of urban space and the dynamism of the local energy innovation ecosystem. The selected pathways do not start from scratch: they reinforce and expand strategies already in place, such as sustainable urban mobility plans, energy rehabilitation programmes, renewable energy initiatives or circular economy policies, helping to consolidate a more robust climate governance framework.

The alignment with the city's 2030 Climate Neutrality Commitments is complete. The impact pathways act on the strategic pillars defined by the municipality: decarbonisation of transport, energy efficiency in buildings, deployment of renewable energies and strengthening of the circular economy. In addition, they incorporate key elements of governance and citizen participation, consistent with the collaborative approach that the city has adopted for its climate transition. In a context where institutional barriers persist – such as dependence on external financing, the need to strengthen multilevel coordination or the lack of fiscal and urban incentives – these channels allow efforts to be directed towards areas with the greatest transformative capacity and with the greatest impact on reducing emissions.

Finally, the impact pathways address short- and long-term climate action priorities in a balanced way. In the short term (1–2 years), they focus on enabling and rapidly implementing actions, such as improving public transport, promoting active mobility, boosting energy rehabilitation, digitalising logistics and strengthening selective collection. These interventions make it possible to overcome immediate barriers such as lack of infrastructure, social inertia or limited technical capacity. In the long term (3–4 years), the roads consolidate structural transformations: massive electrification of the vehicle fleet, a completely renewable electricity system, nearly zero-consumption buildings, optimised logistics chains and a fully operational circular economy. In this way, the selected roads allow progress to be made simultaneously in the climate emergency and in the construction of a sustainable, resilient urban model aligned with the objectives of climate neutrality.

## MODULE B-2

### Transformative Action Portfolio

B-2.1: Description of Transformative Action Portfolios		
Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
Emissions Offsetting	Collaboration with companies for emissions offsetting	Promotion of alliances with local, national and international companies to implement CO <sub>2</sub> emissions compensation schemes through the purchase of carbon credits, reforestation projects, renewable energies or other mitigation actions in Seville and its surroundings. The measure seeks to facilitate business participation in meeting municipal climate objectives.
	Carbon footprint registration and offsetting in the business sector	Incorporation of more than 50 companies in Seville in the Register of carbon footprint, compensation and GHG absorption projects of the Government of Spain. This municipal measure articulates collaboration with companies to register, reduce and offset their emissions, contributing to the mitigation of climate change and the city's climate objectives.
	"Forests for Cities" Project	In collaboration with the University of Seville, work is being done on a scientific management model to: Optimize absorption: Increase the sink capacity of current green spaces by up to 36% through soil management techniques and selection of species according to their photosynthetic efficiency under the Seville climate. Relevant fact: Seville is currently the fifth city in Spain with the most square metres of green area

## B-2.1: Description of Transformative Action Portfolios

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		per inhabitant (11.27), and the aim is to get closer to the standards of leading cities such as Vitoria-Gasteiz by the end of the decade.
	Municipal badge for companies committed to the environment	Implementation of a municipal badge or seal that publicly recognises companies with verifiable actions to reduce and offset their carbon footprint and implement environmentally responsible practices. This distinction aims to encourage business participation in sustainability and promote the competitive positioning of companies committed to mitigating climate change.
	Identification of spaces and projection of green areas in vertical gardening in Seville	Inventory of scenarios in which it is possible to place structures and supports for the provision of green spaces following the new concept of vertical gardening. After the inventory, it is a matter of designing these spaces using models, carrying out at least one demonstration project to determine the viability of this innovation. This would increase the city's green area, with species capable of contributing as CO2 sinks.
	Network of neighbourhood "green lungs"	Beyond the large parks, the planning contemplates the creation of 10 new smaller-scale green spaces integrated into the urban fabric:  New spaces: Projects on plots such as those in Arrayán (Old Town), the Cortijo del Cuarto (Bellavista) and the Guadaíra riverbed corridor (Southern District). Function: To act as local sinkholes and climate shelters for neighbors in densely built-up areas.
Building and heating	Carrying out energy audits and applying the corresponding EMASESA Energy Efficiency and Saving Improvement Plan	Carrying out energy audits allows us to know in detail the equipment and state of the facilities and propose actions to improve energy efficiency and obtain energy and economic savings. The main objectives are to know the current energy situation, to inventory equipment and facilities, to carry out measurements of electrical, thermal and comfort parameters, and to analyse options to optimise the demand for fuels and electricity. The ultimate goal is

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		to propose improvements in accordance with the analyses carried out and to carry out their technical and economic evaluation. It should be noted that 26 EMASESA facilities have been audited to date, but nevertheless the improvement actions to be implemented have not been defined, so it is not possible to estimate the energy savings.
	Implementation of bioclimatic and green urbanism solutions	Bioclimatic urban planning solutions will be implemented, such as photocatalytic pavements, the creation of green roofs and gardens, and the planting of trees in urban areas to reduce the heat island effect. These measures will help mitigate high temperatures and, in turn, reduce the need for cooling, reducing energy consumption in the city. Applied to housing, the construction of more than 4,600 subsidized homes is projected (Shock Plan 2024-2027) under efficiency criteria. An example is the new coliving in Pino Montano, whose works are scheduled to advance significantly during this year 2026. In addition, it seeks to adapt urban design to local climatic conditions, using bioclimatic design techniques to reduce the need for heating and cooling in buildings. This includes optimizing the orientation of buildings and using natural ventilation.
	Mixed Zoning	Promoting the integration of housing, commerce and services in urban areas to reduce long journeys and promote more sustainable and accessible communities. This approach is supported by urban planning policies that seek to balance land use and densities compatible with neighbourhood life.
	Reuse of degraded urban land	Prioritisation of the regeneration and reuse of degraded, vacant or underused urban land in the face of urban expansion towards new land. The measure seeks to promote urban rehabilitation, densification in consolidated areas and the transformation of unused spaces into new residential, productive or service areas, reducing land consumption and the environmental impacts associated with extensive urbanization.
	Tax incentives for sustainable reforms	Granting of tax incentives such as discounts on Property Tax (IBI) and deductions for owners and companies that carry out sustainable renovations in their buildings,

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Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		aimed at improving energy efficiency, integrating renewables or reducing GHG emissions.
	Awareness for the renovation of household appliances	It is proposed to carry out environmental education programmes for adherence to a line of aid and incentives aimed at replacing old household appliances (labelled C or lower) with others of class A+ or higher to achieve significant energy savings and reduction of CO2 emissions. The aim is to achieve a significant reduction in CO2 emissions by refurbishing appliances that are very inefficient from the point of view of energy consumption.
	100% Renewable Buildings: Construction and Renovation	In a "Zero Emissions" building, 100% of the energy demanded is produced through renewable sources and net emissions into the atmosphere are zero. A "zero emissions" building is characterised by having a design that uses passive solutions through its orientation and shape, favouring energy efficiency. It is also equipped with facades that create air chambers as a thermal barrier, and with special materials and designs that allow the regulation of exterior light, air conditioning and ventilation of the interior spaces. For lighting, they must have strategically located openings that favour natural interior lighting, or spaces created to be thermal and acoustic buffers. Finally, energy options such as the installation of photovoltaic panels, mini-wind energy or solar thermal energy for DHW, etc. are the different options that allow achieving a zero emissions balance in the operation of the building itself. In short, it is a matter of minimising energy demand through bioclimatic and eco-efficient architectural elements and maximising energy production with renewable sources.
	Innovation in construction processes to reduce energy demand	The new construction processes will adopt bioclimatic techniques to reduce the need for heating and cooling in buildings, through the use of sustainable materials, improved insulation and the integration of energy-efficient technologies. Particular attention will be paid to the design of nearly zero-energy (nZEB) homes, which will incorporate photovoltaic systems and other renewable energy resources. The actions are mainly focused on three axes:1. Large energy-efficient residential developments:

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Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		<p>several private developers have started or are consolidating large-scale projects under efficient construction standards:</p> <ul style="list-style-type: none"> <li>• Entrenúcleos: Groups such as Descasur are leading projects (such as the development of 503 homes by 2026) that use modern and efficient construction systems to reduce environmental impact and improve thermal insulation.</li> <li>• Cruz del Campo and Palmas Altas: in these new neighbourhoods, the collaboration between private developers and the City Council seeks to build thousands of homes (many of them subsidised housing) that comply with regulations for almost zero primary energy consumption.</li> <li>• El Pítamo neighbourhood: It is projected as a benchmark for sustainability with the integration of green areas and bioclimatic architecture in the private developments that are starting their execution phase.</li> </ul>
	<p>Environmental certifications for sustainable buildings</p>	<p>Promotion of obtaining environmental certifications for sustainable building (such as LEED, BREEAM or EDGE) in new buildings and renovations, with the aim of guaranteeing high standards of energy efficiency, reduction of resource consumption, lower environmental impact and improvement of thermal comfort. The measure promotes the adoption of sustainability criteria in the design, construction and operation of buildings within the municipality of Seville.</p>
	<p>Local production of heating and cooling using cold networks</p>	<p>In the residential and commercial sector, the installation of urban cooling networks that generate heating and cooling from renewable energy sources will be encouraged. These networks will enable more efficient management of energy demand, reducing the need for individual HVAC systems and improving overall energy efficiency.</p>
	<p>Nearly Zero Energy Building Design (nZEB)</p>	<p>Promoting the design and construction of nearly zero energy buildings (nZEB) in accordance with the requirements of the European Energy Efficiency in Buildings Directive, which requires that new buildings have very low energy demand and be met with renewables integrated into the building. This measure is implemented through urban planning and regulation and the execution of public</p>

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		and private projects in accordance with the Technical Building Code and binding energy efficiency standards.
	Establishment of an energy fund to finance the renovation of buildings, based on savings from renovations already carried out	The objective is the creation of a municipal energy fund to finance the rehabilitation of buildings for energy improvement and efficiency, based on the savings obtained thanks to renovations already carried out. The actions to be carried out under this measure are: <ul style="list-style-type: none"> <li>· Creation of an inventory tool that allows the avoided emissions to be accounted for from energy consumption prior to energy efficiency works and subsequent ones, in economic terms.</li> <li>· Creation of an energy fund in which the savings accounted for in the tool designed for this purpose are included.</li> <li>· Application of the annual funds obtained to the energy rehabilitation of buildings with low energy efficiency. The measure is based on its application to a total of 10 buildings (pilot).</li> </ul>
	Energy monitoring and consumption management in municipal facilities	It is about implementing actions related to municipally-owned buildings and municipal companies or other local public bodies. Its objective is to carry out information management associated with the control and measurement of consumption, as well as the monitoring of the execution of the measures applied for energy saving and efficiency. Among the benefits obtained with consumption monitoring are: <ul style="list-style-type: none"> <li>o Continuous control of consumption and electrical parameters that allows the detection of excess power, penalized power factors or anomalous consumption according to the time slot.</li> <li>o Continuous monitoring of the load curves to adjust the contracted power to that actually demanded by the installation.</li> <li>o Identify anomalies in the operation of the facilities, contributing to the reduction of breakdowns.</li> <li>o Identify and quantify how the efficiency measures implemented affect total consumption. The measure is based on its application to a total of 10 municipal buildings (pilot project).</li> </ul>
	Promotion of the circular economy in the construction and rehabilitation of historical heritage	Promotion of the use of recycled materials and sustainable techniques in the construction and rehabilitation of Seville's historical heritage, including projects such as the Royal Artillery Factory, San Jerónimo Monastery,

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Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		<p>Glass Factory and Casa Cernuda. The measure promotes circular economy practices to reduce waste on site and take advantage of existing buildings (which is the most sustainable way to build). In the private sector, developers such as AEDAS Homes aim to achieve the recovery of at least 80% of construction waste in their projects in the city by 2026.</p>
	<p>Installation of energy management systems in commercial spaces</p>	<p>The installation of energy management systems is aimed at implementing a set of actions to obtain the highest possible performance from the energy consumed in commercial buildings. The aim is to know and control the energy consumption of all the consumption units of the municipality, for the use of energy resources in an optimised way and saving without reducing the performance of the different services provided. Based on this information, information/awareness actions can be developed for entrepreneurs aimed at implementing energy saving and efficiency measures.</p>
	<p>Implementation of an energy control system in EMASESA buildings</p>	<p>Centralized control system in a building that governs most of the building's main facilities. This type of system is based on computer applications that control and program the operation of the different building facilities. The main controls refer to air conditioning, ventilation or lighting. These systems incorporate probes for measuring the parameters to be controlled and allow the level and operating hours of the systems to be regulated according to the set parameters entered, achieving significant energy savings by reducing and controlling consumption.</p>
	<p>Free-Cooling Systems in Municipal Buildings and Enterprises</p>	<p>Free-cooling is free cooling, which is based on using the cooling capacity of the outside air to renew and cool the indoor air of a room, which reduces the energy consumption of refrigeration equipment. The proposed measure consists of starting the ventilation of buildings that have air handling units around 7 a.m. so that the outside air enters the premises cooling it without activating the air conditioning system and thus limit the consumption of cooling energy during the early hours of the morning. The</p>

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Issuing sector	Description of the transformative stock portfolio	
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		RITE requires that air-type ventilation subsystems, with a nominal power greater than 70 kW in the cooling regime, have a free outdoor air cooling subsystem. Free cooling systems, in addition to being an economical system, increase the flow of outdoor air that results in an improvement in indoor air quality.
	Energy efficiency in swimming pools - use of sunlight	Installation of equipment to take advantage of sunlight on the roofs of swimming pools, sports halls and sports halls, regulation that optimises the use of natural light together with sensory equipment that optimises the lighting according to the light level reached.
	Pumping efficiency in IMD installations	Improved efficiency in pump equipment with the installation of variable speed drives.
	Energy efficiency in swimming pool covering	Modification of swimming pool cover systems for annual use with more energy-efficient construction elements. Application to swimming pools with presstatic covers of the Torreblanca and Tiro de Línea sports centres. This is a measure aimed at extending the useful life of the structure, which will also provide greater energy efficiency (set according to the forecasts in the project reports).
	Energy efficiency in sports centres	Increasing the performance of indoor equipment and systems (air conditioning, lighting and home automation) of municipal sports centres: replacement of T8 fluorescent equipment with T8 ECO, installation of presence detectors (motion sensor) for integrated drive in home automation network, replacement of incandescent lamps with LED or OLED technology (organic diodes), renovation of autonomous air conditioning equipment to <i>inverter technology</i> or equivalent, etc.
	Increasing lighting efficiency in sports venues	Increased performance of outdoor lighting equipment and systems. Provision of dual-level electronic ballasts in outdoor projection lighting in sports fields, luminous flux regulation equipment (headend or point-to-point) in sports centers with several large fields (Vega de Triana,

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Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
Electricity	Rehabilitation and improvement of energy efficiency in residential buildings	With a stock of about 300,000 homes, Seville is promoting energy rehabilitation in residential buildings. This measure includes the installation of more efficient air conditioning systems, the use of renewable energies (such as solar photovoltaic), and the improvement of energy efficiency through the updating of insulation and heating systems. In addition, another initiative is the CAF Seville and UCI Agreement: The Association of Property Administrators of Seville has partnered with the financial institution UCI to provide specific lines of credit for the energy rehabilitation of old buildings (especially those built between the 70s and 90s). In this context, professional associations (such as the Technical Architects of Seville) function as private advice points to channel projects to specialised companies. Another project is Habitat Seville: A plan to intervene in 20 buildings (more than 2,000 homes) with an expected start in 2026. It includes thermal improvements in facades and roofs, and the installation of aérothermal and micro-cogeneration systems.
	Energy rehabilitation of buildings in the tertiary sector	The tertiary sector, which includes shops, offices and administrative buildings, is undergoing energy renovation to improve energy efficiency. More efficient air conditioning systems will be installed, insulation will be improved and energy consumption will be optimised in these buildings, in order to reduce energy demand and associated emissions. Important note: By 2026, the private focus is very much on non-residential buildings (offices and shops), as new European directives require those with the worst energy performance to be refurbished by 2030. The private sector is taking advantage of incentive lines (such as the Sustainable Construction Programme of the Andalusian Energy Agency) to: <ul style="list-style-type: none"> <li>• Installation of renewable energies: Especially photovoltaic panels and aérothermal energy in service buildings and industrial estates. International certifications: A growing number of new private works in Seville are applying for seals such as BREEAM or LEED, which guarantee the sustainability of the building</li> </ul>

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Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		throughout its life cycle. Note: These actions are aligned with the "Seville Commitment" and the "Seville Platform for Action" (derived from the UN summit in 2025), which seek to catalyze private investment towards resilient and sustainable infrastructure.
	Optimising street lighting with LED technologies	Efficient street lighting systems are being implemented using LED technology and motion sensors. This will not only reduce energy consumption, but also decrease CO <sub>2</sub> emissions related to public lighting throughout the city.
	Seville e-City Project (Isla de la Cartuja): Energy rehabilitation of 62 buildings in the Cartuja Science and Technology Park (PCT)	It is perhaps the most ambitious example of public-private collaboration. Led by entities such as the Andalusian Energy Agency and Endesa, it has the support of 47 private companies that manage 62 buildings in the Cartuja Science and Technology Park (PCT). <ul style="list-style-type: none"> <li>• Objective: To ensure that buildings reduce their energy consumption by 35%.</li> <li>• Actions: Installation of 2MWp of photovoltaic for self-consumption, improvement of thermal envelopes (SATE) and digitalisation of electricity demand.</li> <li>• Innovation: Use of building facades for solar generation through technologies that win innovation challenges (companies such as Biren and Urbantech).</li> <li>• Objective 2026: For this year, the companies installed in the Cartuja are implementing solutions for shared self-consumption, digitalisation of networks (Smart Grids) and smart lighting (1.5 million euros for lighting)</li> <li>• Sustainable Building: The private sector is refurbishing office buildings to adapt them to a zero-emission model, using low-impact materials and efficient air conditioning systems.</li> </ul>
	Reduction of the consumption of various fuels	Seville aims to reduce the consumption of fuels such as LPG, diesel, natural gas, butane, propane, fuel oil and coal. This decrease is expected thanks to the increase in electricity consumption, especially for refrigeration, domestic hot water and other domestic and industrial uses. The generation of renewable energy using solar energy (both for domestic hot water and photovoltaic) will be key to minimising dependence on these fossil fuels.

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Issuing sector	Description of the transformative stock portfolio	
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	Promoting the circular economy in the energy sector	Seville will promote the circular economy in the energy sector through the reuse of recycled materials in construction and the creation of energy use systems from organic waste. This measure will reduce the carbon footprint and the demand for external energy, contributing to the transition to a more sustainable model.
	Automation and home automation for efficient energy management	Promotion of the use of home automation and intelligent automation systems in buildings and facilities to optimise energy consumption (lighting, air conditioning and household appliances management) and reduce energy waste.
	Local electricity generation using solar photovoltaics	Seville will take advantage of its high solar radiation (2,898 hours of sunshine per year) to install photovoltaic solar panels on roofs, pergolas and car parks. This local electricity generation will be integrated into energy communities, enabling self-consumption networks in each district of the city. In addition, large-scale storage facilities will be developed to manage generation and the load curve, allowing for greater integration of solar energy into the urban electricity system.
	Launching new business models to remove the cost barrier for owners	Several energy service companies (ESCOs) in Seville are launching business models designed to eliminate the cost barrier for owners: <ul style="list-style-type: none"> <li>• 100% financing: Companies such as EOS RenovAcción or Sur 37 offer renovations where the cost is assumed by the company or covered with subsidies (Next Generation), guaranteeing savings by contract.</li> <li>• Subsidy Management: The private sector now acts as a "rehabilitation agent", taking care of all the bureaucracy of public funds so that the community of neighbors does not have to advance capital or manage complex procedures.</li> </ul>
	Integrating Renewable Energy into Buildings	Encouraging the installation of renewable energy systems in buildings, such as photovoltaic solar panels and small wind turbines, to reduce conventional energy consumption and increase energy self-sufficiency. It includes aid programmes (such as those of the Recovery,

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		Transformation and Resilience Plan or regional projects), and local incentives for the implementation of self-consumption with batteries. A good example is the INEA Programme: Grants of at least €6,000 for the installation of solar panels with storage (batteries) in private homes.
	Savings Plan in the Public Administration (2022-2026)	The Regional Government of Andalusia has allocated 117 million euros to reduce the electricity consumption of its headquarters in Seville and the rest of the community by 12% by 2026. Rehabilitation of buildings: Action is being taken on public buildings to achieve energy certification A (almost zero consumption). An example is the headquarters of the Andalusian Energy Agency. Self-consumption: Massive installation of photovoltaic panels in administrative centres and schools. Smart management: Optimisation of contracted powers and good practice manuals for public employees.
	Placement of voltage regulators in headlands	Reduction of electrical energy consumption by introducing voltage regulators at the head of the installation.
	Installation of energy storage systems	In order to improve the integration of renewable energy into the city's electricity distribution system, large-scale energy storage systems will be installed. This will make it possible to better manage peak demand and regulate photovoltaic generation, ensuring a more stable and efficient distribution of locally generated electricity.
	Photovoltaic pergolas	Installation of photovoltaic pergolas in public and private spaces to generate renewable solar energy. These structures, in addition to producing clean energy, provide shade in car parks, parks and pedestrian areas, reducing the city's energy consumption and promoting distributed generation.
	Energy rehabilitation of municipal buildings	The Seville City Council is carrying out a process of energy rehabilitation of municipal buildings. This includes upgrading the thermal envelope of buildings, installing renewable energy systems, and upgrading HVAC infra-

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Issuing sector	Description of the transformative stock portfolio	
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		structure to reduce energy consumption and CO <sub>2</sub> emissions. It includes the development and implementation of an energy saving and efficiency action plan in TUS-SAM's offices, garages and workshops, with the incorporation of more efficient lighting, improved air conditioning and insulation.
	Sustainable Mercasevilla	An investment of 4.66 million euros has been planned for 2026 for the modernization of electrical infrastructures, operational efficiency and improvement of waste management.
	Solar thermal collectors for ACS auxiliary parks	The objective is to heat water by capturing maximum solar radiation. Solar thermal energy is proving to be the most economical and environmentally friendly hot water production system of all those currently in existence. The main benefit is the reduction of CO <sub>2</sub> emissions. The production of domestic hot water (DHW) is the main application of solar thermal energy, due to the low preparation temperatures and the homogeneity of its consumption throughout the year. The Technical Building Code requires that in new buildings and in the rehabilitation of existing ones there is a minimum contribution of solar energy to cover the energy needs of DHW
	100 kw Solar Plant for Self-Consumption	Solar plant in the Metrocentro depots, 100 kw for self-consumption
	Replacement of traditional design streetlights	Reduction of electricity consumption by replacing traditional design lanterns, with four transparent or translucent faces, with low light performance and a high degree of light pollution, with more efficient ones.
Others	Recycling and recovery of fluorinated gases	The recycling and recovery of fluorinated gases from end-of-life equipment and systems will be encouraged. This measure will prevent their release into the atmosphere and allow them to be reused instead of being destroyed.

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Issuing sector	Description of the transformative stock portfolio	
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	Substituting F-gases with more sustainable alternatives	The replacement of fluorinated gases (HFCs, PFCs and SF6) with greener and safer alternatives, such as natural refrigerants (propane R-290, ammonia R-717, and carbon dioxide R-744) will be promoted. This transition will significantly reduce the environmental impact of refrigeration and air conditioning systems in the city.
	Preventive maintenance and overhaul of refrigeration and air conditioning equipment	A programme of preventive maintenance and periodic review of refrigeration and air conditioning equipment will be implemented to detect and repair leaks of fluorinated gases, ensuring their efficiency and minimising their release into the atmosphere. This measure will contribute to a significant reduction in emissions of F-gases.
	Transition to clean technologies in refrigeration and air conditioning	Encourage the transition to clean technologies in the refrigeration sector, such as heat pumps and air conditioning systems without fluorinated gases. This includes the gradual replacement of equipment that uses F-gases, with the goal of banning their use completely by 2050. This plan includes the replacement of equipment and products that use HFCs with more sustainable alternatives, with a total ban on their use in products and equipment from 2050.
	Reduction of emissions from enteric fermentation in cattle	Food management practices will be promoted to reduce methane (CH <sub>4</sub> ) emissions, such as improving the quality of animal diets, using feed additives that reduce emissions, and efficiently managing livestock waste. In addition, innovative technologies, such as methane capture systems in stables, will be researched and promoted.
	F-Gas Awareness and Education	Awareness campaigns will be carried out on the environmental impacts of fluorinated gases, promoting the use of sustainable alternatives and educating the population on the importance of reducing their use both at home and in industry.

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Improved manure management		A more efficient system for manure management will be implemented by composting it and using it as fertilizer instead of disposal, which will reduce methane and nitrogen oxide emissions. The capture of biogas produced by the decomposition of manure will also be encouraged.
Improvement in the management of agricultural soils		Through sustainable agricultural practices, such as crop rotation and the use of minimal tillage techniques, the aim is to reduce CO <sub>2</sub> emissions from agricultural soils. This will be complemented by the use of organic fertilizers and soil conservation techniques that increase carbon sequestration.
Improved grazing practices		To reduce CO <sub>2</sub> emissions in the livestock sector, sustainable grazing practices will be implemented that favor soil regeneration and carbon storage, in addition to optimizing pasture management to avoid overexploitation.
Promotion of products with lower fluorinated gas content		The use of products with a lower content of fluorinated gases in the city will be promoted. In addition, the leakage of LP gas will be reduced and the use of fresh and local products will be encouraged, which will reduce the carbon footprint associated with the transport of goods.
Environmental Education Programs		Programmes with dissemination and awareness-raising material on energy saving and sustainable development. An estimated attendance of 8250 people per year is maintained.
Environmental education programs on the efficient use of water		Awareness campaigns are carried out to promote the responsible use of water in homes and the implementation of sustainable practices, such as greywater recycling and efficient use of water in the home. These initiatives seek to reduce the demand for drinking water and improve efficiency in its use.

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	Urban carbon monitoring and the use of open data	Implementation of a real-time urban measurement and monitoring system of carbon emissions and other climate variables, using open data platforms to facilitate informed decision-making in the management of climate and urban policies.
Waste	Energy recovery from non-recyclable waste	The energy recovery of non-recyclable waste will be carried out, which will allow a reduction of 140,000 tCO <sub>2</sub> eq/year. This measure aims to recover energy from waste that cannot be recycled, converting it into electricity and heat, reducing the amount of waste deposited in landfills.
	Waste management at the Montemarta-Cónica Waste Treatment Centre	At the Montemarta-Cónica Waste Treatment Centre, owned by ABORGASE, several activities are carried out to treat waste efficiently. 100 hectares are managed dedicated to recycling, waste treatment, biogas and tires, with a focus on reducing emissions and improving sustainability in the treatment of urban waste.
	New municipal solid waste (MSW) treatment line	The implementation of a new waste treatment line will allow urban waste to be processed more efficiently, resulting in a reduction of 21,000 tCO <sub>2</sub> eq/year. This improvement in treatment processes optimises waste recovery and minimises emissions. Seville is going through a phase of profound modernisation in its cleaning and waste management system, led mainly by Lipasam and framed in Law 7/2022 on waste and contaminated soil. For 2026, the key actions focus on infrastructure renewal, digitalisation and compliance with the European circular economy objectives.
	Digitalization and optimization of wastewater management	EMASESA (Metropolitan Water Supply and Sanitation Company of Seville) is carrying out a digital transformation to optimise water use and improve the capacity to respond to extreme weather events such as droughts and floods. The use of advanced monitoring and control

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Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		<p>technologies will improve efficiency in the management of the integral water cycle. Seville has launched a historic transformation of its sanitation system, with an investment horizon that exceeds 240 million euros for the coming years (Plan 2024-2027). The strategy, led by EMASESA, seeks to ensure that wastewater ceases to be waste and becomes usable resources under a circular economy model. The key actions planned and implemented for 2026 are detailed below:</p> <ol style="list-style-type: none"> <li>1. Transformation of wastewater treatment plants into "Biofactories" The objective is for Wastewater Treatment Plants (WWTPs) to be self-sufficient and generate value: Energy Neutrality: Thermal hydrolysis and co-digestion of waste processes are being expanded to produce biogas, transforming the plants into net energy producers. Production of "Green Gold": Sewage sludge no longer goes to landfills; They are mixed with pruning waste to create high-quality compost for agriculture and green areas. Reclaimed Water: Projects such as the Ranilla Basin (budgeted for 2025-2026) seek to ensure that treated water is systematically used for the irrigation of parks (such as Miraflores or the Ciudad Deportiva del Sevilla F.C.) and street washing, saving drinking water.</li> <li>2. Major Infrastructures and Renovation The most important hydraulic work in the last four decades in the city is being executed: Adaptation of the Port Outfall Collector: An investment of more than 60 million euros to renovate the main collector, increasing its capacity and useful life. New Pumping Stations (EBAP): The construction of the EBAP Tamarguillo stands out, essential to improve flow management and avoid accidental discharges. Network Modernisation: For 2026, EMASESA has budgeted 50.99 million euros specifically for the renovation of general infrastructures and municipal networks.</li> <li>3. Digitalization: "CREANDO" and "Digital Reservoir 5.0" Projects Technology is the pillar for resilient management in the face of climate change: CREANDO Project: Focused on the digitalization of sanitation to monitor discharges in real time and optimize the operation of treatment plants through Artificial Intelligence. Flood Control: Implementation of sensors in the sewerage network to anticipate the response to torrential rains and prevent the collapse of the system.</li> <li>4. Protection of the Natural Environment The actions not only look at the city, but also at its</li> </ol>

## B-2.1: Description of Transformative Action Portfolios

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		environmental impact:Doñana Environment: The treatment plants of municipalities in the metropolitan area (such as Isla Mayor and Gerena) are being completed and improved to ensure that the water returned to the Guadalquivir environment complies with the strictest European standards, thus protecting the Doñana ecosystem.
	Treatment of the selective organic fraction	Implementation and optimisation of the selective collection of the organic fraction (bio-waste) through the use of the brown container in all districts of Seville, with the aim of improving the separation at source of food waste and pruning and allocating them to biological treatment and recovery through composting. The measure includes the reinforcement of collection services, public awareness campaigns to reduce improper waste (such as diapers or wipes) and quality control actions of the waste collected, in order to improve the performance of the treatment and increase the amount of organic matter recovered. This action is key to reducing the emissions associated with the dumping of organic waste, with an estimated reduction of up to 45,000 tCO <sub>2</sub> eq/year thanks to the improvement in the selective collection and adequate treatment of biowaste.
	Recovery and use of landfill biogas	Recovery of the biogas produced at the Cónica Montemarta landfill for electricity generation. The city of Seville contributes 50% of the waste.
	Improving energy efficiency in the water cycle	EMASESA implements technologies to improve energy efficiency in its treatment plants, using renewable sources such as hydropower, photovoltaic and biogas. These actions contribute to reducing the carbon footprint in wastewater treatment, increasing the sustainability of the facilities.
	Digitalisation of waste management	Seville benefits from a regional investment of more than 5.7 million euros from the Junta de Andalucía aimed at strengthening the digitalisation and modernisation of waste management. This investment takes the form, among other actions, of: <ul style="list-style-type: none"> <li>• Traceability: Digitalisation of</li> </ul>

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		management systems to know in real time the production, collection and treatment of waste, improving control, transparency and efficiency of the service. • Planet Plan: Participation of the city in the network for the improvement of Transfer Stations, with the aim of optimising the transfer of waste to treatment plants, reducing costs, emissions and the environmental impact of transport.
	Renewal of the Container Park	Execution of an investment plan of 17 million euros for the progressive renovation of Seville's container fleet until 2029, with the aim of replacing up to 18,000 units, which represents approximately 90% of the city's side-loading container fleet. The new containers incorporate a design without pedal or manual opening, aimed at improving hygiene, facilitating use by citizens and reducing the abandonment of bags outside the deposits. This measure seeks to modernize the collection infrastructure, unify the urban image and improve the efficiency and quality of the service.
	Recovery of non-recyclable plastics	The recovery of non-recyclable plastics will reduce emissions by 4,546 tCO <sub>2</sub> eq/year. This process involves converting plastics that cannot be recycled into energy, thus contributing to the reduction of waste in landfills and the generation of energy from non-fossil sources.
	Injection of biomethane into the grid	The biomethane generated in the waste treatment will be injected into the natural gas network, contributing to a reduction of 1,786 tCO <sub>2</sub> eq/year. This action makes it possible to take advantage of biogas as a renewable energy source, reducing the emissions associated with conventional natural gas production.
	Generation hybridization with biogas and photovoltaic engines	The hybridization of energy generation through the use of biogas and photovoltaic energy will reduce emissions by 1,020 tCO <sub>2</sub> eq/year. This innovative approach combines energy recovery from organic waste and the harnessing of solar energy, offering a sustainable solution for electricity production.

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
	Special plans and recycling in Events	LIPASAM develops special cleaning and waste management devices during large events, such as the April Fair. This plan reinforces the collection of differentiated waste (light packaging, glass, paper/cardboard and the rest), enables specific container points and distributes bags and litter bins to facilitate separation at source. It is accompanied by awareness campaigns together with Ecoembes to promote the circular economy in the management of waste generated in the booths.
	Community composting in urban gardens	Promotion of community composting in urban gardens and participatory spaces in the city to promote the reduction of organic waste at source and the local production of quality compost. The measure seeks to ensure that the users of the orchards themselves, together with the municipal coordination, manage biowaste (plant and organic remains) through small-scale composting facilities, promoting the circular economy, environmental education and awareness of the separation of biowaste.
	Implementation of containerised collection of domestic oil Smart Glass Container Installation	Carry out the collection of domestic oil, adapting it to the new Municipal Ordinance, to deliver it to an authorised manager for recovery. Application of intelligent systems to the city's glass containers to improve the efficiency and sustainability of their management, since 65% of the containers destined for glass containers are emptied with very little glass (when they are only 25% full). This is a measure based on the Life Ewas project that consists of the use of efficient and sustainable methodologies for waste management through the use of ICT tools that reduce polluting emissions. The technology applied is based on laser sensors installed inside that transmit in real time the filling information (the optimal level is that they are at 80% of their capacity) to software and a platform developed by Wellness Smart Cites & Solutions. This information allows the frequency of collection routes to be readjusted and better planned to reduce economic and environmental costs. Project estimates indicate that the need for glass collection with these sensors is being reduced by 66% in containers, going from 100 services per year to 34, trucks circulate 400 hours less and collection routes go from three out of every 12 days to one out of every seven.

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		with the savings in fuel and noise that it entails. All in all, its installation means fewer truck routes, less fuel expenditure, and less pollution overall.
Urbanism / built environment	Laboratory for the mobility of the future in the Cartuja Technology Park	The Cartuja Technology Park is being transformed into a laboratory for the mobility of the future, where new technologies and innovative transport systems, such as autonomous and electric vehicles, will be tested to improve the efficiency of transport in the city and contribute to sustainability.
	Incentives for the use of electric vehicles	Seville will promote the use of electric vehicles through economic incentives and the installation of charging points in the different districts of the city (there are already 250 in operation). The goal is for 10% of private vehicles to be electric by 2030, and for all public transport vehicles to be zero-emission.
	Adaptation of buildings to accommodate charging point infrastructures for electric vehicles	Seville will promote the use of electric vehicles through economic incentives and will continue with the installation of charging points in different parts of the city. The goal is for 10% of private vehicles to be electric by 2030, and for all public transport vehicles to be zero-emission.
	Adaptation of buildings to accommodate charging point infrastructures for electric vehicles	Implementation of charging systems for home EVs. The aim is to promote the availability of charging points in the city.
	Design of walkable and cycleable cities	Development of pedestrian infrastructure and connected cycle lanes to encourage the use of non-motorised modes of transport (walking and cycling). It includes the creation, improvement and connection of bike lane networks within the city and to nearby municipalities such as La Rinconada or Salteras, as well as the installation of secure bicycle parking spaces (bicycle racks) with the aim of exceeding 5,000 units on public roads.

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
	Promoting sustainable mobility	Seville is committed to reducing transport-related greenhouse gas (GHG) emissions. It seeks to promote sustainable mobility through the development of new infrastructures for public transport, such as the construction of new metro and tram lines, the expansion of the network of bike lanes and traffic calming. Work will be done on the integration of the city with the metropolitan area, promoting better connectivity between the two. The aim of the Sustainable Urban Mobility Plan (SUMP) is that, by the end of this decade, 2 out of 3 journeys in the city will be made on foot, by bike or by public transport.
	Implementation of low emission zones	Low Emission Zones (LEZs) will be created where the access of polluting vehicles will be restricted, with the aim of promoting the use of electric vehicles. These zones will help reduce air pollution and the city's carbon footprint, incentivising the transition to emission-free mobility. The restriction on Isla de la Cartuja (eCitySevilla) that came into force on January 8, 2024 is consolidated and new applications for the historic center are being studied. This measure is in the current Sustainable Urban Mobility Plan of the City 2030.
	Extension of the tram (Metrocentro) to Santa Justa Station and development of the Trambus	The extension of the tram to Santa Justa Station will be carried out, improving connectivity with other parts of the city and rail transport. In addition, comprehensive redevelopment works are being carried out in areas such as Plaza Nueva to improve pedestrian stays and the integration of transport. In addition, a system of platforms reserved for electric buses (called trambus) will be developed, which will connect Santa Justa with Plaza del Duque and Sevilla Este, contributing to the improvement of sustainable mobility and the reduction of congestion. The extension to Plaza del Duque is expected to be completed in the second half of 2026.
	Reduction in the use of private vehicles	According to the SUMP, in Seville the aim is for 2/3 of journeys to be made by more sustainable means of transport, such as public transport and non-motorised modes (walking, cycling). The measure includes a decrease in the participation of private vehicles, establishing that only 1/3 of journeys are made by car, which will

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		result in an improvement in air quality and the reduction of congestion.
	Construction of Metro Line 3	In Seville, the construction of Line 3 of the Metro is underway, a crucial project to improve the city's connectivity and reduce the use of private transport. With a total investment of €1.3 billion, this project is expected to contribute significantly to the decarbonisation of urban transport, offering a fast, efficient and sustainable alternative. The works between Pino Montano and the Prado de San Sebastián continue at full capacity. Although its full inauguration will be later (around 2030), 2026 is a key year for the execution of tunnels and stations.
	Construction of Line 2 of the Metro	The first studies for the construction of Line 2 of the Metro have begun. This project will allow greater coverage of the public transport system, relieving pressure on existing lines and contributing to reducing emissions of polluting gases by promoting the use of public transport over private cars.
	Improvements to public transport infrastructure	The city aims to improve the efficiency of the public transport system, both in terms of time and coverage. It is planned that trips by public transport will take no more than 20 minutes, improving connectivity and reducing waiting time, thus facilitating quick access to different points of the city and the metropolitan area. Projects such as Sevilla TechPark are tendering smart mobility services and real-time fleet management to optimise Tussam routes.
	Implementation of an efficient driving system in the TUSSAM fleet	An Efficient Driving System will be implemented in the entire TUSSAM fleet (385 buses). The system includes the installation in all buses of the fleet of equipment that captures the necessary data on the driving of the vehicle and on the identity of the driver, storing it and allowing the subsequent analysis of the driving mode. During driving, the driver is shown on a screen whether his driving is optimal. It includes training in efficient and safe driving for TUSSAM's 1200 drivers and middle managers and the

## B-2.1: Description of Transformative Action Portfolios

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		monitoring of all drivers, analysing their driving mode and promoting efficient and safe driving with personalised monitoring. An average annual reduction of 8% in fleet fuel consumption is expected.
	Incorporating zero-emission vehicles into public transport	To reduce the carbon footprint in the transport sector, all buses in the city will need to be zero-emission. This includes the development of new electric buses and the renewal of the public transport vehicle fleet to ensure that all journeys on public transport are sustainable. Seville has tendered the purchase of 70 new electric city buses.
	Efficient Driving for Taxis and Industrial Vehicles Courses	Development of efficient driving courses for taxi and industrial vehicle drivers, in order to achieve fuel-saving driving habits.
	Advertising campaigns to promote the use of Public Transport	Every year, TUSSAM carries out between 5 and 7 advertising campaigns to encourage the use of public transport and reduce the use of private vehicles. These campaigns aim to ensure that the citizens of Seville adopt behaviours in their daily lives that influence a better perception of Public Transport and greater use, which will result in a future reduction in the use of private vehicles and a reduction in CO2 emissions. The campaigns are of various kinds and emphasize both the use of the bus and the tram.
	Expansion of the network of reserved bus lanes in different areas of the city	Extension of the bus lane network to: Ronda de Triana, López de Gomara, Virgen de Luján, Avenida Monte Sierra, Ronda del Tamarguillo, Avenida de la Borbolla, Avenida Ramón y Cajal, Avenida Bueno Monreal, Paseo de las Delicias, Avenida Eduardo Dato, and Avenida de Andalucía.
	Start-up of new BRT lines: Seville East-Historic Centre	The commissioning of two BRT (Bus Rapid Transit) lines between the neighborhoods of East Seville and the historic center is planned. These lines will have an exclusive platform for a large part of their route and separated from the rest of the road and elevated stops to facilitate quick access to the bus. It will be studied that in the stops of greater use an enclosure and a prepayment system will

**B-2.1: Description of Transformative Action Portfolios**

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
		be built at the stop itself. It will be ensured that most of the route runs through the centre of the road to avoid interference with traffic at side intersections. The construction of four kilometers of exclusive platform is considered.
	Reserved platforms (HOV Bus Lane) for public transport and vehicles with two or more occupants	Platforms reserved for public transport and vehicles with two or more occupants (HOV Bus Lane) are being implemented at several key points in the city, such as in Aljarafe Central and Aljarafe Norte. This system will incentivise carpooling and the use of public transport, reducing CO <sub>2</sub> emissions and improving the efficiency of journeys. In the spring of 2026, the Bus-HOV lane between Seville and Salteras is scheduled to open, designed to reduce traffic jams at the entrance from the Aljarafe by prioritising public transport and shared vehicles.
	Incorporation of LIPASAM's Vehicle Fleet Management System	The objective is to manage LIPASAM's fleets of vehicles to improve efficiency and reduce unnecessary trips, and therefore avoiding emissions into the atmosphere, while improving the effectiveness of route control, and reducing fuel consumption. Management systems are essential to achieve operational excellence within a transport company and, in addition, reduce unnecessary expenses.
	Expansion of the CNG Filling Station to allow the refueling of 300 buses during the night	The expansion of the CNG refueling station will increase the CNG bus fleet by an additional 100 vehicles. Of the CO <sub>2</sub> emission savings achieved with these 100 vehicles, 10% is attributed to the CNG refueling station itself and 90% to the bus.
	Use of electric vehicles in LIPASAM's vehicle fleet	Renewal of the LIPASAM fleet with the acquisition of electric vehicles that are more efficient in energy consumption and with a lower impact on associated CO <sub>2</sub> emissions. The project includes the purchase of 4 electric multipurpose vehicles and 50 electric motorcycles.
	Education and awareness programmes to encourage the	Awareness campaigns aimed at students to encourage the use of Public Transport will be promoted in schools at the Compulsory Secondary Education (ESO) level.

## B-2.1: Description of Transformative Action Portfolios

Issuing sector	Description of the transformative stock portfolio	
	Stock listing	Overview
	use of Public Transport in schools	These campaigns aim to ensure that in their daily lives they adopt behaviours that influence a better perception of Public Transport and greater use, which will result in a future reduction in the use of private vehicles and a reduction in CO2 emissions. The campaign consists of organising visits by ESO students to our headquarters in Avenida de Andalucía throughout the school year, with an exhibition of the advantages of Public Transport, a visit to the Control Centre, the Workshops, a photovoltaic solar plant, a CNG refuelling plant and the rest of the facilities. Emphasizing the recycling of batteries, tires, used motor oil, coolant and separation of other waste according to its class.
	Use of electric vehicles in LIPASAM's fleet of supervisory vehicles	The measure is based on its application to motorcycles and multipurpose vehicles of the LIPASAM fleet

# Transport actions as a field of emission

TR-001. Laboratory for the mobility of the future in the Cartuja Technology Park.		
Scheme of action	Name of the action	Laboratory for the mobility of the future in the Cartuja Technology Park
	Type of action	Mitigation
	Description of the action	The Cartuja Technology Park is being transformed into a laboratory for the mobility of the future, where new technologies and innovative transport systems, such as autonomous and electric vehicles, will be tested to improve the efficiency of transport in the city and contribute to sustainability.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing
	Result (according to module B-1.1)	In the short term, the initiation and execution of research projects in mobility is expected, while in the long term the application of some of the technologies presented in the laboratory is expected.
Implementation	Agencies/persons responsible for implementation	Sevilla TechPark, Technological Corporation of Andalusia (CTA), Regional Government of Andalusia
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local government, industry, education
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	TBD
	Energy removed/replaced, volume or type of fuel	TBD
	GHG Emission Reduction Estimate (Total)	TBD

TR-001. Laboratory for the mobility of the future in the Cartuja Technology Park.		
	Total costs and costs per unit of CO2eq	TBD

TR-002. Incentives for the use of electric vehicles.		
Scheme of action	Name of the action	Incentives for the use of electric vehicles
	Type of action	Mitigation
	Description of the action	Seville will promote the use of electric vehicles through economic incentives and the installation of charging points in different parts of the city (increase the existing 250). The goal is for 10% of private vehicles to be electric by 2030, and for all public transport vehicles to be zero-emission.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/infrastructure; Policy and governance
	Result (according to module B-1.1)	In the short term, the increase in private electric vehicles in the city is expected, while in the long term the percentage of these vehicles is expected to reach 10% of all public transport vehicles will be zero emissions by 2030
Implementation	Agencies/persons responsible for implementation	Andalusian Energy Agency
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, users of public and private transport
	Feedback on implementation	Action considered in updating the PACES document as: "Awareness program for the renewal of the vehicle fleet by incentives". Status: to begin.
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

TR-002. Incentives for the use of electric vehicles.			
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	154,221 tCO <sub>2</sub> e / year	616,884 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€0.14 / tCO <sub>2</sub> e	90.000 € total

TR-003. Adaptation of buildings to accommodate charging point infrastructures for electric vehicles.		
Scheme of action	Name of the action	Adaptation of buildings to accommodate charging point infrastructures for electric vehicles
	Type of action	Mitigation
	Description of the action	Implementation of charging systems for home EVs. The aim is to promote the availability of charging points in the city.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Municipal Urban Planning Management
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, users of public and private transport
	Feedback on implementation	Action considered in the update of PACES. Status: to begin.
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

**TR-003. Adaptation of buildings to accommodate charging point infrastructures for electric vehicles.**

	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	41,597 tCO <sub>2</sub> e / year	166,388 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€1.50 / tCO <sub>2</sub> e	250.000 € total

**TR-004. Design of walkable and cyclable cities.**

Scheme of action	Name of the action	Design of walkable and cyclable cities
	Type of action	Mitigation
	Description of the action	"Development of pedestrian infrastructures and connected bike lanes to encourage the use of non-motorised modes of transport (walking and cycling). It includes the creation, improvement and connection of networks of bike lanes within the city and to nearby municipalities such as La Rinconada or Salteras, as well as the installation of secure parking for bicycles (bicycle racks) with the aim of exceeding 5,000 units on public roads."
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, it is expected to expand and connect the cycling and pedestrian network; In the medium term, increase the use of non-motorized modes.
Implementation	Agencies/persons responsible for implementation	Seville City Council
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Citizenship, mobility services

TR-004. Design of walkable and cyclable cities.			
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	5,918 tCO <sub>2</sub> e / year	23,672 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€549.17 / tCO <sub>2</sub> e	€13,000,000.0 total

TR-005. Promotion of sustainable mobility.		
Scheme of action	Name of the action	Promoting sustainable mobility
	Type of action	Mitigation
	Description of the action	Seville is committed to reducing transport-related greenhouse gas (GHG) emissions. It seeks to promote sustainable mobility through the development of new infrastructures for public transport, such as the construction of new metro and tram lines, the expansion of the network of bike lanes and traffic calming. Work will be done on the integration of the city with the metropolitan area, promoting better connectivity between the two. The aim of the Sustainable Urban Mobility Plan (SUMP) is that, by the end of this decade, 2 out of 3 journeys in the city will be made on foot, by bike or by public transport.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the effective completion of the metro line is expected as a result. In the medium term, it is expected that the infrastructures will have optimal conditions (in terms of time, safety, attention

TR-005. Promotion of sustainable mobility.			
		to demand) in order to increase use (according to the objective of 2 out of 3 journeys in the city being made on foot, by bike or by public transport)	
Implementation	Agencies/persons responsible for implementation	Tussam, Seville City Council (Taxi Institute); Seville Area Metropolitan Consortium	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, residents of Seville, users of public and private transport	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	11,836 tCO <sub>2</sub> e / year	47,344 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	633,66 €/ tCO <sub>2</sub> e	30.000.000,00 € total

TR-006. Implementation of low emission zones.		
Scheme of action	Name of the action	Implementation of low emission zones
	Type of action	Mitigation
	Description of the action	Low Emission Zones (LEZs) will be created where the access of polluting vehicles will be restricted, with the aim of promoting the use of electric vehicles. These zones will help reduce air pollution and the city's carbon footprint, incentivising the transition to emission-free mobility. The restriction on Isla de la Cartuja (eCitySevilla) that came into force on January 8, 2024 is consolidated and new applications for the historic center are being studied.

**TR-006. Implementation of low emission zones.**

		This measure is in the current Sustainable Urban Mobility Plan of the City 2030.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Technology/infrastructure; Politics and governance; Learning and Skills	
	Result (according to module B-1.1)	In the short term, the necessary execution of the infrastructure in the area is expected. In the long term, a reduction of approximately 17,730 tCO <sub>2</sub> /year in greenhouse gas emissions is expected.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Directorate General of Mobility	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, industry, public and private transport users	
	Feedback on implementation	Action considered in the update of PACES. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	17,730 tCO <sub>2</sub> e / year	70,920 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€3.52 / tCO <sub>2</sub> e	250.000 € total

**TR-007. Extension of the tram (Metrocentro) to Santa Justa Station and development of the Trambus.**

Scheme of action	Name of the action	Extension of the tram (Metrocentro) to Santa Justa Station and development of the Trambus	
	Type of action	Mitigation	

**TR-007. Extension of the tram (Metrocentro) to Santa Justa Station and development of the Trambus.**

	Description of the action	The extension of the tram to Santa Justa Station will be carried out, improving connectivity with other parts of the city and rail transport. In addition, comprehensive redevelopment works are being carried out in areas such as Plaza Nueva to improve pedestrian stays and the integration of transport. In addition, a system of platforms reserved for electric buses (called trambus) will be developed, which will connect Santa Justa with Plaza del Duque and Sevilla Este, contributing to the improvement of sustainable mobility and the reduction of congestion. The extension to Plaza del Duque is expected to be completed in the second half of 2026.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing	
	Result (according to module B-1.1)	In the short term, the extension to Plaza del Duque is expected, while in the long term the extension of Metrocentro to Santa Justa station is expected	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Adif	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, residents of Seville, users of public and private transport	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Electric power	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	4,142 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime.
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total.	46.000.000 € total

TR-008. Reduction of the use of private vehicles.			
Scheme of action	Name of the action	Reduction in the use of private vehicles	
	Type of action	Mitigation	
	Description of the action	In Seville, the aim is for 2/3 of journeys to be made by more sustainable means of transport, such as public transport and non-motorised modes (walking, cycling). The measure includes a decrease in the participation of private vehicles, establishing that only 1/3 of journeys are made by car, which will result in an improvement in air quality and the reduction of congestion.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Politics and governance; Learning and Skills	
	Result (according to module B-1.1)	In the short term, a response of awareness among citizens is expected. In the long term, it is expected that only 1/3 of journeys will be made by car, preferably in a shared way.	
Implementation	Agencies/persons responsible for implementation	Drivers and pedestrians	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, residents of Seville, users of public and private transport	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	2,959.0 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime.

<b>TR-008. Reduction of the use of private vehicles.</b>			
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total.	€8 – €15 million total

<b>TR-009. Construction of Line 3 of the Metro.</b>		
Scheme of action	Name of the action	Construction of Metro Line 3
	Type of action	Mitigation
	Description of the action	In Seville, the construction of Line 3 of the Metro is underway, a crucial project to improve the city's connectivity and reduce the use of private transport. With a total investment of €1.3 billion, this project is expected to contribute significantly to the decarbonisation of urban transport, offering a fast, efficient and sustainable alternative. The works between Pino Montano and the Prado de San Sebastián continue at full capacity. Although its full inauguration will be later (around 2030), 2026 is a key year for the execution of tunnels and stations.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing
	Result (according to module B-1.1)	In the short term it is under execution, while in the long term its inauguration is projected.
Implementation	Agencies/persons responsible for implementation	Ministry of Development, Articulation of the Territory and Housing.
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, residents of Seville, users of public and private transport
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

TR-009. Construction of Line 3 of the Metro.			
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	5,918.0 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime.
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total.	1.300.000.000 € total

TR-010. Construction of Line 2 of the Metro.		
Scheme of action	Name of the action	Construction of Line 2 of the Metro
	Type of action	Mitigation
	Description of the action	The first studies for the construction of Line 2 of the Metro have begun. This project will allow greater coverage of the public transport system, relieving pressure on existing lines and contributing to reducing emissions of polluting gases by promoting the use of public transport over private cars.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing
	Result (according to module B-1.1)	In the short term, its execution is projected to begin, while in the long term its inauguration is projected.
Implementation	Agencies/persons responsible for implementation	Ministry of Development, Articulation of the Territory and Housing.
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, residents of Seville, users of public and private transport
	Feedback on implementation	Status: Under study.

**TR-010. Construction of Line 2 of the Metro.**

Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	5,918 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD	

**TR-011. Improvements in public transport infrastructure.**

Scheme of action	Name of the action	Improvements to public transport infrastructure
	Type of action	Mitigation
	Description of the action	The city aims to improve the efficiency of the public transport system, both in terms of time and coverage. It is planned that trips by public transport will take no more than 20 minutes, improving connectivity and reducing waiting time, thus facilitating quick access to different points of the city and the metropolitan area. Projects such as Sevilla TechPark are tendering smart mobility services and real-time fleet management to optimise Tussam routes.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	It is expected that in the short term smart mobility improvements will begin to be implemented, so that in the long term the travel time will progressively decrease to a maximum time of 20 minutes.
Implementation	Agencies/persons responsible for implementation	Industry, Regional Government of Andalusia (Ministry of Development, Articulation of the Territory and Housing), Seville City Council, Seville Area Metropolitan Transport Consortium (CTMAS),

TR-011. Improvements in public transport infrastructure.			
		General Directorate of Mobility, Tussam, Ministry of Transport and Sustainable Mobility	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, industry, public and private transport users	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	2,200 tCO <sub>2</sub> e / year	8,800 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	267 € / tCO <sub>2</sub> e	2.350.000 € total

TR-012. Implementation of an efficient Driving System in the TUSSAM fleet.		
Scheme of action	Name of the action	Implementation of an efficient driving system in the TUSSAM fleet
	Type of action	Mitigation
	Description of the action	An Efficient Driving System will be implemented in the entire TUSSAM fleet (385 buses). The system includes the installation in all buses of the fleet of equipment that captures the necessary data on the driving of the vehicle and on the identity of the driver, storing it and allowing the subsequent analysis of the driving mode. During driving, the driver is shown on a screen whether his driving is optimal. It includes training in efficient and safe driving for TUSSAM's 1200 drivers and middle managers and the monitoring of all drivers, analysing their driving mode and promoting efficient and safe driving with personalised monitoring. An average annual reduction of 8% in the

**TR-012. Implementation of an efficient Driving System in the TUSSAM fleet.**

		fuel consumption of the fleet.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Social innovation; Learning and Capabilities	
	Result (according to module B-1.1)	In the short term, a reduction of close to 8% is expected, and in the long term, a reduction of at least 8% in emissions is expected.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, users of public and private transport	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	2,200.0 tCO <sub>2</sub> e / year	8,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	267 € / tCO <sub>2</sub> e	2.350.000 € total

**TR-013. Incorporation of zero-emission vehicles in public transport.**

Scheme of action	Name of the action	Incorporating zero-emission vehicles into public transport
	Type of action	Mitigation

TR-013. Incorporation of zero-emission vehicles in public transport.			
	Description of the action	To reduce the carbon footprint in the transport sector, all buses in the city will need to be zero-emission. This includes the development of new electric buses and the renewal of the public transport vehicle fleet to ensure that all journeys on public transport are sustainable. Seville has tendered the purchase of 70 new electric city buses.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the CNG-powered fleet is expected to increase to at least 75%, until a fraction of at least 25% of the fleet with a zero-emission environmental label is reached in the long term.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, residents of Seville, users of public and private transport	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels.	
	GHG Emission Reduction Estimate	90 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	26.135.000 € total

**TR-014. Efficient Driving Courses for Taxis and Industrial Vehicles.**

Scheme of action	Name of the action	Efficient Driving for Taxis and Industrial Vehicles Courses	
	Type of action	Mitigation	
	Description of the action	Development of efficient driving courses for taxi and industrial vehicle drivers, in order to achieve fuel-saving driving habits.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Social innovation; Learning and Skills	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Seville Energy and Sustainability Agency	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, users of public and private transport	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	618 tCO <sub>2</sub> e / year	2,474 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	22,63 € / tCO <sub>2</sub> e	€56,000 total

**TR-015. Advertising campaigns to promote the use of Public Transport.**

Scheme of action	Name of the action	Advertising campaigns to promote the use of Public Transport	
	Type of action	Mitigation	
	Description of the action	Every year, TUSSAM carries out between 5 and 7 advertising campaigns to encourage the use of public transport and reduce the use of private vehicles. These campaigns aim to ensure that the citizens of Seville adopt behaviours in their daily lives that influence a better perception of Public Transport and greater use, which will result in a future reduction in the use of private vehicles and a reduction in CO2 emissions. The campaigns are of various kinds and emphasize both the use of the bus and the tram.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Learning and Skills	
	Result (according to module B-1.1)	In the short term, a significant increase in the use of public transport is expected, in the long term the full execution of the measure is expected.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, users of public and private transport	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development. Period 2015-2030.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	450 tCO <sub>2</sub> e / year	6,750 tCO <sub>2</sub> e total

<b>TR-015. Advertising campaigns to promote the use of Public Transport.</b>			
	Total costs and costs per unit of CO2eq	296,3€ / tCO <sub>2</sub> e	2.000.000 € total

<b>TR-016. Expansion of the network of reserved bus lanes in different areas of the city</b>		
Scheme of action	Name of the action	Expansion of the network of reserved bus lanes in different areas of the city
	Type of action	Mitigation
	Description of the action	Extension of the bus lane network to: Ronda de Triana, López de Gomara, Virgen de Luján, Avenida Monte Sierra, Ronda del Tamarguillo, Avenida de la Borbolla, Avenida Ramón y Cajal, Avenida Bueno Monreal, Paseo de las Delicias, Avenida Eduardo Dato, and Avenida de Andalucía.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, users of public and private transport
	Feedback on implementation	Action considered in the updating of the PACES document. Status: To begin with.
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Not applicable

TR-016. Expansion of the network of reserved bus lanes in different areas of the city			
	GHG Emission Reduction Estimate	380.4 tCO <sub>2</sub> e / year	1,521.6 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	105,15 € / tCO <sub>2</sub> e	1.600 € total

TR-017. Start-up of new BRT lines: Seville East-Historic Centre.		
Scheme of action	Name of the action	Start-up of new BRT lines: Seville East-Historic Centre
	Type of action	Mitigation
	Description of the action	The commissioning of two BRT (Bus Rapid Transit) lines between the neighborhoods of East Seville and the historic center is planned. These lines will have an exclusive platform for a large part of their route and separated from the rest of the road and elevated stops to facilitate quick access to the bus. It will be studied that in the stops of greater use an enclosure and a prepayment system will be built at the stop itself. It will be ensured that most of the route runs through the centre of the road to avoid interference with traffic at side intersections. The construction of four kilometers of exclusive platform is considered.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term it is under execution, while in the long term its inauguration is projected.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, users of public and private transport
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development.

<b>TR-017. Start-up of new BRT lines: Seville East-Historic Centre.</b>			
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	144.15 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	€13,067,400 total

<b>TR-018. Reserved platforms (HOV Bus Lane) for public transport and vehicles with two or more occupants.</b>		
Scheme of action	Name of the action	Reserved platforms (HOV Bus Lane) for public transport and vehicles with two or more occupants
	Type of action	Mitigation
	Description of the action	Platforms reserved for public transport and vehicles with two or more occupants (HOV Bus Lane) are being implemented at several key points in the city, such as in Aljarafe Central and Aljarafe Norte. This system will incentivise carpooling and the use of public transport, reducing CO <sub>2</sub> emissions and improving the efficiency of journeys. In the spring of 2026, the Bus-HOV lane between Seville and Salteras is scheduled to open, designed to reduce traffic jams at the entrance from the Aljarafe by prioritising public transport and shared vehicles.
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing
	Result (according to module B-1.1)	TBD
Implementation	Agencies/persons responsible for implementation	DGT, The Regional Government of Andalusia (Ministry of Development, Articulation of the Territory and Housing)

<b>TR-018. Reserved platforms (HOV Bus Lane) for public transport and vehicles with two or more occupants.</b>			
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, users of public and private transport	
	Feedback on implementation	Action considered in updating the PACES document. Status: To begin with.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of fossil fuel consumption	
	GHG Emission Reduction Estimate	108 tCO <sub>2</sub> e / year	432 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	81 € / tCO <sub>2</sub> e	35.000 € total

<b>TR-019. Incorporation of LIPASAM's vehicle fleet Management System.</b>		
Scheme of action	Name of the action	Incorporation of LIPASAM's Vehicle Fleet Management System
	Type of action	Mitigation
	Description of the action	<p>The objective is to manage LIPASAM's fleets of vehicles to improve efficiency and reduce unnecessary trips, and therefore avoiding emissions into the atmosphere, while improving the effectiveness of route control, and reducing fuel consumption.</p> <p>Management systems are essential to achieve operational excellence within a transport company and, in addition, reduce unnecessary expenses.</p>
Reference to the impact pathway	Scope of Issuance	Transportation
	Systemic lever	Technology/Infrastructure

**TR-019. Incorporation of LIPASAM's vehicle fleet Management System.**

	Result (according to module B-1.1)	In the short term, the study for the implementation of the measure is expected. In the medium term, the project is expected to have started.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in updating the PACES document. Status: Not started.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of fossil fuel consumption	
	GHG Emission Reduction Estimate	103 tCO <sub>2</sub> e / year	412 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	126 € / tCO <sub>2</sub> e	52.000 € total

**TR-020. Expansion of the CNG Filling Station to allow the refueling of 300 buses during the night.**

Scheme of action	Name of the action	Expansion of the CNG Filling Station to allow the refueling of 300 buses during the night	
	Type of action	Mitigation	
	Description of the action	The expansion of the CNG refueling station will increase the CNG bus fleet by an additional 100 vehicles. Of the CO <sub>2</sub> emission savings achieved with these 100 vehicles, 10% is attributed to the CNG refueling station itself and 90% to the bus.	
	Scope of Issuance	Transportation	

**TR-020. Expansion of the CNG Filling Station to allow the refueling of 300 buses during the night.**

Reference to the impact pathway	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the CNG refueling station is expected to increase, and in the long term the bus fleet is expected to increase	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: To begin with.	
Impacts and costs	Renewable energy generated (if applicable)	CNG	
	Energy removed/replaced, volume or type of fuel	Fossil fuel substitution	
	GHG Emission Reduction Estimate	97.0 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	1.400.000 € total

**TR-021. Use of electric vehicles in LIPASAM's fleet of vehicles.**

Scheme of action	Name of the action	Use of electric vehicles in LIPASAM's vehicle fleet
	Type of action	Mitigation
	Description of the action	Renewal of the LIPASAM fleet with the acquisition of electric vehicles that are more efficient in energy consumption and with a lower impact on associated CO <sub>2</sub> emissions. The project includes the purchase of 4 electric multipurpose vehicles and 50 electric motorcycles.

**TR-021. Use of electric vehicles in LIPASAM's fleet of vehicles.**

Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM (Waste Management)	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, residents of Seville, visitors, owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: To begin with.	
Impacts and costs	Renewable energy generated (if applicable)	Electric power	
	Energy removed/replaced, volume or type of fuel	Fossil fuel substitution	
	GHG Emission Reduction Estimate	85 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	900.000 € total

**TR-022. Education and awareness programmes to encourage the use of Public Transport in schools.**

Scheme of action	Name of the action	Education and awareness programmes to encourage the use of Public Transport in schools	
	Type of action	Mitigation	
	Description of the action	Awareness campaigns aimed at students to encourage the use of Public Transport will be promoted in schools at the Compulsory Secondary	

**TR-022. Education and awareness programmes to encourage the use of Public Transport in schools.**

		Education (ESO) level. These campaigns aim to ensure that in their daily lives they adopt behaviours that influence a better perception of Public Transport and greater use, which will result in a future reduction in the use of private vehicles and a reduction in CO2 emissions. The campaign consists of organising visits by ESO students to our headquarters in Avenida de Andalucía throughout the school year, with an exhibition of the advantages of Public Transport, a visit to the Control Centre, the Workshops, a photovoltaic solar plant, a CNG refuelling plant and the rest of the facilities. Emphasizing the recycling of batteries, tires, used motor oil, coolant and separation of other waste according to its class.	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Learning and Skills	
	Result (according to module B-1.1)	In the short term, a significant increase in the use of public transport is expected, in the long term the full execution of the measure is expected.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, users of public and private transport, educational institutions	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development. Period: 2015-2030.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	27.5 tCO <sub>2</sub> e / year	412.5 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	242 € / tCO <sub>2</sub> e	100.000 € total

TR-023. Use of electric vehicles in LIPASAM's fleet of supervisory vehicles.			
Scheme of action	Name of the action	Use of electric vehicles in LIPASAM's fleet of supervisory vehicles	
	Type of action	Mitigation	
	Description of the action	The measure is based on its application to motorcycles and multipurpose vehicles of the LIPASAM fleet	
Reference to the impact pathway	Scope of Issuance	Transportation	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin. Period: 2018-2028.	
Impacts and costs	Renewable energy generated (if applicable)	Electric power	
	Energy removed/replaced, volume or type of fuel	Fossil fuel substitution	
	GHG Emission Reduction Estimate	16.0 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	€250,000 total.

Building and heating actions as a field of emission

<b>EC-001. Carrying out energy audits and applying the corresponding EMASESA Energy Efficiency and Saving Improvement Plan.</b>		
Scheme of action	Name of the action	Carrying out energy audits and applying the corresponding EMASESA Energy Efficiency and Saving Improvement Plan
	Type of action	Mitigation
	Description of the action	Carrying out energy audits allows us to know in detail the equipment and state of the facilities and propose actions to improve energy efficiency and obtain energy and economic savings. The main objectives are to know the current energy situation, to inventory equipment and facilities, to carry out measurements of electrical, thermal and comfort parameters, and to analyse options to optimise the demand for fuels and electricity. The purpose is to propose improvements according to the analyses carried out and their technical and economic evaluation. It should be noted that 26 EMASESA facilities have been audited to date, but nevertheless the improvement actions to be implemented have not been defined, so it is not possible to estimate the energy savings.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, EMASESA
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local government, residents of Seville, property owners
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development. Period: 2018-2028.
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

**EC-001. Carrying out energy audits and applying the corresponding EMASESA Energy Efficiency and Saving Improvement Plan.**

	Energy removed/replaced, volume or type of fuel	Not applicable
	GHG Emission Reduction Estimate	TBD
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD

**EC-002. Implementation of bioclimatic solutions and green urbanism.**

Scheme of action	Name of the action	Implementation of bioclimatic and green urbanism solutions
	Type of action	Mitigation
	Description of the action	Bioclimatic urban planning solutions will be implemented, such as photocatalytic pavements, the creation of green roofs and gardens, and the planting of trees in urban areas to reduce the heat island effect. These measures will help mitigate high temperatures and, in turn, reduce the need for cooling, reducing energy consumption in the city. Applied to housing, the construction of more than 4,600 subsidized homes is projected (Shock Plan 2024-2027) under efficiency criteria. An example is the new coliving in Pino Montano, whose works are scheduled to advance significantly during this year 2026. In addition, it seeks to adapt urban design to local climatic conditions, using bioclimatic design techniques to reduce the need for heating and cooling in buildings. This includes optimizing the orientation of buildings and using natural ventilation.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, more tree planting is expected in urban areas to reduce the heat island effect, as well as the construction of houses considering the orientation to optimize natural air conditioning. In the long term, measures such as photocatalytic pavements, creation of green roofs and gardens,

EC-002. Implementation of bioclimatic solutions and green urbanism.			
Implementation	Agencies/persons responsible for implementation	Seville City Council, EMVISESA, construction sector	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, construction sector, residents of Seville, visitors, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	101,038.6 tCO <sub>2</sub> e / year	34,576.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	205,9 € / tCO <sub>2</sub> e	7.120.000 € total

EC-004. Mixed zoning.		
Scheme of action	Name of the action	Mixed Zoning
	Type of action	Mitigation
	Description of the action	Promoting the integration of housing, commerce and services in urban areas to reduce long journeys and promote more sustainable and accessible communities. This approach is supported by urban planning policies that seek to balance land use and densities compatible with neighbourhood life.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Policy and governance

EC-004. Mixed zoning.			
	Result (according to module B-1.1)	In the medium term, it is expected to reduce long journeys and promote more self-sufficient and accessible neighbourhoods.	
Implementation	Agencies/persons responsible for implementation	Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, citizenship	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	3,750 tCO <sub>2</sub> e / year	15,000 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	100 € / tCO <sub>2</sub> e	1.500.000 € total

EC-007. Reuse of degraded urban land.		
Scheme of action	Name of the action	Reuse of degraded urban land
	Type of action	Mitigation
	Description of the action	Prioritisation of the regeneration and reuse of degraded, vacant or underused urban land in the face of urban expansion towards new land. The measure seeks to promote urban rehabilitation, densification in consolidated areas and the transformation of unused spaces into new residential, productive or service areas, reducing land consumption and the environmental impacts associated with extensive urbanization.

**EC-007. Reuse of degraded urban land.**

Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Policy and governance	
	Result (according to module B-1.1)	In the medium term, it is expected to prioritise urban rehabilitation and reduce the consumption of new land.	
Implementation	Agencies/persons responsible for implementation	Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration; Promoters	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	2,500 tCO <sub>2</sub> e / year	10,000 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	120 € / tCO <sub>2</sub> e	1.200.000 € total

**EC-008. Tax incentives for sustainable reforms.**

Scheme of action	Name of the action	Tax incentives for sustainable reforms	
	Type of action	Mitigation	
	Description of the action	Granting of tax incentives such as discounts on Real Estate Tax (IBI) and deductions on Personal Income Tax for owners and companies that carry out sustainable renovations in their buildings, aimed at	

**EC-008. Tax incentives for sustainable reforms.**

		improving energy efficiency, integrating renewables or reducing GHG emissions.	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Finance and financing	
	Result (according to module B-1.1)	In the short term, it is expected to encourage reforms; in the medium term, improve the efficiency of the existing building stock.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, State	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Contributors	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	10,000 tCO <sub>2</sub> e / year	40,000 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	95 € / tCO <sub>2</sub> e	3.800.000 € total

**EC-009. Awareness for the renovation of household appliances.**

Scheme of action	Name of the action	Awareness for the renovation of household appliances	
	Type of action	Mitigation	

EC-009. Awareness for the renovation of household appliances.			
	Description of the action	It is proposed to carry out environmental education programmes for adherence to a line of aid and incentives aimed at replacing old household appliances (labelled C or lower) with others of class A+ or higher to achieve significant energy savings and reduction of CO2 emissions. The aim is to achieve a significant reduction in CO2 emissions by refurbishing appliances that are very inefficient from the point of view of energy consumption.	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Seville Energy and Sustainability Agency	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	9,707 tCO <sub>2</sub> e / year	38,828 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€0.64 / tCO <sub>2</sub> e	25.000 € total

**EC-010. 100% Renewable Buildings: Construction and renovation.**

Scheme of action	Name of the action	100% Renewable Buildings: Construction and Renovation
	Type of action	Mitigation
	Description of the action	In a "Zero Emissions" building, 100% of the energy demanded is produced through renewable sources and net emissions into the atmosphere are zero. A "zero emissions" building is characterised by having a design that uses passive solutions through its orientation and shape, favouring energy efficiency. It is also equipped with facades that create air chambers as a thermal barrier, and with special materials and designs that allow the regulation of exterior light, air conditioning and ventilation of the interior spaces. For lighting, they must have strategically located openings that favour natural interior lighting, or spaces created to be thermal and acoustic buffers. Finally, energy options such as the installation of photovoltaic panels, mini-wind energy or solar thermal energy for DHW, etc. are the different options that allow achieving a zero emissions balance in the operation of the building itself. In short, it is a matter of minimising energy demand through bioclimatic and eco-efficient architectural elements and maximising energy production with renewable sources.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Energy and Sustainability Agency
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.

**EC-010. 100% Renewable Buildings: Construction and renovation.**

Impacts and costs	Renewable energy generated (if applicable)	Solar photovoltaic, wind, Solar DHW	
	Energy removed/replaced, volume or type of fuel	Elimination of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	2,000.0 tCO <sub>2</sub> e / year	8,000.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€93.75 / tCO <sub>2</sub> e	750.000 € total

**EC-013. Innovation in construction processes to reduce energy demand.**

Scheme of action	Name of the action	Innovation in construction processes to reduce energy demand
	Type of action	Mitigation
	Description of the action	<p>The new construction processes will adopt bioclimatic techniques to reduce the need for heating and cooling in buildings, through the use of sustainable materials, improved insulation and the integration of energy-efficient technologies. Particular attention will be paid to the design of nearly zero-energy (nZEB) homes, which will incorporate photovoltaic systems and other renewable energy resources. The actions focus on three axes:</p> <p>1. Large Energy-Efficient Residential Developments Several private developers have initiated or are consolidating large-scale projects under efficient construction standards:</p> <ul style="list-style-type: none"> <li>• Entrenúcleos: Groups such as Descasur are leading projects (such as the development of 503 homes by 2026) that use modern and efficient construction systems to reduce environmental impact and improve thermal insulation.</li> <li>• Cruz del Campo and Palmas Altas: In these new neighbourhoods, the collaboration between private developers and the City Council seeks to build thousands of homes (many of them subsidised housing) that comply with</li> </ul>

EC-013. Innovation in construction processes to reduce energy demand.			
		<p>regulations for almost zero primary energy consumption.</p> <ul style="list-style-type: none"> <li>El Pítamo neighbourhood: It is projected as a benchmark for sustainability with the integration of green areas and bioclimatic architecture in the private developments that are starting their execution phase.</li> </ul>	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Technology/infrastructure; Finance and financing; Social innovation	
	Result (according to module B-1.1)	In the short term, the study of the proposed measure is expected. In the long term, the start of the project is expected to reduce the energy demand in construction processes.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, EMVISESA, construction sector	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, construction sector, residents of Seville, visitors	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	1,728 tCO <sub>2</sub> e / year	6,915 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	4.322 € / tCO <sub>2</sub> e	25.000.000 € total

**EC-014. Environmental certifications for sustainable buildings.**

Scheme of action	Name of the action	Environmental certifications for sustainable buildings	
	Type of action	Mitigation	
	Description of the action	Promotion of obtaining environmental certifications for sustainable building (such as LEED, BREEAM or EDGE) in new buildings and renovations, with the aim of guaranteeing high standards of energy efficiency, reduction of resource consumption, lower environmental impact and improvement of thermal comfort. The measure promotes the adoption of sustainability criteria in the design, construction and operation of buildings within the municipality of Seville.	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Policy and governance	
	Result (according to module B-1.1)	In the medium term, the number of buildings with high standards of efficiency and sustainability is expected to increase.	
Implementation	Agencies/persons responsible for implementation	City Council, construction sector	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Promoters, technicians	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	1,700 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)

<b>EC-014. Environmental certifications for sustainable buildings.</b>			
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	2.500.000 € total

<b>EC-015. Local production of heating and cooling using cooling networks.</b>		
Scheme of action	Name of the action	Local production of heating and cooling using cold networks
	Type of action	Mitigation
	Description of the action	In the residential and commercial sector, the installation of urban cooling networks that generate heating and cooling from renewable energy sources will be encouraged. These networks will enable more efficient management of energy demand, reducing the need for individual HVAC systems and improving overall energy efficiency.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, it is expected that the project will be studied for its application in the city. In the long term, it is expected that this project will begin
Implementation	Agencies/persons responsible for implementation	Seville City Council, Andalusian Energy Agency, industrial sector
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, industrial sector, residents of Seville, visitors, property owners
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources

EC-015. Local production of heating and cooling using cooling networks.			
	GHG Emission Reduction Estimate	366.17 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	12.000.000 € total

EC-016. Nearly Zero Energy Building Design (nZEB).		
Scheme of action	Name of the action	Nearly Zero Energy Building Design (nZEB)
	Type of action	Mitigation
	Description of the action	Promoting the design and construction of nearly zero energy buildings (nZEB) in accordance with the requirements of the European Energy Efficiency in Buildings Directive, which requires that new buildings have very low energy demand and be met with renewables integrated into the building. This measure is implemented through urban planning and regulation and the execution of public and private projects in accordance with the Technical Building Code and binding energy efficiency standards.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the medium and long term, it is expected to generalize buildings with very low energy consumption.
Implementation	Agencies/persons responsible for implementation	Public administrations and developers
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Construction sector
	Feedback on implementation	

EC-016. Nearly Zero Energy Building Design (nZEB).			
Impacts and costs	Renewable energy generated (if applicable)	Building-integrated renewables	
	Energy removed/replaced, volume or type of fuel	Replacing fossil-based electricity	
	GHG Emission Reduction Estimate	900–1,000 tCO <sub>2</sub> e / year	2,700-4,000 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	To be defined	

EC-017. Establishment of an energy fund to finance the renovation of buildings, based on savings obtained from renovations already carried out.		
Scheme of action	Name of the action	Establishment of an energy fund to finance the renovation of buildings, based on savings from renovations already carried out
	Type of action	Mitigation
	Description of the action	The objective is the creation of a municipal energy fund to finance the rehabilitation of buildings for energy improvement and efficiency, based on the savings obtained thanks to renovations already carried out. The actions to be carried out under this measure are: ☐ Creation of an inventory tool that allows the avoided emissions to be accounted for from energy consumption prior to energy efficiency works and subsequently, in economic terms. ☐ Creation of an energy fund that includes the savings accounted for in the tool designed for this purpose. ☐ Application of the annual funds obtained to the energy rehabilitation of buildings with low energy efficiency. The measure is based on its application to a total of 10 buildings (pilot).
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.

<b>EC-017. Establishment of an energy fund to finance the renovation of buildings, based on savings obtained from renovations already carried out.</b>			
Implementation	Agencies/persons responsible for implementation	Seville City Council, Energy and Sustainability Agency	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	880.00 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	500,000 € total

<b>EC-018. Energy monitoring and consumption management in municipal facilities.</b>		
Scheme of action	Name of the action	Energy monitoring and consumption management in municipal facilities
	Type of action	Mitigation
	Description of the action	It is about implementing actions related to buildings owned by municipal companies or other local public bodies. Its objective is to carry out information management associated with the control and measurement of consumption, as well as the monitoring of the execution of the measures applied for energy saving and efficiency. Among the benefits obtained with consumption monitoring are: <ul style="list-style-type: none"> <li>o Continuous control of consumption and electrical parameters that allows the detection of excess power, penalized power factors or anomalous consumption according to the time slot.</li> <li>o Continuous monitoring of the load curves to adjust</li> </ul>

**EC-018. Energy monitoring and consumption management in municipal facilities.**

		<p>the contracted power to that actually demanded by the installation.</p> <ul style="list-style-type: none"> <li>o Identify anomalies in the operation of the facilities, contributing to the reduction of breakdowns.</li> <li>o Identify and quantify how the efficiency measures implemented affect total consumption. The measure is based on its application to a total of 10 buildings (pilot project).</li> </ul>	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the study for the implementation of the measure is expected. In the medium term, the project is expected to have started.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Energy and Sustainability Agency	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: Not started.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	700.00 tCO <sub>2</sub> e / year	2,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	89 € / tCO <sub>2</sub> e	250.000 € total

<b>EC-019. Promotion of the circular economy in the construction and rehabilitation of historical heritage.</b>		
Scheme of action	Name of the action	Promotion of the circular economy in the construction and rehabilitation of historical heritage
	Type of action	Mitigation
	Description of the action	Promotion of the use of recycled materials and sustainable techniques in the construction and rehabilitation of Seville's historical heritage, including projects such as the Royal Artillery Factory, San Jerónimo Monastery, Glass Factory and Casa Cernuda. The measure promotes circular economy practices to reduce waste on site and take advantage of existing buildings (which is the most sustainable way to build). In the private sector, developers such as AEDAS Homes aim to achieve the recovery of at least 80% of construction waste in their projects in the city by 2026.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Policy and governance
	Result (according to module B-1.1)	In the medium term, it is expected to increase the recovery of construction waste and prioritise the reuse of existing buildings.
Implementation	Agencies/persons responsible for implementation	City Council, developers
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Developers, construction sector
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Not applicable

<b>EC-019. Promotion of the circular economy in the construction and rehabilitation of historical heritage.</b>			
	GHG Emission Reduction Estimate	400 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD	

<b>EC-020. Installation of energy management systems in commercial spaces.</b>		
Scheme of action	Name of the action	Installation of energy management systems in commercial spaces
	Type of action	Mitigation
	Description of the action	<p>The installation of energy management systems is aimed at implementing a set of actions to obtain the highest possible performance from the energy consumed in commercial buildings. It is about knowing and controlling the energy consumption of all the units</p> <p>of consumption of the municipality, to use energy resources in an optimised way and saving without reducing the performance of the services provided. Based on this information, information/awareness actions can be developed for entrepreneurs aimed at implementing energy saving and efficiency measures.</p>
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the study for the implementation of the measure is expected. In the medium term, the project is expected to have started.
Implementation	Agencies/persons responsible for implementation	Seville City Council, EMASESA
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, residents of Seville, visitors

<b>EC-020. Installation of energy management systems in commercial spaces.</b>			
	Feedback on implementation	Action considered in the updating of the PACES document. Status: Not started.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	250 tCO <sub>2</sub> e / year	1,000 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	75 € / tCO <sub>2</sub> e	75.000 € total

<b>EC-021. Implementation of an energy control system in EMASESA buildings.</b>		
Scheme of action	Name of the action	Implementation of an energy control system in EMASESA buildings
	Type of action	Mitigation
	Description of the action	Centralized control system in a building that governs most of the building's main facilities. This type of system is based on computer applications that control and program the operation of the different building facilities. The main controls refer to air conditioning, ventilation or lighting. These systems incorporate probes for measuring the parameters to be controlled and allow the level and operating hours of the systems to be regulated according to the set parameters entered, achieving significant energy savings by reducing and controlling consumption.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.

EC-021. Implementation of an energy control system in EMASESA buildings.			
Implementation	Agencies/persons responsible for implementation	Seville City Council, EMASESA	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	75.8 tCO <sub>2</sub> e / year	303.2 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	148 € / tCO <sub>2</sub> e	45.000 € total

EC-022. "Free-Cooling" systems in municipal buildings and companies.		
Scheme of action	Name of the action	Free-Cooling Systems in Municipal Buildings and Enterprises
	Type of action	Mitigation
	Description of the action	Free-cooling is free cooling, which is based on using the cooling capacity of the outside air to renew and cool the indoor air of a room, which reduces the energy consumption of refrigeration equipment. The proposed measure consists of starting the ventilation of buildings that have air handling units around 7 a.m. so that the outside air enters the premises cooling it without activating the air conditioning system and thus limit the consumption of cooling energy during the early hours of the morning. The RITE requires that air-type ventilation subsystems, with a nominal power greater than 70

<b>EC-022. "Free-Cooling" systems in municipal buildings and companies.</b>			
		kW in the cooling regime, have a free outdoor air cooling subsystem. Free cooling systems, in addition to being an economical system, increase the flow of outdoor air that results in an improvement in indoor air quality.	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the study for the implementation of the measure is expected. In the medium term, the project is expected to have started.	
Implementation	Agencies/persons responsible for implementation	To be defined	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners, visitors	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: Not started.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	64 tCO <sub>2</sub> e / year	258 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	580 € / tCO <sub>2</sub> e	150.000 € total

<b>EC-023. Energy efficiency in swimming pools - use of sunlight.</b>		
Scheme of action	Name of the action	Energy efficiency in swimming pools - use of sunlight

EC-023. Energy efficiency in swimming pools - use of sunlight.			
	Type of action	Mitigation	
	Description of the action	Installation of equipment to take advantage of sunlight on the roofs of swimming pools, pavilions and sports halls, regulation that optimises the use of natural light together with sensory equipment that optimises the lighting according to the light level reached.	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management, Municipal Sports Institute	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, athletes, residents of Seville, visitors	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	38.10 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	170,000 € total

EC-024. Efficiency in pumping IMD installations.			
Scheme of action	Name of the action	Pumping efficiency in IMD installations	
	Type of action	Mitigation	
	Description of the action	Improved efficiency in pump equipment with the installation of variable speed drives.	
Reference to the impact pathway	Scope of Issuance	Building and heating	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management, Municipal Sports Institute	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, athletes, residents of Seville, visitors	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	16.2 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	85.000 €

EC-025. Energy efficiency in pool covering.		
Scheme of action	Name of the action	Energy efficiency in swimming pool covering
	Type of action	Mitigation
	Description of the action	Modification of swimming pool cover systems for annual use with more energy-efficient construction elements. Application to swimming pools with presstatic covers of the Torreblanca and Tiro de Línea sports centres. This is a measure aimed at extending the useful life of the structure, which will also provide greater energy efficiency (set according to the forecasts in the project reports).
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management, Municipal Sports Institute
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, athletes, residents of Seville, visitors
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Not applicable
	GHG Emission Reduction Estimate	14.25 tCO <sub>2</sub> e / year

<b>EC-025. Energy efficiency in pool covering.</b>			
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	750.000 €

<b>EC-026. Energy efficiency in sports centres.</b>		
Scheme of action	Name of the action	Energy efficiency in sports centres
	Type of action	Mitigation
	Description of the action	Increase in the performance of indoor equipment and systems (air conditioning, lighting and home automation) of municipal sports centres: replacement of T8 fluorescent equipment with T8 ECO, installation of presence detectors (motion sensor) for integrated operation in the home automation network, replacement of incandescent lamps with LED or OLED technology (organic diodes), renovation of autonomous air conditioning equipment to inverter technology or equivalent, etc.
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management, Municipal Sports Institute
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, athletes, residents of Seville, visitors
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

EC-026. Energy efficiency in sports centres.			
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	9.5 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	750.000 €

EC-027. Increased lighting efficiency in sports centres.		
Scheme of action	Name of the action	Increasing lighting efficiency in sports venues
	Type of action	Mitigation
	Description of the action	Increased performance of outdoor lighting equipment and systems. Provision of dual-level electronic ballasts in outdoor projection lighting in sports fields, luminous flux regulation equipment (headend or point-to-point) in sports centers with several large fields (Vega de Triana, "Charco de la Pava", Parque Amate, Alcosa, Parque de San Jerónimo and Los Caños de Torreblanca as a pilot plan).
Reference to the impact pathway	Scope of Issuance	Building and heating
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management, Municipal Sports Institute
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, athletes, residents of Seville, visitors

EC-027. Increased lighting efficiency in sports centres.			
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	5.9 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	150.000 € total

Electricity shares as a field of issuance

EL-001. Rehabilitation and improvement of energy efficiency in residential buildings.		
Scheme of action	Name of the action	Rehabilitation and improvement of energy efficiency in residential buildings
	Type of action	Mitigation
	Description of the action	With a stock of about 300,000 homes, Seville is promoting energy rehabilitation in residential buildings. This measure includes the installation of more efficient air conditioning systems, the use of renewable energies (such as solar photovoltaic), and the improvement of energy efficiency through the updating of insulation and heating systems. In addition, another initiative is the CAF Seville and UCI Agreement: The Association of Property Administrators of Seville has partnered with the financial institution UCI to provide specific lines of credit for the energy rehabilitation of old buildings (especially those built between the 70s and 90s). In this context, professional associations (such as the Technical Architects of Seville) function as private advice points to channel projects to specialised companies. Another project is Habitat Seville: A plan to intervene in 20 buildings (more than 2,000 homes) with an expected start in 2026. It includes thermal improvements in facades and roofs, and the installation of aérothermal and micro-cogeneration systems.
	Scope of Issuance	Electricity

EL-001. Rehabilitation and improvement of energy efficiency in residential buildings.			
Reference to the impact pathway	Systemic lever	Technology/infrastructure; Finance and financing	
	Result (according to module B-1.1)	In the short term, it is expected to reduce electricity consumption due to greater efficiency in the air conditioning system. In the long term, it is expected that the percentage of buildings built between the 70s and 90s that have energy rehabilitation will increase.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Seville Energy Agency, CAF Agreement	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: To start	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	87,723 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	250.000 €

EL-002. Energy rehabilitation of buildings in the tertiary sector.		
Scheme of action	Name of the action	Energy rehabilitation of buildings in the tertiary sector
	Type of action	Mitigation
	Description of the action	"The tertiary sector, which includes shops, offices and administrative buildings, is undergoing energy rehabilitation to improve energy efficiency. More efficient air conditioning systems will be installed, insulation will be improved and energy consumption will be optimised in these buildings, in order to reduce energy demand and associated emissions. Important note: By 2026, the private focus is very much on non-residential buildings (offices and shops), as new European directives require the worst energy performing buildings to be refurbished by 2030.

EL-002. Energy rehabilitation of buildings in the tertiary sector.		
		<p>The private sector is taking advantage of incentive lines (such as the Sustainable Construction Programme of the Andalusian Energy Agency) to:</p> <ul style="list-style-type: none"> <li>• Installation of renewable energies: Especially photovoltaic panels and aerothermal energy in service buildings and industrial estates. International certifications: A growing number of new private works in Seville are applying for seals such as BREEAM or LEED, which guarantee the sustainability of the building throughout its life cycle. Note: These actions are aligned with the "Seville Commitment" and the "Seville Platform for Action" (derived from the UN summit in 2025), which seek to catalyze private investment towards resilient and sustainable infrastructure."</li> </ul>
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Finance and financing
	Result (according to module B-1.1)	In the short term, improvements in the air conditioning of buildings are expected, as well as an increase in energy efficiency. In the long term, the percentage of buildings with BREEAM or LEED certifications is expected to increase
Implementation	Agencies/persons responsible for implementation	Andalusian Energy Agency, Seville City Council, EMVISESA
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local government, industry, property owners
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources

<b>EL-002. Energy rehabilitation of buildings in the tertiary sector.</b>			
	GHG Emission Reduction Estimate	10,003.65 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	240.0000 € total

<b>EL-003. Optimization of public lighting with LED technologies.</b>		
Scheme of action	Name of the action	Optimising street lighting with LED technologies
	Type of action	Mitigation
	Description of the action	Efficient street lighting systems are being implemented using LED technology and motion sensors. This will not only reduce energy consumption, but also decrease CO <sub>2</sub> emissions related to public lighting throughout the city.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, a reduction in local electricity consumption is expected, due to efficiency due to the use of LED technologies. In the long term, it is expected to have the two improvements, the use of LED lighting and sensors.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, residents of Seville, visitors, users of public and private transport
	Feedback on implementation	

EL-003. Optimization of public lighting with LED technologies.			
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	11,786.00 tCO <sub>2</sub> e / year	47,144.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	381 € / tCO <sub>2</sub> e	18.000.000 € total

EL-004. Seville e-City Project (Isla de la Cartuja): Energy rehabilitation of 62 buildings in the Cartuja Science and Technology Park (PCT).		
Scheme of action	Name of the action	Seville e-City Project (Isla de la Cartuja): Energy rehabilitation of 62 buildings in the Cartuja Science and Technology Park (PCT)
	Type of action	Mitigation
	Description of the action	<p>It is perhaps the most ambitious example of public-private collaboration. Led by entities such as the Andalusian Energy Agency and Endesa, it has the support of 47 private companies that manage 62 buildings in the Cartuja Science and Technology Park (PCT).</p> <ul style="list-style-type: none"> <li>• Objective: To get buildings to reduce their energy consumption by 35%.</li> <li>• Actions: Installation of 2MWp of photovoltaic for self-consumption, improvement of thermal envelopes (SATE) and digitalisation of electricity demand.</li> <li>• Innovation: Use of building facades for solar generation through technologies that win innovation challenges (companies such as Biren and Urbantech).</li> <li>• Objective 2026: For this year, the companies installed in the Cartuja are implementing solutions for shared self-consumption, digitalisation of networks (Smart Grids)</li> </ul>

EL-004. Seville e-City Project (Isla de la Cartuja): Energy rehabilitation of 62 buildings in the Cartuja Science and Technology Park (PCT).		
		<p>and smart lighting (1.5 million euros for lighting)</p> <ul style="list-style-type: none"> <li>• Sustainable Building: The private sector is rehabilitating office buildings to adapt them to a zero-emission model, using low-impact materials and efficient air conditioning systems.</li> </ul>
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Social innovation; Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, it is expected that the installation of photovoltaic solar panels will begin in the facilities, while in the long term the adaptation to a zero-emission model is expected
Implementation	Agencies/persons responsible for implementation	Andalusian Energy Agency and Endesa
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local government, industry, education
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources
	GHG Emission Reduction Estimate	TBD
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD

EL-005. Reduction of the consumption of various fuels.		
Scheme of action	Name of the action	Reduction of the consumption of various fuels
	Type of action	Mitigation
	Description of the action	Seville aims to reduce the consumption of fuels such as LPG, diesel, natural gas, butane, propane, fuel oil and coal. This decrease is expected thanks to the increase in electricity consumption, especially for refrigeration, domestic hot water and other domestic and industrial uses. The generation of renewable energy using solar energy (both for domestic hot water and photovoltaic) will be key to minimising dependence on these fossil fuels.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Social innovation; Learning and Skills
	Result (according to module B-1.1)	In the short term, the study of the proposed measure is expected. In the long term, the initiation of a project to reduce the consumption of various fuels is expected
Implementation	Agencies/persons responsible for implementation	Seville City Council, Andalusian Energy Agency, industrial sector
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, construction sector, residents of Seville, visitors
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Reduction of fossil fuel consumption
	GHG Emission Reduction Estimate	6,302.0 tCO <sub>2</sub> e / year      25,208.0 tCO <sub>2</sub> e total

EL-005. Reduction of the consumption of various fuels.		
	Total costs and costs per unit of CO <sub>2</sub> eq	1.190 € / tCO <sub>2</sub> e 30.000.000 € total

EL-006. Promotion of the circular economy in the energy sector.		
Scheme of action	Name of the action	Promoting the circular economy in the energy sector
	Type of action	Mitigation
	Description of the action	Seville will promote the circular economy in the energy sector through the reuse of recycled materials in construction and the creation of energy use systems from organic waste. This measure will reduce the carbon footprint and the demand for external energy, contributing to the transition to a more sustainable model.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Finance and financing; Social innovation; Learning and Skills
	Result (according to module B-1.1)	In the short term, more research is expected on the implementation of recycled materials in the construction sector. In the long term, a safe implementation of this measure is expected, with which a significant reduction in this sector will be achieved.
Implementation	Agencies/persons responsible for implementation	Seville City Council, EMVISESA, construction sector, research sector
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local government, residents of Seville, property owners
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Electrical energy from organic waste

<b>EL-006. Promotion of the circular economy in the energy sector.</b>			
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	3421.7 tCO <sub>2</sub> e / year	13,687.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	127,85 € / tCO <sub>2</sub> e	1.749.883 € total

<b>EL-007. Automation and home automation for efficient energy management.</b>		
Scheme of action	Name of the action	Automation and home automation for efficient energy management
	Type of action	Mitigation
	Description of the action	Promotion of the use of home automation and intelligent automation systems in buildings and facilities to optimise energy consumption (lighting, air conditioning and household appliances management) and reduce energy waste.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, it is expected to improve the control of consumption; In the medium term, reduce energy consumption in buildings.
Implementation	Agencies/persons responsible for implementation	Owners / managers
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Technology companies, users
	Feedback on implementation	

<b>EL-007. Automation and home automation for efficient energy management.</b>			
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	4,600 tCO <sub>2</sub> e / year	18,400 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	1.600 € / tCO <sub>2</sub> e	7,300,000 € total

<b>EL-008. Local electricity generation using photovoltaic solar energy.</b>		
Scheme of action	Name of the action	Local electricity generation using solar photovoltaics
	Type of action	Mitigation
	Description of the action	Seville will take advantage of its high solar radiation (2,898 hours of sunshine per year) to install photovoltaic solar panels on roofs, pergolas and car parks. This local electricity generation will be integrated into energy communities, enabling self-consumption networks in each district of the city. In addition, large-scale storage facilities will be developed to manage generation and the load curve, allowing for greater integration of solar energy into the urban electricity system.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Finance and financing; Social innovation; Learning and Skills
	Result (according to module B-1.1)	In the short term, an increase in the percentage of installation of photovoltaic solar panels on roofs, pergolas and car parks is expected. In the long term, it is expected that
Implementation	Agencies/persons responsible for implementation	Seville City Council, Andalusian Energy Agency, industrial sector

**EL-008. Local electricity generation using photovoltaic solar energy.**

	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, industrial sector, residents of Seville, visitors, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: To begin	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Replacing fossil-based electricity	
	GHG Emission Reduction Estimate	3,779.28 tCO <sub>2</sub> e / year	15,117.1 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€0.79 / tCO <sub>2</sub> e	€12,000 total

**EL-009. Launching new business models to remove the cost barrier for owners.**

Scheme of action	Name of the action	Launching new business models to remove the cost barrier for owners	
	Type of action	Mitigation	
	Description of the action	<p>Several energy service companies (ESCOs) in Seville are launching business models designed to remove the cost barrier for owners:</p> <ul style="list-style-type: none"> <li>• 100% financing: Companies such as EOS RenovAcción or Sur 37 offer renovations where the cost is assumed by the company or covered with subsidies (Next Generation), guaranteeing savings by contract.</li> <li>• Subsidy Management: The private sector now acts as a "rehabilitation agent", taking care of all the bureaucracy of public funds so that the community of neighbors does not have to advance capital or manage complex procedures.</li> </ul>	

EL-009. Launching new business models to remove the cost barrier for owners.			
Reference to the impact pathway	Scope of Issuance	Electricity	
	Systemic lever	Social innovation; Technology/infrastructure; Finance and financing	
	Result (according to module B-1.1)	TBD	
Implementation	Agencies/persons responsible for implementation	Next Generation UE, Seville City Council, EMVISESA	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, European funding projects, property owners	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	864.44 tCO <sub>2</sub> e / year	3,457.8 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	520 € / tCO <sub>2</sub> e	€1,798,030.0 total

EL-010. Integration of renewable energies in buildings.		
Scheme of action	Name of the action	Integrating Renewable Energy into Buildings
	Type of action	Mitigation
	Description of the action	Encouraging the installation of renewable energy systems in buildings, such as photovoltaic solar panels and small wind turbines, to reduce conventional energy consumption and increase energy self-sufficiency. It includes aid programmes (such as those of the Recovery, Transformation and Resilience Plan or regional pro-

<b>EL-010. Integration of renewable energies in buildings.</b>			
		jects), and local incentives for the implementation of self-consumption with batteries. A good example is the INEA Programme: Grants of at least €6,000 for the installation of solar panels with storage (batteries) in private homes.	
Reference to the impact pathway	Scope of Issuance	Electricity	
	Systemic lever	Finance and financing	
	Result (according to module B-1.1)	In the short term, it is expected to increase self-consumption installations; in the medium term, increase the energy self-sufficiency of buildings.	
Implementation	Agencies/persons responsible for implementation	City Council, Junta de Andalucía, State	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Owners, installation companies	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy, wind energy	
	Energy removed/replaced, volume or type of fuel	Replacing fossil-based electricity	
	GHG Emission Reduction Estimate	3,100 tCO <sub>2</sub> e / year	12,400.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	3.900 € / tCO <sub>2</sub> e	12.000.000 € total

<b>EL-011. Savings plan in the Public Administration (2022-2026).</b>		
Scheme of action	Name of the action	Savings Plan in the Public Administration (2022-2026)
	Type of action	Mitigation

EL-011. Savings plan in the Public Administration (2022-2026).			
	Description of the action	<p>The Regional Government of Andalusia has allocated 117 million euros to reduce the electricity consumption of its headquarters in Seville and the rest of the community by 12% by 2026.</p> <p>Building refurbishment: Action is being taken on public buildings to achieve energy certification A (almost zero consumption). An example is the headquarters of the Andalusian Energy Agency.</p> <p>Self-consumption: Massive installation of photovoltaic panels in administrative centres and schools.</p> <p>Smart management: Optimisation of contracted powers and good practice manuals for public employees.</p>	
Reference to the impact pathway	Scope of Issuance	Electricity	
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing; Learning and Skills	
	Result (according to module B-1.1)	Consult	
Implementation	Agencies/persons responsible for implementation	Regional Government of Andalusia	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	729.20 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year <i>value</i> per project lifetime. (total tCO <sub>2</sub> e)

EL-011. Savings plan in the Public Administration (2022-2026).			
	Total costs and costs per unit of CO2eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	To be defined

EL-012. Placement of voltage regulators in headlands.			
Scheme of action	Name of the action	Placement of voltage regulators in headlands	
	Type of action	Mitigation	
	Description of the action	Reduction of electrical energy consumption by introducing voltage regulators at the head of the installation.	
Reference to the impact pathway	Scope of Issuance	Electricity	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Seville Energy and Sustainability Agency	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	2,076.07 tCO <sub>2</sub> e / year	8,304.3 tCO <sub>2</sub> e total

EL-012. Placement of voltage regulators in headlands.			
	Total costs and costs per unit of CO <sub>2</sub> eq	1,6 € / tCO <sub>2</sub> e	13.286 € total

EL-013. Installation of energy storage systems.		
Scheme of action	Name of the action	Installation of energy storage systems
	Type of action	Mitigation
	Description of the action	In order to improve the integration of renewable energy into the city's electricity distribution system, large-scale energy storage systems will be installed. This will make it possible to better manage peak demand and regulate photovoltaic generation, ensuring a more stable and efficient distribution of locally generated electricity.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Finance and financing; Social innovation; Learning and Skills
	Result (according to module B-1.1)	In the short term, the study of the proposed measure is expected. In the long term, the initiation of a project for the installation of energy storage systems is expected.
Implementation	Agencies/persons responsible for implementation	Seville City Council, Andalusian Energy Agency, industrial sector
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration, industrial sector, residents of Seville, visitors, property owners
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

EL-013. Installation of energy storage systems.			
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	637 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year <i>value</i> per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total (€ / tCO <sub>2</sub> e)	TBD

EL-014. Photovoltaic pergolas.		
Scheme of action	Name of the action	Photovoltaic pergolas
	Type of action	Mitigation
	Description of the action	Installation of photovoltaic pergolas in public and private spaces to generate renewable solar energy. These structures, in addition to producing clean energy, provide shade in car parks, parks and pedestrian areas, reducing the city's energy consumption and promoting distributed generation.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, it is expected to install new solar generation surfaces; In the medium term, increase renewable distributed generation.
Implementation	Agencies/persons responsible for implementation	City Council, private sector
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Companies, citizens

EL-014. Photovoltaic pergolas.			
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Replacing fossil-based electricity	
	GHG Emission Reduction Estimate	590 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year <i>value</i> per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total (€ / tCO <sub>2</sub> e)	900.000 € total

EL-015. Energy rehabilitation of municipal buildings.		
Scheme of action	Name of the action	Energy rehabilitation of municipal buildings
	Type of action	Mitigation
	Description of the action	The Seville City Council is carrying out a process of energy rehabilitation of municipal buildings. This includes upgrading the thermal envelope of buildings, installing renewable energy systems, and upgrading HVAC infrastructure to reduce energy consumption and CO <sub>2</sub> emissions. It includes the development and implementation of an energy saving and efficiency action plan in TUS-SAM's offices, garages and workshops, with the incorporation of more efficient lighting, improved air conditioning and insulation.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Politics and governance; Finance and financing
	Result (according to module B-1.1)	In the short term, the initiation of intervention of buildings is expected, while in the long term a decrease in the percentage of buildings in need of rehabilitation is expected

EL-015. Energy rehabilitation of municipal buildings.			
Implementation	Agencies/persons responsible for implementation	Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration, residents of Seville, visitors	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	At least 273.5 tCO <sub>2</sub> e/year for solar energy generation and self-consumption	tCO <sub>2</sub> e/year <i>value</i> per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> e	€ total between <i>tCO<sub>2</sub>e total</i> . (€ / tCO <sub>2</sub> e)	TBD

EL-016. Sustainable Mercasevilla.		
Scheme of action	Name of the action	Sustainable Mercasevilla
	Type of action	Mitigation
	Description of the action	An investment of 4.66 million euros has been planned for 2026 for the modernization of electrical infrastructures, operational efficiency and improvement of waste management.
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/infrastructure; Finance and financing
	Result (according to module B-1.1)	In the short term, the start of the project is expected, in the long term
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM (Waste Management) and municipal energy companies.
	Scale of action and target entities	Municipal - citizenship

EL-016. Sustainable Mercasevilla.			
	Actors involved	Local administration, residents of Seville, visitors	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	27.25 tCO <sub>2</sub> e / year	109.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	398 € / tCO <sub>2</sub> e	43.488 € total

EL-017. Solar thermal collectors for ACS auxiliary parks		
Scheme of action	Name of the action	Solar thermal collectors for ACS auxiliary parks
	Type of action	Mitigation
	Description of the action	The objective is to heat water by capturing maximum solar radiation. Solar thermal energy is proving to be the most economical and environmentally friendly hot water production system of all those currently in existence. The main benefit is the reduction of CO <sub>2</sub> emissions. The production of domestic hot water (DHW) is the main application of solar thermal energy, due to the low preparation temperatures and the homogeneity of its consumption throughout the year. The Technical Building Code requires that in new buildings and in the rehabilitation of existing ones there is a minimum contribution of solar energy to cover the energy needs of DHW
Reference to the impact pathway	Scope of Issuance	Electricity
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the study for the implementation of the measure is expected. In the medium term, the project is expected to have started.
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local government, industry
	Feedback on implementation	Action considered in the updating of the PACES document. Status: Not started.
Impacts and costs	Renewable energy generated (if applicable)	Solar Energy

EL-017. Solar thermal collectors for ACS auxiliary parks			
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	68.3 tCO <sub>2</sub> e / year	273.2 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	139 € / tCO <sub>2</sub> e	€37,974.8 total

EL-018. 100 kW Solar Plant for Self-Consumption			
Scheme of action	Name of the action	100 kW Solar Plant for Self-Consumption	
	Type of action	Mitigation	
	Description of the action	Solar plant in the Metrocentro depots, 100 kW for self-consumption	
Reference to the impact pathway	Scope of Issuance	Electricity	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the study for the implementation of the measure is expected. In the medium term, the project is expected to have started.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Tussam	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: Not started.	
Impacts and costs	Renewable energy generated (if applicable)	Photovoltaic solar energy	
	Energy removed/replaced, volume or type of fuel	Fossil fuel substitution	
	GHG Emission Reduction Estimate	67.5 tCO <sub>2</sub> e / year	270.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	658 € / tCO <sub>2</sub> e	€177,660.0 total

EL-019. Replacement of traditional design streetlights		
Scheme of action	Name of the action	Replacement of traditional design streetlights
	Type of action	Mitigation

EL-019. Replacement of traditional design streetlights			
	Description of the action	Reduction of electricity consumption by replacing traditional design lanterns, with four transparent or translucent faces, with low light performance and a high degree of light pollution, with more efficient ones.	
Reference to the impact pathway	Scope of Issuance	Electricity	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Urban Planning and Environment Management	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: Started	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	56.25 tCO <sub>2</sub> e / year	225 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	1.130 € / tCO <sub>2</sub> e	254.346 €

Actions on waste as an area of emission

RE-001. Energy recovery from non-recyclable waste.		
Scheme of action	Name of the action	Energy recovery from non-recyclable waste
	Type of action	Mitigation
	Description of the action	The energy recovery of non-recyclable waste will be carried out, which will allow a reduction of 140,000 tCO <sub>2</sub> eq/year. This measure aims to recover energy from waste that cannot be recycled, converting it into electricity and heat, reducing the amount of waste deposited in landfills.
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the technological implementation of energy recovery systems is expected. In the

RE-001. Energy recovery from non-recyclable waste.			
		medium term, it is expected to achieve full operability that allows the reduction of 140,000 tCO <sub>2</sub> eq/year, drastically minimizing dependence on landfills and generating secondary energy.	
Implementation	Agencies/persons responsible for implementation	LIPASAM, Seville City Council and recovery plant managers	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Power plant operators, Red Eléctrica de España (REE), environmental agencies and thermal technology companies.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Generation of electrical and thermal energy from waste	
	Energy removed/replaced, volume or type of fuel	Reduction of electrical energy generated with fossil fuels	
	GHG Emission Reduction Estimate	28,000.00 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year <i>value</i> per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	142 € / tCO <sub>2</sub> e	TBD

RE-002. Waste management at the Montemarta-Cónica Waste Treatment Centre.		
Scheme of action	Name of the action	Waste management at the Montemarta-Cónica Waste Treatment Centre
	Type of action	Mitigation
	Description of the action	At the Montemarta-Cónica Waste Treatment Centre, owned by ABORGASE, several activities are carried out to treat waste efficiently. 100 hectares are managed dedicated to recycling, waste treatment, biogas and tires, with a focus on reducing emissions and improving sustainability in the treatment of urban waste.
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the optimization of the segregation and recovery processes in the center is expected. In the medium term, it is expected that the infrastructures will operate under maximum efficiency standards, reducing the environmental

<b>RE-002. Waste management at the Montemarta-Cónica Waste Treatment Centre.</b>		
		impact and emissions associated with the treatment of waste in the area.
Implementation	Agencies/persons responsible for implementation	ABORGASE (owner) in coordination with the Commonwealth and the Seville City Council.
	Scale of action and target entities	Municipal - citizenship
	Actors involved	ABORGASE, LIPASAM, energy recovery companies.
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Biogas
	Energy removed/replaced, volume or type of fuel	Substitution of grid electricity and fossil fuels
	GHG Emission Reduction Estimate	4,903.74 tCO <sub>2</sub> e / year      19,615.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD

<b>RE-003. New municipal solid waste (MSW) treatment line.</b>		
Scheme of action	Name of the action	New municipal solid waste (MSW) treatment line
	Type of action	Mitigation
	Description of the action	<p>The implementation of a new waste treatment line will allow urban waste to be processed more efficiently, resulting in a reduction of 21,000 tCO<sub>2</sub>eq/year. This improvement in treatment processes optimises waste recovery and minimises emissions. Seville is going through a phase of profound modernisation in its cleaning and waste management system, led mainly by LIPASAM and framed in Law 7/2022 on waste and contaminated soil.</p> <p>For 2026, the key actions focus on infrastructure renewal, digitalisation and compliance with the European circular economy objectives.</p>
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the completion of the installation and commissioning of the new treatment line is expected. In the medium term, it is expected to achieve optimal operability that allows the reduction

RE-003. New municipal solid waste (MSW) treatment line.			
		of 21,000 tCO <sub>2</sub> eq/year, significantly improving the city's recovery rates.	
Implementation	Agencies/persons responsible for implementation	LIPASAM (Municipal Cleaning Company of Seville) and Seville City Council.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	LIPASAM, waste treatment technology companies	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Substitution of grid electricity and fossil fuels	
	GHG Emission Reduction Estimate	2,100 tCO <sub>2</sub> e / year	8,400.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	€297.61 / tCO <sub>2</sub> e	2.500.000 € total

RE-004 Digitalisation and optimisation of wastewater management.		
Scheme of action	Name of the action	Digitalization and optimization of wastewater management
	Type of action	Mitigation
	Description of the action	<p>EMASESA (Metropolitan Water Supply and Sanitation Company of Seville) is carrying out a digital transformation to optimise water use and improve the capacity to respond to extreme weather events such as droughts and floods. The use of advanced monitoring and control technologies will improve efficiency in the management of the integral water cycle. Seville has launched a historic transformation of its sanitation system, with an investment horizon that exceeds 240 million euros for the coming years (Plan 2024-2027). The strategy, led by EMASESA, seeks to ensure that wastewater ceases to be waste and becomes usable resources under a circular economy model.</p> <p>Below are the key actions planned and in execution for 2026:</p> <p>1. Transformation of treatment plants into "Biofactories"</p> <p>The aim is for Wastewater Treatment Plants (WWTPs) to be self-sufficient and generate value: Energy Neutrality: Thermal hydrolysis and co-digestion processes of waste are being expanded to</p>

**RE-004 Digitalisation and optimisation of wastewater management.**

		<p>produce biogas, transforming the plants into net energy producers.</p> <p>Production of "Green Gold": Sewage sludge no longer goes to landfills; They are mixed with pruning waste to create high-quality compost for agriculture and green areas.</p> <p>Reclaimed Water: Projects such as the Ranilla Basin (budgeted for 2025-2026) seek to ensure that treated water is systematically used for the irrigation of parks (such as Miraflores or the Ciudad Deportiva del Sevilla F.C.) and street washing, saving drinking water.</p> <p>2. Major Infrastructures and Renovation</p> <p>The most important hydraulic work in the last four decades in the city is being executed: Adaptation of the Port Outfall Collector: An investment of more than 60 million euros to renovate the main collector, increasing its capacity and useful life.</p> <p>New Pumping Stations (EBAP): The construction of the EBAP Tamarguillo stands out, essential to improve flow management and avoid accidental discharges.</p> <p>Network Modernisation: For 2026, EMASESA has budgeted 50.99 million euros specifically for the renovation of general infrastructures and municipal networks.</p> <p>3. Digitalization: "CREANDO" and "Digital Reservoir 5.0" projects</p> <p>Technology is the pillar for resilient management in the face of climate change:</p> <p>CREANDO Project: Focused on the digitalisation of sanitation to monitor discharges in real time and optimise the operation of treatment plants through Artificial Intelligence.</p> <p>Flood Control: Implementation of sensors in the sewer network to anticipate the response to torrential rains and prevent the collapse of the system.</p> <p>4. Protection of the Natural Environment</p> <p>The actions not only look at the city, but also at its environmental impact:</p> <p>Doñana Environment: The treatment plants in municipalities in the metropolitan area (such as Isla Mayor and Gerena) are being completed and improved to ensure that the water returned to the Guadalquivir environment meets the strictest European standards, thus protecting the Doñana ecosystem.</p>
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the execution of the works to adapt the collector and the implementation of real-time

<b>RE-004 Digitalisation and optimisation of wastewater management.</b>			
		monitoring sensors is expected. In the medium term, it is expected to achieve energy self-sufficiency of the plants, the elimination of sludge discharges to landfill and management of the water cycle in the face of extreme weather events.	
Implementation	Agencies/persons responsible for implementation	EMASESA (Metropolitan Water Supply and Sanitation Company of Seville).	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	EMASESA, Seville City Council	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: To start	
Impacts and costs	Renewable energy generated (if applicable)	Biogas	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	12,200 tCO <sub>2</sub> e / year	48,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	19.700 € / tCO <sub>2</sub> e	125.000 €

<b>RE-005. Treatment of the selective organic fraction.</b>		
Scheme of action	Name of the action	Treatment of the selective organic fraction
	Type of action	Mitigation
	Description of the action	Implementation and optimisation of the selective collection of the organic fraction (bio-waste) through the use of the brown container in all districts of Seville, with the aim of improving the separation at source of food waste and pruning and allocating them to biological treatment and recovery through composting. The measure includes the reinforcement of collection services, public awareness campaigns to reduce improper waste (such as diapers or wipes) and quality control actions of the waste collected, in order to improve the performance of the treatment and increase the amount of organic matter recovered. This action is key to reducing the emissions associated with the dumping of organic waste, with an estimated reduction of up to 45,000 tCO <sub>2</sub> eq/year thanks to the

<b>RE-005. Treatment of the selective organic fraction.</b>			
		improvement in the selective collection and adequate treatment of biowaste.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, increase the correct separation of organic; in the medium term, significantly reduce emissions from treatment/landfill with an expected reduction of 45,000 tCO <sub>2</sub> eq/year.	
Implementation	Agencies/persons responsible for implementation	LIPASAM	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Citizenship; Picking Equipment	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	548 tCO <sub>2</sub> e / year	2,192 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	235 € / tCO <sub>2</sub> e	515.250 € total

<b>RE-006. Recovery and use of landfill biogas.</b>		
Scheme of action	Name of the action	Recovery and use of landfill biogas
	Type of action	Mitigation

<b>RE-006. Recovery and use of landfill biogas.</b>			
	Description of the action	Recovery of the biogas produced at the Cónica Montemarta landfill for electricity generation. The city of Seville contributes 50% of the waste.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Electrical energy through biogas	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	9,008 tCO <sub>2</sub> e / year	36,032.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD	

<b>RE-007. Improvement of energy efficiency in the water cycle.</b>		
Scheme of action	Name of the action	Improving energy efficiency in the water cycle
	Type of action	Mitigation
	Description of the action	EMASESA implements technologies to improve energy efficiency in its treatment plants, using renewable sources such as hydropower, photovoltaic and biogas. These actions contribute to

RE-007. Improvement of energy efficiency in the water cycle.			
		reducing the carbon footprint in wastewater treatment, increasing the sustainability of the facilities.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the installation of photovoltaic panels and hydraulic turbines is expected at strategic points in the grid. In the medium term, the facilities are expected to reach a high share of renewable self-consumption, reducing dependence on fossil sources.	
Implementation	Agencies/persons responsible for implementation	EMASESA (Metropolitan Water Supply and Sanitation Company of Seville).	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	EMASESA, renewable technology providers.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Hydraulic, Photovoltaic and Biogas	
	Energy removed/replaced, volume or type of fuel	Reduction of electricity consumption generated from non-renewable sources	
	GHG Emission Reduction Estimate	71 tCO <sub>2</sub> e / year	284 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	528 € / tCO <sub>2</sub> e	150.000 € total

RE-008. Digitalisation of waste management.		
Scheme of action	Name of the action	Digitalisation of waste management
	Type of action	Mitigation
	Description of the action	Seville benefits from a regional investment of more than 5.7 million euros from the Junta de Andalucía aimed at strengthening the digitalisation and modernisation of waste management. This investment takes the form of, among other actions: <ul style="list-style-type: none"> <li>• Traceability: Digitalisation of management systems to know in real time the production,</li> </ul>

RE-008. Digitalisation of waste management.		
		<p>collection and treatment of waste, improving control, transparency and efficiency of the service.</p> <ul style="list-style-type: none"> <li>• Planet Plan: Participation of the city in the network to improve Transfer Stations, with the aim of optimising the transfer of waste to treatment plants, reducing costs, emissions and the environmental impact of transport.</li> </ul>
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, real-time information on the production and treatment of waste is expected to be available through digital traceability systems. In the medium term, an improvement in the efficiency of the transfer of waste to treatment plants is expected thanks to the optimization of Transfer Stations, reducing environmental impacts associated with transport and management.
Implementation	Agencies/persons responsible for implementation	LIPASAM
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Waste Management Services
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Reducing the consumption of non-renewable fuels in waste collection and transport operations
	GHG Emission Reduction Estimate	1,500.0 tCO <sub>2</sub> e / year      6,000.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	> €5.7 million (regional investment). For 10 years (≈ 9,000 tCO <sub>2</sub> ).

<b>RE-009. Renovation of the Container Park.</b>			
Scheme of action	Name of the action	Renewal of the Container Park	
	Type of action	Mitigation	
	Description of the action	Execution of an investment plan of 17 million euros for the progressive renovation of Seville's container fleet until 2029, with the aim of replacing up to 18,000 units, which represents approximately 90% of the city's side-loading container fleet. The new containers incorporate a design without pedal or manual opening, aimed at improving hygiene, facilitating use by citizens and reducing the abandonment of bags outside the deposits. This measure seeks to modernize the collection infrastructure, unify the urban image and improve the efficiency and quality of the service.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, progressive replacement of the fleet; In the medium term, improvement of urban hygiene and optimisation of collection by reducing abandonment outside the container.	
Implementation	Agencies/persons responsible for implementation	LIPASAM and Seville City Council.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	LIPASAM, container manufacturers, urban maintenance services and citizens.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	687 tCO <sub>2</sub> e / year	2,748 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	2.154 € / tCO <sub>2</sub> e	5.920.000 € total

<b>RE-010. Recovery of non-recyclable plastics.</b>		
Scheme of action	Name of the action	Recovery of non-recyclable plastics

<b>RE-010. Recovery of non-recyclable plastics.</b>			
	Type of action	Mitigation	
	Description of the action	The recovery of non-recyclable plastics will reduce emissions by 4,546 tCO <sub>2</sub> eq/year. This process involves converting plastics that cannot be recycled into energy, thus contributing to the reduction of waste in landfills and the generation of energy from non-fossil sources.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the optimization of the processes of classification and energy recovery of the rejected plastic fraction is expected. In the medium term, it is expected to achieve a reduction of 4,546 tCO <sub>2</sub> eq/year, minimizing the volume of waste destined for landfill.	
Implementation	Agencies/persons responsible for implementation	LIPASAM and Seville City Council.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Hazardous/non-hazardous waste managers, energy industries, plastics manufacturers and incineration or pyrolysis plants.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Fossil fuel substitution	
	GHG Emission Reduction Estimate	1,136.50 tCO <sub>2</sub> e / year	4,546.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD	

<b>RE-011. Injection of biomethane into the grid.</b>			
Scheme of action	Name of the action	Injection of biomethane into the grid	
	Type of action	Mitigation	
	Description of the action	The biomethane generated in the waste treatment will be injected into the natural gas network, contributing to a reduction of 1,786 tCO <sub>2</sub> eq/year. This action makes it possible to take advantage of biogas as a renewable energy source, reducing the	

<b>RE-011. Injection of biomethane into the grid.</b>			
		emissions associated with conventional natural gas production.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the enrichment plant will be put into operation and connected to the grid. In the medium term, it is expected to achieve a constant injection that results in a reduction of 1,786 tCO <sub>2</sub> eq/year, allowing biogas to be used as a renewable energy source, reducing the emissions associated with conventional natural gas production.	
Implementation	Agencies/persons responsible for implementation	LIPASAM (Seville), gas network operators and Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Energy companies, biogas purification technologists, guarantee of origin certification bodies.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Biomethane	
	Energy removed/replaced, volume or type of fuel	Natural Gas	
	GHG Emission Reduction Estimate	1786 tCO <sub>2</sub> e / year	7,144 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	2.800 € / tCO <sub>2</sub> e	5.000.000 €

<b>RE-012. Hybridization of generation with biogas and photovoltaic engines.</b>			
Scheme of action	Name of the action	Generation hybridization with biogas and photovoltaic engines	
	Type of action	Mitigation	
	Description of the action	The hybridization of energy generation through the use of biogas and photovoltaic energy will reduce emissions by 1,020 tCO <sub>2</sub> eq/year. This innovative approach combines energy recovery from organic waste and the harnessing of solar energy, offering a sustainable solution for electricity production.	

**RE-012. Hybridization of generation with biogas and photovoltaic engines.**

Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the technical infrastructure necessary to integrate biogas engines with photovoltaic installations is expected to be commissioned. In the medium term, it is expected to achieve the full operation of the hybrid system, achieving a stable and 100% renewable electricity production that will meet the objective of reducing emissions by 1,020 tCO <sub>2</sub> eq/year through the joint use of organic waste and solar resources.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM (Waste Management) and municipal energy companies.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Waste managers, solar technology providers, energy engineering companies and electricity grid operators.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Biogas and Photovoltaic	
	Energy removed/replaced, volume or type of fuel	Replacing fossil-based electricity	
	GHG Emission Reduction Estimate	255.00 tCO <sub>2</sub> e / year	1,020.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	2.940 € / tCO <sub>2</sub> e	3.000.000 € total

**RE-013. Adaptation of the collection system to separate collection of biowaste.**

Scheme of action	Name of the action	Adaptation of collection to separate collection of biowaste
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<b>RE-013. Adaptation of the collection system to separate collection of biowaste.</b>			
	Type of action	Mitigation	
	Description of the action	Once the collection of biowaste in food markets has been launched, the implementation of the system will continue, once the results have been assessed, extending it to the rest of the city.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	The measure is in execution. In the long term, it is expected to have the measure implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners, visitors	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: In development.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	887 tCO <sub>2</sub> e / year	3,549 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	52 € / tCO <sub>2</sub> e	185.109 €

<b>RE-14. Special plans and recycling in Events.</b>		
Scheme of action	Name of the action	Special plans and recycling in Events

**RE-14. Special plans and recycling in Events.**

	Type of action	Mitigation	
	Description of the action	LIPASAM develops special cleaning and waste management devices during large events, such as the April Fair. This plan reinforces the collection of differentiated waste (light packaging, glass, paper/cardboard and the rest), enables specific container points and distributes bags and litter bins to facilitate separation at source. It is accompanied by awareness campaigns together with Ecoembes to promote the circular economy in the management of waste generated in the booths.	
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, it is expected to strengthen selective collection and separation at source during high-traffic events through special devices and awareness campaigns; In the medium term, it is expected to improve the rates of differentiated collection and recovery of waste generated at events.	
Implementation	Agencies/persons responsible for implementation	LIPASAM (in collaboration with Ecoembes for awareness campaigns)	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	LIPASAM, Ecoembes, booth organizers, citizens	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	92.0 tCO <sub>2</sub> e / year	371 tCO <sub>2</sub> e total

<b>RE-14. Special plans and recycling in Events.</b>		
	Total costs and costs per unit of CO2eq	TBD

<b>RE-015. Community composting in urban gardens.</b>		
Scheme of action	Name of the action	Community composting in urban gardens
	Type of action	Mitigation
	Description of the action	Promotion of community composting in urban gardens and participatory spaces in the city to promote the reduction of organic waste at source and the local production of quality compost. The measure seeks to ensure that the users of the orchards themselves, together with the municipal coordination, manage biowaste (plant and organic remains) through small-scale composting facilities, promoting the circular economy, environmental education and awareness of the separation of biowaste.
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Social innovation
	Result (according to module B-1.1)	In the short term, diverting part of the organic fraction to local composting; in the medium term, improve soils and reduce waste managed by the conventional system.
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Citizenship
	Feedback on implementation	Not applicable

<b>RE-015. Community composting in urban gardens.</b>			
Impacts and costs	Renewable energy generated (if applicable)	15,596 kWh/year for each composter	
	Energy removed/replaced, volume or type of fuel	Action considered in the updating of the PACES document. Status: Not started	
	GHG Emission Reduction Estimate	461 tCO <sub>2</sub> e / year	1,844 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	353 € / tCO <sub>2</sub> e	651.000 € total

<b>RE-016. Implementation of containerised collection of domestic oil.</b>		
Scheme of action	Name of the action	Implementation of containerised collection of domestic oil
	Type of action	Mitigation
	Description of the action	Carry out the collection of domestic oil, adapting it to the new Municipal Ordinance, to deliver it to an authorised manager for recovery.
Reference to the impact pathway	Scope of Issuance	Waste
	Systemic lever	Technology/infrastructure; Social innovation
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Local administration
	Feedback on implementation	

**RE-016. Implementation of containerised collection of domestic oil.**

Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	105.9 tCO <sub>2</sub> e / year	423.6 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	425 € / tCO <sub>2</sub> e	180.000 € total

**RE-017. Installation of smart glass containers.**

Scheme of action	Name of the action	Smart Glass Container Installation
	Type of action	Mitigation
	Description of the action	<p>Application of intelligent systems to the city's glass containers to improve the efficiency and sustainability of their management, since 65% of the containers destined for glass containers are emptied with very little glass (when they are only 25% full). This is a measure based on the Life Ewas project that consists of the use of efficient and sustainable methodologies for waste management through the use of ICT tools that reduce polluting emissions. The technology applied is based on laser sensors installed inside that transmit in real time the filling information (the optimal level is that they are at 80% of their capacity) to software and a platform developed by Wellness Smart Cites &amp; Solutions. This information allows the frequency of collection routes to be readjusted and better planned to reduce economic and environmental costs. Project estimates indicate that the need for glass collection with these sensors is being reduced by 66% in containers, going from 100 services per year to 34, trucks circulate 400 hours less and collection routes go from three out of every 12 days to one out of every seven. with the savings in fuel and noise that it entails. All in all, its installation means fewer truck routes, less fuel expenditure, and less pollution overall.</p>

<b>RE-017. Installation of smart glass containers.</b>			
Reference to the impact pathway	Scope of Issuance	Waste	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	The measure is in execution. In the long term, it is expected to have the measure implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, LIPASAM	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, residents of Seville, property owners, visitors	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Recovering data. Wait a few seconds and try to cut or copy again.	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	6.4 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year <i>value</i> per project lifetime. (total tCO <sub>2</sub> e)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	185.000 € total

Actions in offsetting emissions as an emission scope

<b>CE-001. Collaboration with companies for the compensation of emissions.</b>		
Scheme of action	Name of the action	Collaboration with companies for emissions offsetting
	Type of action	Mitigation
	Description of the action	Promotion of alliances with local, national and international companies to implement CO <sub>2</sub> emissions

CE-001. Collaboration with companies for the compensation of emissions.			
		compensation schemes through the purchase of carbon credits, reforestation projects, renewable energies or other mitigation actions in Seville and its surroundings. The measure seeks to facilitate business participation in meeting municipal climate objectives.	
Reference to the impact pathway	Scope of Issuance	Emissions Offsetting	
	Systemic lever	Policy and governance	
	Result (according to module B-1.1)	In the short term, it is expected to formalize collaboration agreements with companies for the compensation of emissions; In the medium term, the volume of emissions offset by the private sector in the city is expected to increase.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, in collaboration with private entities	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Companies; Local administration	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	3,200.0 tCO <sub>2</sub> e/year	12,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	156 €/tCO <sub>2</sub> e	2.000.000 € total

CE-002. Carbon footprint registration and offsetting in the business sector.		
Scheme of action	Name of the action	Carbon footprint registration and offsetting in the business sector
	Type of action	Incorporation of more than 50 companies in Seville in the Register of carbon footprint, compensation and GHG absorption projects of the Government of Spain. This municipal measure articulates collaboration with companies to register, reduce and offset their emissions, contributing to the mitigation of climate change and the city's climate objectives.
	Description of the action	Mitigation
Reference to the impact pathway	Scope of Issuance	Emissions Offsetting
	Systemic lever	Policy and governance
	Result (according to module B-1.1)	In the short term, the participation of more than 50 companies in the official registry is consolidated; In the medium term, it is expected to improve the measurement, reduction and compensation of emissions from the business fabric.
Implementation	Agencies/persons responsible for implementation	Companies; Government of Spain (registry management)
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Companies
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Not applicable
	GHG Emission Reduction Estimate	3125.0 tCO <sub>2</sub> e/year

CE-002. Carbon footprint registration and offsetting in the business sector.			
	Total costs and costs per unit of CO <sub>2</sub> eq	32 €/tCO <sub>2</sub> e	400.000 € total

CE-003. "Forests for Cities" project.		
Scheme of action	Name of the action	"Forests for Cities" Project
	Type of action	Mitigation
	Description of the action	In collaboration with the University of Seville, work is being done on a scientific management model to: Optimize absorption: Increase the sink capacity of current green spaces by up to 36% through soil management techniques and selection of species according to their photosynthetic efficiency under the Seville climate. Relevant fact: Seville is currently the fifth city in Spain with the most square metres of green area per inhabitant (11.27), and the aim is to get closer to the standards of leading cities such as Vitoria-Gasteiz by the end of the decade.
Reference to the impact pathway	Scope of Issuance	Emissions Offsetting
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the scientific model will be validated to identify the most efficient species and soil improvement pilots will be initiated in key parks. In the medium term, it will be possible to increase the CO <sub>2</sub> capture capacity of the current green infrastructure by 36%, bringing Seville closer to the European standards of excellence (green m <sup>2</sup> /inhabitant ratio) of cities such as Vitoria-Gasteiz.
Implementation	Agencies/persons responsible for implementation	Seville City Council
	Scale of action and target entities	Municipal - citizenship

CE-003. "Forests for Cities" project.			
	Actors involved	Parks and Gardens Services	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	650.0 tCO <sub>2</sub> e / year	2600.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD	

CE-004. Municipal badge for companies committed to the environment.		
Scheme of action	Name of the action	Municipal badge for companies committed to the environment
	Type of action	Mitigation
	Description of the action	Implementation of a municipal badge or seal that publicly recognises companies with verifiable actions to reduce and offset their carbon footprint and implement environmentally responsible practices. This distinction aims to encourage business participation in sustainability and promote the competitive positioning of companies committed to mitigating climate change.
Reference to the impact pathway	Scope of Issuance	Emissions Offsetting
	Systemic lever	Policy and governance
	Result (according to module B-1.1)	In the short term, it is expected to encourage business adhesion through public recognition; In the medium term, the number of companies involved in offsetting and reducing emissions is expected to increase.

<b>CE-004. Municipal badge for companies committed to the environment.</b>			
Implementation	Agencies/persons responsible for implementation	Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Companies	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	625.0 tCO <sub>2</sub> e / year	2500.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	80 € / tCO <sub>2</sub> e	200.000 € total

<b>CE-015. Identification of spaces and projection of green areas in vertical gardening in Seville.</b>		
Scheme of action	Name of the action	Identification of spaces and projection of green areas in vertical gardening in Seville
	Type of action	Mitigation
	Description of the action	Inventory of scenarios in which it is possible to place structures and supports for the provision of green spaces following the new concept of vertical gardening. After the inventory, it is a matter of designing these spaces using models, carrying out at least one demonstration project to determine the viability of this innovation. This would increase the city's green area, with species capable of contributing as CO <sub>2</sub> sinks.
	Scope of Issuance	Emissions Offsetting

CE-015. Identification of spaces and projection of green areas in vertical gardening in Seville.			
Reference to the impact pathway	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the start of the project is expected. In the medium term, the measure is expected to be implemented.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Parks and gardens	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local administration	
	Feedback on implementation	Action considered in the updating of the PACES document. Status: to begin.	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	112.5 tCO <sub>2</sub> e / year	450.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	277 € / tCO <sub>2</sub> e	125.000 € total

CE-016. Network of neighbourhood "green lungs".		
Scheme of action	Name of the action	Network of neighbourhood "green lungs"
	Type of action	Mitigation
	Description of the action	Beyond the large parks, the planning contemplates the creation of 10 new smaller-scale green spaces integrated into the urban fabric: New spaces: Projects on plots such as those of Arrayán (Old Town), the Cortijo

CE-016. Network of neighbourhood "green lungs".			
		del Cuarto (Bellavista) and the Guadaira riverbed corridor (Southern District). Function: To act as local sink-holes and climate shelters for neighbors in densely built-up areas.	
Reference to the impact pathway	Scope of Issuance	Emissions Offsetting	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the physical transformation of the 10 identified plots will begin, prioritising those in areas with a greater deficit of trees. In the medium term, the densest neighbourhoods will be provided with cool "oases" accessible on foot, reducing the local temperature (heat island effect) and improving the quality of life.	
Implementation	Agencies/persons responsible for implementation	Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Parks & Gardens Service	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	19,000 tCO <sub>2</sub> e / year	tCO <sub>2</sub> e/year value per project lifetime. (tCO <sub>2</sub> e total)
	Total costs and costs per unit of CO <sub>2</sub> eq	€ total between tCO <sub>2</sub> e total. (€ / tCO <sub>2</sub> e)	1.800.000 € total

Shares in others as a scope of issuance

OT-001. Recycling and recovery of fluorinated gases.		
Scheme of action	Name of the action	Recycling and recovery of fluorinated gases
	Type of action	Mitigation
	Description of the action	The recycling and recovery of fluorinated gases from end-of-life equipment and systems will be encouraged. This measure will prevent their release into the atmosphere and allow them to be reused instead of destroying them.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	A strict protocol will be activated in clean points and technical services to guarantee the safe emptying of old appliances. In the medium term, Seville will have a closed circuit that prevents these gases from reaching the air, transforming a hazardous waste into a regenerated resource.
Implementation	Agencies/persons responsible for implementation	LIPASAM / Authorised Waste Managers.
	Scale of action and target entities	Municipal - citizenship
	Actors involved	LIPASAM, clean points and management companies
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable
	Energy removed/replaced, volume or type of fuel	Not applicable
	GHG Emission Reduction Estimate	11,383.67 tCO <sub>2</sub> e / year

OT-001. Recycling and recovery of fluorinated gases.			
	Total costs and costs per unit of CO <sub>2</sub> eq	125 € / tCO <sub>2</sub> e	5.000.000 € total

OT-002. Replacing F-gases with more sustainable alternatives.		
Scheme of action	Name of the action	Substituting F-gases with more sustainable alternatives
	Type of action	Mitigation
	Description of the action	The replacement of fluorinated gases (HFCs, PFCs and SF <sub>6</sub> ) with greener and safer alternatives, such as natural refrigerants (propane R-290, ammonia R-717, and carbon dioxide R-744) will be promoted. This transition will significantly reduce the environmental impact of refrigeration and air conditioning systems in the city.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the implementation of pilot projects and lines of aid for the change of gases for natural refrigerants (R-290, R-717 and R-744) is expected in strategic sectors. In the medium term, it is expected that the majority of the city's refrigeration and air conditioning fleet will have completed the transition to these greener alternatives, achieving a drastic reduction in environmental impact and eliminating dependence on gases with high global warming potential.
Implementation	Agencies/persons responsible for implementation	Seville City Council
	Scale of action and target entities	Municipal - citizenship
	Actors involved	HVAC maintenance companies, refrigeration equipment manufacturers, and energy agencies.

OT-002. Replacing F-gases with more sustainable alternatives.			
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	12,500 tCO <sub>2</sub> e / year	50,000.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	3.200 € / tCO <sub>2</sub> e	40.000.000 € total

OT-003. Preventive maintenance and overhaul of refrigeration and air conditioning equipment.		
Scheme of action	Name of the action	Preventive maintenance and overhaul of refrigeration and air conditioning equipment
	Type of action	Mitigation
	Description of the action	A programme of preventive maintenance and periodic review of refrigeration and air conditioning equipment will be implemented to detect and repair leaks of fluorinated gases, ensuring their efficiency and minimising their release into the atmosphere. This measure will contribute to a significant reduction in emissions of F-gases.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, the implementation of the technical inspection program and the creation of a maintenance registry that allows the early detection and immediate repair of leaks is expected. In the medium term, the aim is to achieve a significant and sustained reduction in

<b>OT-003. Preventive maintenance and overhaul of refrigeration and air conditioning equipment.</b>			
		emissions of fluorinated gases into the atmosphere, minimising their environmental impact.	
Implementation	Agencies/persons responsible for implementation	Seville City Council and maintenance companies	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Maintenance companies, refrigeration technicians	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of excessive electricity consumption in air conditioning systems.	
	GHG Emission Reduction Estimate	2,750.00 tCO <sub>2</sub> e / year	11,000.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	455 € / tCO <sub>2</sub> e	5.000.000 € total

<b>OT-004. Transition to clean technologies in refrigeration and air conditioning.</b>		
Scheme of action	Name of the action	Transition to clean technologies in refrigeration and air conditioning
	Type of action	Mitigation
	Description of the action	Encourage the transition to clean technologies in the refrigeration sector, such as heat pumps and air conditioning systems without fluorinated gases. This includes the gradual replacement of equipment that uses F-gases, to ban their use completely by 2050. This plan includes the replacement of equipment and products that use HFCs with more sustainable alternatives, with

OT-004. Transition to clean technologies in refrigeration and air conditioning.			
		a total ban on their use in products and equipment from 2050.	
Reference to the impact pathway	Scope of Issuance	Others	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, the replacement of equipment that uses F-gases with sustainable alternatives is expected. In the medium term, the aim is to achieve neutrality in air conditioning systems, ensuring that the technological transition progresses effectively to achieve a total ban and the exclusive use of clean technologies without fluorinated gases by 2050.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, Seville Energy Agency.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Equipment Manufacturers	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Renewable thermal power generation	
	Energy removed/replaced, volume or type of fuel	Elimination of synthetic refrigerant gases (HFCs) of high Global Warming Potential.	
	GHG Emission Reduction Estimate	1,422.92 tCO <sub>2</sub> e / year	5,691.7 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	175,69€ / tCO <sub>2</sub> e	999.973 € total

OT-005. Reduction of emissions from enteric fermentation in cattle.			
Scheme of action	Name of the action	Reduction of emissions from enteric fermentation in cattle	
	Type of action	Mitigation	
	Description of the action	Food management practices will be promoted to reduce methane (CH <sub>4</sub> ) emissions, such as improving the quality of animal diets, using feed additives that reduce emissions, and efficiently managing livestock waste. In addition, innovative technologies, such as methane capture systems in stables, will be researched and promoted.	
Reference to the impact pathway	Scope of Issuance	Others	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, local farmers are expected to adopt new controlled grazing techniques. In the medium term, the aim is for pasture soils to be healthier and more fertile, functioning as "sponges" that trap CO <sub>2</sub> .	
Implementation	Agencies/persons responsible for implementation	Seville City Council and agricultural management entities.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Livestock associations	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	750.0 tCO <sub>2</sub> e / year	3,000.0 tCO <sub>2</sub> e total

OT-005. Reduction of emissions from enteric fermentation in cattle.			
	Total costs and costs per unit of CO <sub>2</sub> eq	640 € / tCO <sub>2</sub> e	1.920.000 € total

OT-006. Awareness and education about F-gases.		
Scheme of action	Name of the action	F-Gas Awareness and Education
	Type of action	Mitigation
	Description of the action	Awareness campaigns will be carried out on the environmental impacts of fluorinated gases, promoting the use of sustainable alternatives and educating the population on the importance of reducing their use both at home and in industry.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Learning and Skills
	Result (according to module B-1.1)	In the short term, the launch of educational materials and good practice guides for homes and businesses is expected. In the medium term, the aim is for citizens to actively demand technologies free of fluorinated gases when renewing their equipment.
Implementation	Agencies/persons responsible for implementation	Seville City Council
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Educational centres, consumer associations, the media.
	Feedback on implementation	
Impacts and costs	Renewable energy generated (if applicable)	Not applicable

OT-006. Awareness and education about F-gases.			
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	750.0 tCO <sub>2</sub> e / year	3,000.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	100 € / tCO <sub>2</sub> e	300.000 € total

OT-007. Improvement in manure management.		
Scheme of action	Name of the action	Improved manure management
	Type of action	Mitigation
	Description of the action	A more efficient system for manure management will be implemented by composting it and using it as fertilizer instead of disposal, which will reduce methane and nitrogen oxide emissions. The capture of biogas produced by the decomposition of manure will also be encouraged.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the medium term, the aim is to stop manure from being a polluting waste to become a quality fertilizer and clean energy, drastically reducing bad odors and greenhouse gas emissions.
Implementation	Agencies/persons responsible for implementation	LIPASAM
	Scale of action and target entities	Municipal - citizenship
	Actors involved	Organic fertilizer companies, biogas technologists, and waste managers.

OT-007. Improvement in manure management.			
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Biogas	
	Energy removed/replaced, volume or type of fuel	Replacement of synthetic chemical fertilizers	
	GHG Emission Reduction Estimate	600.0 tCO <sub>2</sub> e / year	2,400.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	1.040 € / tCO <sub>2</sub> e	2.496.000 € total

OT-008. Improvement in the management of agricultural soils.		
Scheme of action	Name of the action	Improvement in the management of agricultural soils
	Type of action	Mitigation
	Description of the action	Through sustainable agricultural practices, such as crop rotation and the use of minimal tillage techniques, the aim is to reduce CO <sub>2</sub> emissions from agricultural soils. This will be complemented by the use of organic fertilizers and soil conservation techniques that increase carbon sequestration.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Technology/Infrastructure
	Result (according to module B-1.1)	In the short term, training of agricultural sectors in minimum tillage techniques is expected. In the medium term, an increase in the soil's carbon sequestration capacity and a reduction in emissions from soil degradation and the use of chemical fertilizers are expected.
Implementation	Agencies/persons responsible for implementation	Seville City Council and Delegation of Agriculture

OT-008. Improvement in the management of agricultural soils.			
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local farmers, agricultural associations	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Reduction of consumption of non-renewable fuels	
	GHG Emission Reduction Estimate	450.0 tCO <sub>2</sub> e / year	1,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	690 € / tCO <sub>2</sub> e	1.242.000 €

OT-009. Improvement in grazing practices.			
Scheme of action	Name of the action	Improved grazing practices	
	Type of action	Mitigation	
	Description of the action	To reduce CO <sub>2</sub> emissions in the livestock sector, sustainable grazing practices will be implemented that favor soil regeneration and carbon storage, in addition to optimizing pasture management to avoid overexploitation.	
Reference to the impact pathway	Scope of Issuance	Others	
	Systemic lever	Technology/Infrastructure	
	Result (according to module B-1.1)	In the short term, local farmers are expected to adopt new controlled grazing techniques. In the medium term, the aim is for pasture soils to be healthier and more fertile, functioning as "sponges" that trap CO <sub>2</sub> .	

<b>OT-009. Improvement in grazing practices.</b>			
Implementation	Agencies/persons responsible for implementation	Seville City Council and agricultural management entities.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Livestock associations	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	450.0 tCO <sub>2</sub> e / year	1,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> e	640 € / tCO <sub>2</sub> e	1.150.000 €

<b>OT-010. Promotion of products with a lower content of fluorinated gases.</b>		
Scheme of action	Name of the action	Promotion of products with lower fluorinated gas content
	Type of action	Mitigation
	Description of the action	The use of products with a lower content of fluorinated gases in the city will be promoted. In addition, the leakage of LP gas will be reduced and the use of fresh and local products will be encouraged, which will reduce the carbon footprint associated with the transport of goods.
Reference to the impact pathway	Scope of Issuance	Others
	Systemic lever	Technology/Infrastructure

<b>OT-010. Promotion of products with a lower content of fluorinated gases.</b>			
	Result (according to module B-1.1)	In the short term: Campaigns will be launched to identify products with a lower content of fluorinated gases and review protocols will be activated to prevent LP gas leaks in the commercial sector.	
Implementation	Agencies/persons responsible for implementation	Seville City Council	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, industry	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Fossil fuel substitution	
	GHG Emission Reduction Estimate	450.0 tCO <sub>2</sub> e / year	1,800.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	555 € / tCO <sub>2</sub> e	1.000.000 €

From OT-11 to OT-15 are actions related to adaptation.

<b>OT-016. Environmental Education Programs.</b>		
Scheme of action	Name of the action	Environmental Education Programs
	Type of action	Mitigation
	Description of the action	Programmes with dissemination and awareness-raising material on energy saving and sustainable development. An estimated attendance of 8250 people per year is maintained.

<b>OT-016. Environmental Education Programs.</b>			
Reference to the impact pathway	Scope of Issuance	Others	
	Systemic lever	Learning and Skills	
	Result (according to module B-1.1)	In the short term, it is expected to have the identification of the companies to receive the programs, in the long term it is expected to have completed the project.	
Implementation	Agencies/persons responsible for implementation	Corporation of municipal companies	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Local government, industry	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	411.1 tCO <sub>2</sub> e / year	1,644.6 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	45 € / tCO <sub>2</sub> e	75.000 € total

<b>OT-017. Environmental education programs on the efficient use of water</b>		
Scheme of action	Name of the action	Environmental education programs on the efficient use of water
	Type of action	Mitigation

OT-017. Environmental education programs on the efficient use of water			
	Description of the action	Awareness campaigns are carried out to promote the responsible use of water in homes and the implementation of sustainable practices, such as greywater recycling and efficient use of water in the home. These initiatives seek to reduce the demand for drinking water and improve efficiency in its use.	
Reference to the impact pathway	Scope of Issuance	Others	
	Systemic lever	Awareness and education for sustainability.	
	Result (according to module B-1.1)	In the short term, an increase in citizen knowledge about water saving and recycling techniques is expected. In the medium term, a measurable reduction in the per capita demand for drinking water and a greater adoption of efficient technologies in the domestic sphere are expected.	
Implementation	Agencies/persons responsible for implementation	EMASESA and Seville City Council.	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Schools, consumer associations, media and citizen participation platforms.	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel		
	GHG Emission Reduction Estimate	40 tCO <sub>2</sub> e / year	160 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	1.875 € / tCO <sub>2</sub> e	300.000 € total

OT-018. Urban carbon monitoring and the use of open data			
Scheme of action	Name of the action	Urban carbon monitoring and the use of open data	
	Type of action	Mitigation	
	Description of the action	Implementation of a real-time urban measurement and monitoring system of carbon emissions and other climate variables, using open data platforms to facilitate informed decision-making in the management of climate and urban policies.	
Reference to the impact pathway	Scope of Issuance	Others	
	Systemic lever	Learning and Skills	
	Result (according to module B-1.1)	In the short term, real-time data is expected to be available; in the medium term, improve decision-making in climate policies.	
Implementation	Agencies/persons responsible for implementation	Seville City Council, technical services	
	Scale of action and target entities	Municipal - citizenship	
	Actors involved	Administration, technicians	
	Feedback on implementation		
Impacts and costs	Renewable energy generated (if applicable)	Not applicable	
	Energy removed/replaced, volume or type of fuel	Not applicable	
	GHG Emission Reduction Estimate	10.0 tCO <sub>2</sub> e / year	40.0 tCO <sub>2</sub> e total
	Total costs and costs per unit of CO <sub>2</sub> eq	TBD	

### **B-2.3: Summary of the strategy for residual emissions**

The residual emissions forecast for Seville in 2030 represent the fraction of greenhouse gases that will remain after the full implementation of the prioritised impact pathways in the transport, buildings, electricity and waste sectors and the measures in section B-2.2. These emissions will come mainly from heavy transport and part of interurban mobility, where total electrification is not yet feasible due to technological and infrastructure limitations; of certain non-recyclable waste streams that cannot be materially recovered; of specific thermal uses in buildings and economic activities that depend on fossil equipment that is difficult to replace in the short term; and industrial and service processes that require technologies that are still under development or with disproportionate replacement costs. Also included are diffuse emissions linked to urban activities that cannot be completely eliminated before 2030 without compromising social equity or the continuity of essential services.

The city has evaluated additional reduction options that have ultimately been ruled out for technical, economic, social or institutional reasons. Some technologies, such as the full electrification of heavy transport, green hydrogen for urban uses, or carbon capture in small facilities, will not reach the maturity needed before 2030. Other measures have costs per tonne avoided well above reasonable thresholds for a local government, especially in a context of budgetary constraints and dependence on external funding. In addition, certain interventions could generate regressive social impacts, such as the accelerated replacement of thermal equipment or vehicles in vulnerable households, which would not be feasible without significant aid. Institutional and regulatory barriers, such as fragmentation of competencies, lack of fiscal incentives and the need for metropolitan coordination, have also been identified as preventing the deployment of certain structural measures over the Mission's time horizon. Finally, solutions that could generate technological or urban blockages that would hinder deep decarbonisation after 2030 have been ruled out. For all these reasons, residual emissions are defined as those that cannot be eliminated without compromising the technical, economic or social viability of Seville's climate transition.

The offsetting of these residual emissions will be articulated through a combination of local natural sinks, permanent sequestration solutions and, only as a last resort, external offsets of high climate integrity. In the field of natural sinks, Seville will promote the improvement and expansion of urban trees, the ecological restoration of peri-urban parks and green corridors, and collaboration with the metropolitan environment for the sustainable management of agricultural and forest soils that increase the carbon stored in biomass and soils. These actions will be designed with criteria of permanence, biodiversity, climate resilience and continuous monitoring, ensuring that the absorptions generated are quantifiable and verifiable.

As for permanent sequestration, the strategy prioritizes options that ensure a lasting storage of carbon captured from the atmosphere. These include the use of biogenic-based building materials, such as certified structural wood or biocomposites, which act as long-term carbon stores; the incorporation of biochar in urban and peri-urban soils, with stable storage capacity for centuries; and participation in carbon capture and geological storage projects, provided that they meet strict criteria of additionality, traceability and independent verification. Only these durable storage options will be part of the main calculation of climate neutrality, in line with the NetZeroCities criteria.

## MODULE B-3

### Monitoring, evaluation and learning indicators

B-3.1: Impact Pathways						
Results/impacts addressed	Action/Project	Indicator No.	Indicator Name	Target values		
				2025	2027	2030
	Reduction of motorized transport	1	Reduction of motorized transport	5%	20%	35%
	Change of transport	2	Transition of transport	5%	15%	30%
	Promoting carpooling	3	Private carpooling	2%	10%	15%
	Electrification of passenger cars	4	Electric Vehicle	5%	15%	30%
	Electrification of buses	5	Electric bus	5%	15%	50%
	Last mile optimization	6	Last mile	10%	25%	60%
	Truck electrification >3.5 t	7	Electrification of heavy transport	5%	15%	20%
	Motorcycle electrification	8	Motorcycle electrification	10%	25%	50%
	Renovation of the building stock	9	Building renovation	10%	20%	40%
	New buildings with almost zero energy consumption	10	Zero-energy buildings	50%	75%	90%

	Reduced residential electricity consumption	11	Efficient lighting and appliances	20%	40%	80%
	Reduction of residential	12	Residential Air Conditioning	15%	35%	75%
	Reducing electricity consumption in commerce	13	Electricity consumption trading	20%	30%	50%
	Reducing electricity consumption in administrative buildings	14	Electricity consumption in public administration	10%	20%	50%
	Reduction (substitution) of natural gas and LPG consumption in fixed installations	15	Consumption of other fuels	10%	20%	40%
	New waste management models	16	CH4 Landfill	10%	25%	100%
	Increased absorption capacity	17	CO2 absorption capacity	5%	20%	50%

The metadata for each of the indicators is presented below.

<b>B-3.2.1: Reduction of motorized transport.</b>	
Indicator Name	Reduction of motorized transport
Indicator unit	% reduction compared to base year
Definition	Percentage decrease in the use of private motor vehicles in the municipality.
Calculation method	$(\text{Vehkm base year} - \text{Vehkm current year}) / \text{Vehkm base year} \times 100$

<b>B-3.2.1: Reduction of motorized transport.</b>	
Background	Motorised transport is the main emitter of GHGs in Seville
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Improved air quality, noise reduction, road safety
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Reduction of motorized transport
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	-
Expected data source	SUMPs, traffic gauging, municipal sensors
Expected availability	Annual
Expected collection interval	Annual
References	PACES, SUMP 2030
Results describing the indicator	Decrease in the use of private cars
Other indicator systems that use this indicator	-

<b>B-3.2.2: Transport transition.</b>	
Indicator Name	Transport transition
Indicator unit	% of trips in sustainable modes
Definition	Proportion of journeys made by public transport, bicycle or on foot.
Calculation method	Sustainable travel / total trips × 100
Background	SUMP target: 2/3 of travel in sustainable modes by 2030.
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Public health, congestion reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Change of transport
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	Mobility surveys, SUMPs
Expected data source	Annual
Expected availability	Annual
Expected collection interval	SUMP 2030
References	-
Results describing the indicator	Increasing the use of sustainable modes

<b>B-3.2.2: Transport transition.</b>	
Other indicator systems that use this indicator	-

<b>B-3.2.3: Private carpooling.</b>	
Indicator Name	Private carpooling
Indicator unit	No. of users or % of rideshares
Definition	Measurement of the use of car-sharing platforms between individuals.
Calculation method	Active users / motorized population × 100
Background	Measure to reduce the use of private vehicles.
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Reduced congestion and parking demand
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Promoting carpooling
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	no
Additional information	
Expected data source	Carsharing operators, SUMPs
Expected availability	Annual

<b>B-3.2.3: Private carpooling.</b>	
Expected collection interval	Annual
References	SUMP
Results describing the indicator	Increased sharing
Other indicator systems that use this indicator	ICLEI

<b>B-3.2.4: Electric vehicle.</b>	
Indicator Name	Electric Vehicle
Indicator unit	% of electrified vehicle fleet
Definition	Proportion of electric cars with respect to the total number of vehicles.
Calculation method	$N^{\circ} \text{ EV} / \text{total vehicles} \times 100$
Background	Electrification of the vehicle fleet as a key mitigation route.
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Noise Reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Electrification of passenger cars
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes

<b>B-3.2.4: Electric vehicle.</b>	
Additional information	
Expected data source	DGT, City Council
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	EV Surge
Other indicator systems that use this indicator	CDP Cities

<b>B-3.2.5: Electric bus.</b>	
Indicator Name	Electric bus
Indicator unit	% of electric fleet
Definition	Proportion of electric buses in TUSSAM's fleet.
Calculation method	Number of electric buses / total fleet × 100
Background	SUMP target: 75% of trips on public transport zero emissions.
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Noise and pollution reduction
Can the indicator be used to monitor impact pathways?	Yes

<b>B-3.2.5: Electric bus.</b>	
If so, for which route of impact?	Electrification of buses
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	-
Expected data source	TUSSAM
Expected availability	Annual
Expected collection interval	Annual
References	SUMP
Results describing the indicator	Electrification of public transport
Other indicator systems that use this indicator	My Covenant

<b>B-3.2.6: Last mile optimization.</b>	
Indicator Name	Last mile optimization
Indicator unit	% sustainable deliveries
Definition	Proportion of deliveries made with electric or low-emission vehicles.
Calculation method	$\text{Sustainable deliveries} / \text{total deliveries} \times 100$
Background	Urban logistics optimisation
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes

<b>B-3.2.6: Last mile optimization.</b>	
If yes, what co-benefit does it measure?	Congestion reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Last mile optimization
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	no
Additional information	
Expected data source	Logistics operators
Expected availability	Annual
Expected collection interval	Annual
References	ACCS 2026
Results describing the indicator	Reduction of logistics emissions
Other indicator systems that use this indicator	ICLEI

<b>B-3.2.7: Electrification of heavy-duty transport</b>	
Indicator Name	Electrification of heavy transport
Indicator unit	% of trucks electrified
Definition	Proportion of electric heavy-duty vehicles in the total
Calculation method	$N^{\circ} \text{ electric trucks} / \text{total trucks} \times 100$
Background	Truck electrification >3.5 t
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes

**B-3.2.7: Electrification of heavy-duty transport**

If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Noise Reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Truck electrification
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	no
Additional information	
Expected data source	DGT
Expected availability	Annual
Expected collection interval	Annual
References	ACCS 2026
Results describing the indicator	Electrification of heavy-duty transport
Other indicator systems that use this indicator	-

**B-3.2.8: Electrification of motorcycles**

Indicator Name	Motorcycle electrification
Indicator unit	% of electric motorcycles
Definition	Proportion of electric motorcycles in the total
Calculation method	$N^{\circ} \text{ electric motorcycles} / \text{total motorcycles} \times 100$

<b>B-3.2.8: Electrification of motorcycles</b>	
Background	Electrification of light fleets
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Transportation (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Noise Reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Motorcycle electrification
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	no
Additional information	
Expected data source	DGT
Expected availability	Annual
Expected collection interval	Annual
References	ACCS 2026
Results describing the indicator	Increase in electric motorcycles
Other indicator systems that use this indicator	-

<b>B-3.2.9: Building Renovation</b>	
Indicator Name	Building renovation

<b>B-3.2.9: Building Renovation</b>	
Indicator unit	% of area rehabilitated
Definition	Proportion of the built stock energetically renovated
Calculation method	refurbished m <sup>2</sup> / total m <sup>2</sup> × 100
Background	Energy rehabilitation of the built stock
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Buildings (Scope 1 & 2)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Thermal comfort, reduction of energy poverty
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Renovation of the building stock
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	ENVISESA, City Council
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	Improved energy efficiency
Other indicator systems that use this indicator	MyCovenant

<b>B-3.2.10: Zero-Energy Buildings</b>	
Indicator Name	Zero-energy buildings
Indicator unit	No. or % of NZEB buildings
Definition	Buildings that meet near-zero consumption standards.
Calculation method	$N^{\circ} \text{ NZEB} / \text{total new buildings} \times 100$
Background	European efficiency requirements
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Buildings (Scope 2)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Reduction of energy demand
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Nearly Zero Energy Buildings
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	Urban planning licenses
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	Increase in NZEB buildings

<b>B-3.2.10: Zero-Energy Buildings</b>	
Other indicator systems that use this indicator	ICLEI

<b>B-3.2.11: Zero-Energy Buildings</b>	
Indicator Name	Efficient lighting and appliances
Indicator unit	% of households with efficient equipment
Definition	Measurement of the penetration of low-consumption equipment.
Calculation method	Homes with efficient equipment / total homes × 100
Background	Reduced residential electricity consumption
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Electricity (Scope 2)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Reduction of energy bill
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Reduced residential electricity consumption
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	no
Additional information	
Expected data source	Energy surveys
Expected availability	Biennial

<b>B-3.2.11: Zero-Energy Buildings</b>	
Expected collection interval	Biennial
References	PACES
Results describing the indicator	Reduced consumption
Other indicator systems that use this indicator	-

<b>B-3.2.12: Residential Air Conditioning</b>	
Indicator Name	Residential Air Conditioning
Indicator unit	% of efficient equipment
Definition	Proportion of efficient HVAC equipment
Calculation method	No. of efficient equipment / total equipment × 100
Background	Reduction of residential energy consumption
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Electricity (Scope 2)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Thermal comfort
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Reduction of residential energy consumption
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	no

<b>B-3.2.12: Residential Air Conditioning</b>	
Additional information	
Expected data source	Energy surveys
Expected availability	Biennial
Expected collection interval	Biennial
References	PACES
Results describing the indicator	Reduced use of air conditioning
Other indicator systems that use this indicator	-

<b>B-3.2.13: Electricity Consumption Trading</b>	
Indicator Name	Electricity consumption trading
Indicator unit	kWh/year or % reduction
Definition	Electricity consumption in the commercial sector
Calculation method	Current consumption – base year consumption
Background	Reducing electricity consumption in commerce
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Electricity (Scope 2)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Reduced operating costs
Can the indicator be used to monitor impact pathways?	Yes

<b>B-3.2.13: Electricity Consumption Trading</b>	
If so, for which route of impact?	Reducing electricity consumption in commerce
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	Electricity marketers
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	Reduced commercial consumption
Other indicator systems that use this indicator	My Covenant

<b>B-3.2.14: Electricity consumption in the public administration</b>	
Indicator Name	Electricity consumption in public administration
Indicator unit	kWh/year or % reduction
Definition	Electricity consumption of municipal buildings.
Calculation method	Current consumption – base year consumption
Background	Reducing electricity consumption in administrative buildings
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Electricity (Scope 2)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes

<b>B-3.2.14: Electricity consumption in the public administration</b>	
If yes, what co-benefit does it measure?	Budget savings
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Reducing electricity consumption in administrative buildings
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	City Council
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	Reduction of public consumption
Other indicator systems that use this indicator	MyCovenant

<b>B-3.2.15: Consumption of other fuels</b>	
Indicator Name	Consumption of other fuels
Indicator unit	kWh/year or % reduction
Definition	Reduction of the use of natural gas and LPG
Calculation method	Current consumption – base year consumption
Background	Fossil fuel substitution
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes

<b>B-3.2.15: Consumption of other fuels</b>	
If so, to which scope of issuance is the co-benefit linked?	Buildings and Industry (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Pollution reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Reduction of natural gas and LPG consumption
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	Marketers
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	Reducing fuel use
Other indicator systems that use this indicator	My Covenant

<b>B-3.2.16: CH<sub>4</sub> Landfill</b>	
Indicator Name	CH <sub>4</sub> Landfill
Indicator unit	t CH <sub>4</sub> /year
Definition	Methane emissions from landfill.
Calculation method	IPCC calculation for waste

<b>B-3.2.16: CH<sub>4</sub> Landfill</b>	
Background	New waste management models
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	Waste (Scope 3)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Reduction of odours and health risks
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	New waste management models
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	LIPASAM
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	CH <sub>4</sub> Reduction
Other indicator systems that use this indicator	IPCC

<b>B-3.2.17: CO<sub>2</sub> absorption capacity</b>	
Indicator Name	CO <sub>2</sub> absorption capacity

<b>B-3.2.17: CO<sub>2</sub> absorption capacity</b>	
Indicator unit	t CO <sub>2</sub> /year
Definition	CO <sub>2</sub> absorbed by trees and green areas
Calculation method	Absorption formulas by species and surface area
Background	Increase in urban sinkholes
Does the indicator measure direct impacts (i.e., reduction in greenhouse gas emissions?)	Yes
If so, to which scope of issuance is the co-benefit linked?	AFOLU (Scope 1)
Does the indicator measure indirect impacts (i.e., co-benefits)?	Yes
If yes, what co-benefit does it measure?	Heat Island Reduction
Can the indicator be used to monitor impact pathways?	Yes
If so, for which route of impact?	Increased absorption capacity
Is the indicator covered by the existing CDP/SCIS/Covenant of Mayors platforms?	Yes
Additional information	
Expected data source	Parks and Gardens
Expected availability	Annual
Expected collection interval	Annual
References	PACES
Results describing the indicator	Increase in observations
Other indicator systems that use this indicator	ICLEI

# PART C - ACHIEVING CLIMATE NEUTRALITY BY 2030

## MODULE C-1

### Innovation interventions in organization and governance

C.1.1: Organizational and governance interventions					
Name of the performance	Description	Person and entity/body responsible	Actors involved	Impact	Co-benefits
Municipal Climate Change Task Force	It is a working group regulated by the OM of Seville for Energy, Climate Change and Sustainability.	Energy and Sustainability Agency	All municipal delegations and companies	Internal coordination	Holistic and integrated vision of the problem, taking into account all points of view, so that no one is excluded from diagnoses and action plans.
Spanish Network of Cities for Climate	Network linked to the EMFF, for advice and support for municipal actions against climate change. The Ministry participates.	Energy and Sustainability Agency	On the part of Seville, a political representative and a technical representative.	Cooperation and exchange of experiences	To take advantage of synergies in the needs of the participating cities (more than 300).
Andalusian Federation of Municipalities and Provinces	Mitigation and adaptation working groups	Energy and Sustainability Agency	A technical representative, from the Energy and Sustainability Agency.	Cooperation and exchange of experiences	Exploit synergies in the needs of participating cities
European networks	Pact of Large Cities, EuroCities, ICLEI	City Council and Technical Representative	Energy and Sustainability Agency	Cooperation and exchange of experiences. Monitoring of the situation and international actions.	Take advantage of synergies in the needs of the participating cities.

**C.1.1: Organizational and governance interventions**

Name of the performance	Description	Person and entity/body responsible	Actors involved	Impact	Co-benefits
Spanish Network of Smart Cities	Spanish network for cooperation in digitalisation and urban sustainability, with more than 140 member cities.	Energy and Sustainability Agency	Political representative and technical representative	Cooperation and exchange of experiences	Take advantage of synergies in the needs of the participating cities.

**C-1.2: Description of organizational and governance interventions**

Structure and responsibilities

- Main coordinator: Energy and Sustainability Agency (design, monitoring and reporting).
- Political impetus: Mayor's Office and European Funds Area, Urban Agenda, Sustainability and Strategic Plans (mobilisation of resources and decisions).
- Sectoral operators: municipal companies (TUSSAM, EMASESA, LIPASAM and EMVISESA) and delegations responsible for implementation.

Multi-level coordination and networking

- Relationship with the Regional Government of Andalusia: technical alignment and access to the official carbon footprint tool.
- External networks: participation in the Spanish Network of Cities for Climate, EuroCities and ICLEI for exchange and financing.
- Operational mechanism: quarterly meetings of the Working Group and ad hoc technical committees.

Citizen participation and actors

- Instruments: web portal, district workshops, open tables and operational census of actors.
- Inclusion: accessible materials, prioritization of vulnerable neighborhoods and social support measures.
- Co-decision: technical panels and public consultations that feed into the equity portfolio.

Tracking and data

- Monitoring system: indicators fed by the Board's tool and municipal operational data.
- Needs: greater spatial disaggregation and real-time mobility data.
- Review cycle: annual updates and methodological adjustments.

## MODULE C-2

### Social and other innovation actions

C.2.1: Social and other innovation interventions					
Name of the performance	Description	Person entity/body responsible	Actors involved	Impact	Co-benefits
Seville Climate Action Web Portal	Municipal digital platform that centralizes information from the PMCC, PACES and ACCS; it allows citizen participation, consultation of inventories, submission of proposals and monitoring of the process.	Energy and Sustainability Agency	Citizens, districts, municipal companies (TUSSAM, EMASESA, LIPASAM and EMVISESA), universities	It facilitates climate action by improving access to information and transparency; it drives behavioral changes.	Climate education, citizen empowerment, transparency, social cohesion.
Podcast "Seville for the Climate"	A series of thematic episodes involving districts, municipal companies and experts to disclose climate risks, impact pathways and opportunities for participation.	Ecological Transition Delegation	Representatives of districts, municipal companies, citizens, experts	It raises awareness and accelerates the adoption of sustainable habits in mobility, energy and waste.	Improvement of knowledge, inclusive participation, information accessibility.
Operational Census of Climate Actors	Identification and mapping of actors by district (companies, educational centers, health, associations, industrial estates) to guarantee	Energy and Sustainability Agency	Companies, associations, professional associations, educational centres, hospitals, NGOs	It allows for the design of more precise and effective interventions, aligned with the pathways of impact.	Multilevel governance, social structuring, co-responsibility.

**C.2.1: Social and other innovation interventions**

Name of the performance	Description	Person and entity/body responsible	Actors involved	Impact	Co-benefits
	sectoral and territorial participation.				
District Diagnostic and Co-creation Workshops	Face-to-face sessions by district with educational capsules, sectoral tables and prioritisation of measures in mobility, energy, waste, biodiversity and air quality.	Citizen Participation Delegation / Districts	Citizens, municipal companies, neighborhood associations, shops, educational centers	They generate concrete proposals that feed the impact pathways and accelerate their implementation.	Social cohesion, improvement of knowledge, co-responsibility, health and well-being.
Thematic sectoral roundtables (mobility, energy, waste, biodiversity)	Spaces for technical and social deliberation to validate measures, identify barriers and propose adjustments to strategic interventions.	Ecological Transition Delegation	Logistics operators, TUSSAM, LIPASAM, EMASESA, and EMVISESA, energy companies, NGOs	It improves the technical quality of the measures and their social acceptance, reducing emissions in key sectors.	Social innovation, collaborative governance, operational efficiency.
Network of Neighbourhood Energy Communities	Promotion of local energy communities with technical, legal and training support, prioritising vulnerable neighbourhoods .	Energy and Sustainability Agency	Citizens, cooperatives, SMEs, educational centres, EMVISESA	It increases local renewable generation and reduces emissions from the electricity sector.	Energy saving, resilience, community cohesion, reduction of energy poverty.
Climate Education Program in Civic Centers	Continuous training in energy efficiency, sustainable	Delegation of Education / Districts	Civic centres, associations, universities, citizens	Accelerate the adoption of sustainable behaviors and	Health, well-being, empowerment, reduction of inequalities.

**C.2.1: Social and other innovation interventions**

Name of the performance	Description	Person and entity/body responsible	Actors involved	Impact	Co-benefits
	mobility, waste management and climate adaptation, integrated into the network of civic centres.			reduce diffuse emissions.	
Annual Forum of Climate-Neutral Cities	Meetings with the Spanish cities of the Mission to exchange good practices in water, waste, CO <sub>2</sub> , mobility and energy.	Seville City Council / Mission Cities Network	Barcelona, Madrid, Valencia, Zaragoza, Valladolid, Vitoria-Gasteiz, Seville	It allows innovative solutions to be incorporated and the implementation of impact pathways to be accelerated.	Innovation, collective learning, international reputation.
"Zero Company Seville" Program	Support for SMEs to decarbonise processes, electrify fleets and improve energy efficiency through voluntary agreements.	Delegation of Economy / Chamber of Commerce	SMEs, business associations, consultancies, universities	Reduces emissions from the service sector and light industrial.	Competitiveness, innovation, green employment, cost reduction.
Community Climate Refuge Network	Conversion of public facilities into spaces of climatic comfort during heat waves, with the participation of local residents.	Delegation of Ecological Transition / Social Services	Educational centres, neighbourhood associations, EMASESA, Civil Protection	It reduces climate vulnerability and energy consumption in homes.	Public health, well-being, urban resilience, social cohesion.

## C-2.2: Description of social and other innovation actions

The social innovation and collaborative governance interventions proposed make it possible to directly address the systemic barriers identified in module A3, especially those related to the lack of accessible climate information, limited institutional capacity, fragmentation between actors, territorial and social inequality, and cultural inertia that hinders the adoption of sustainable behaviours.

These innovations empower stakeholders and citizens by providing clear, accessible, and up-to-date information on climate risks, impact pathways, and opportunities for action. The combination of digital tools – such as the web portal, interactive forms or podcasts – with face-to-face spaces – workshops by district, sectoral tables, climate-neutral city forums – allows anyone, regardless of their level of prior knowledge, to understand what is being decided, how they can influence and what impact their contributions have. This approach reinforces co-responsibility and makes it easier for citizens to actively join the path towards climate neutrality, not only as recipients of policies, but as co-creators of solutions.

These innovations also significantly reduce barriers that have traditionally limited the participation of marginalized groups or those with less access to resources. The territorial decentralisation of the workshops, the adaptation of easy-to-read materials, universal accessibility in the calls, the presence of data protection clauses, the incorporation of civic centres as climate education nodes and the prioritisation of vulnerable neighbourhoods in programmes such as energy communities or fair rehabilitation ensure that the climate transition does not reproduce existing inequalities. The design of the participatory process explicitly recognizes that climate vulnerability and social vulnerability are interlinked, and that only inclusive participation can ensure a just transition.

The long-term impact and scaling up of these innovation activities is ensured by several mechanisms embedded in the ACCS design itself. First, the institutionalization of permanent tools – such as the web portal, the census of actors or the sectoral tables – ensures that participation is not a one-off exercise, but a continuous process that evolves with each iteration of the Climate Agreement. Secondly, the creation of stable networks, such as the Network of Neighbourhood Energy Communities or the Annual Forum of Climate Neutral Cities, makes it possible to scale learning, replicate good practices and attract technical and financial resources. Third, the traceability of citizen input and the obligation to respond to a reasoned response strengthen public trust and consolidate the legitimacy of the process. Finally, integrating participatory monitoring into municipal climate governance—through indicators, periodic evaluations, and feedback mechanisms—ensures that social innovations are not only sustained over time, but scaled up as the city's institutional capacity and climate maturity increases.

## MODULE C-3

### Equity Portfolio Financing (Economic Case)

C-3.1: Summary of actions with related costs					
Name of the action / performance	Responsible person and entity	Start and end date	Scope of action	Impact	Estimated total cost
Reduced need for motorized passenger transport	Mobility Area / Urban Planning Management / SUMP	2026–2030	Transportation	65 kt CO <sub>2</sub> e in 2030. Improvement of air quality, noise, urban habitability	To be confirmed
Shift to public and non-motorized transportation	TUSSAM / Mobility Area / Urban Planning Management	2026–2030	Transportation	47 kt CO <sub>2</sub> e. Public health, congestion reduction, reclaimed urban space	To be confirmed
Increased carpooling	Mobility Area / Innovation / Private Operators	2026–2030	Transportation	24 kt CO <sub>2</sub> e. Economic savings, less congestion, community networks	To be confirmed
Electrification of cars and motorcycles	Energy Transition Area / Mobility / DGT	2026–2030	Transportation	28 kt CO <sub>2</sub> e. Clean air, noise reduction, industrial innovation	To be confirmed
Electrification of buses	TUSSAM	2026–2030	Transportation	14 kt CO <sub>2</sub> e. Improving public transport, reducing noise	To be confirmed
Optimization of urban logistics	Area of Economy / Mobility / Logistics Operators	2026–2030	Transportation	59 kt CO <sub>2</sub> e. Competitiveness, reduced congestion,	To be confirmed

**C-3.1: Summary of actions with related costs**

Name of the action / performance	Responsible person and entity	Start and end date	Scope of action	Impact	Estimated total cost
				logistics efficiency	
Truck electrification	Mobility Area / Logistics Operators / Regional Government of Andalusia	2026–2030	Transportation	5 kt CO <sub>2</sub> e. Noise reduction, technological innovation	To be confirmed
Building renovation (envelope)	ENVIRESA / Urban Planning Management	2026–2030	Building	2 kt CO <sub>2</sub> e. Thermal comfort, reduction of energy poverty	To be confirmed
New Energy Efficient Buildings (NZEB)	Urban Planning Management	2026–2030	Building	1 kt CO <sub>2</sub> e. Economic savings, comfort, lower energy demand	To be confirmed
Decarbonization of heat generation	Energy Transition Area / ENVIRESA	2026–2030	Building / Energy	–10 kt CO <sub>2</sub> e. Air quality, reduction of energy costs	To be confirmed
Efficient lighting and appliances	Energy Transition Area	2026–2030	Electricity	30 kt CO <sub>2</sub> e. Cost savings, less pressure on the grid	To be confirmed
Decarbonization of electricity generation	Energy Transition Area / Energy Operators	2026–2030	Electricity	432 kt CO <sub>2</sub> e. Energy independence, green employment	To be confirmed
Increasing waste recycling	LIPASAM	2026–2030	Waste	42 kt CO <sub>2</sub> e. Circular economy, pollution reduction,	To be confirmed

**C-3.1: Summary of actions with related costs**

<b>Name of the action / performance</b>	<b>Responsible person and entity</b>	<b>Start and end date</b>	<b>Scope of action</b>	<b>Impact</b>	<b>Estimated total cost</b>
				green employment	

## Outlook and next steps

The roll-out of Seville's Climate Action Plan marks a turning point in the transition to climate neutrality by 2030, but at the same time constitutes the beginning of a deeper phase of urban, institutional and social transformation. The current 2026 iteration of the City's Climate Agreement confirms that Seville has consolidated a solid foundation in terms of planning, governance and participation, and that it has a set of strategic interventions capable of significantly reducing emissions in key sectors. However, achieving climate neutrality requires maintaining a continuous process of learning, adaptation and capacity building, in line with the iterative nature of the Cities Mission and with the evolution of European, national and regional regulatory frameworks.

The next steps, in successive iterations, will focus on three priority lines: firstly, the deepening of the implementation of the impact pathways and measures, strengthening the coordination mechanisms between municipal areas, public companies and private actors, and ensuring that the planned investments are executed with criteria of efficiency, equity and climate coherence. This phase will include the consolidation of structural projects in sustainable mobility, energy rehabilitation, renewable energies, circular economy and climate adaptation, as well as the activation of new monitoring tools that allow the real progress of each intervention to be evaluated.

Secondly, progress will be made in the institutionalisation of participation and social innovation as permanent pillars of climate action. The tools created in this iteration – the web portal, the podcast, the district workshops, the census of actors, the sectoral tables and the multilevel governance spaces – will evolve into a stable system of continuous participation, capable of integrating new contributions, correcting deviations and strengthening citizen co-responsibility. This approach will make the climate transition inclusive, accessible, and socially just, especially in the most vulnerable neighborhoods.

Thirdly, Seville will have to address the expansion and scalability of actions, incorporating lessons learned from other Mission cities, strengthening metropolitan cooperation and exploring new opportunities for European and state funding. The city will continue to build internal technical capacities, improve the quality of climate data, and strengthen evidence-based planning. Likewise, progress will be made in the definition of the residual emissions strategy and in the consolidation of natural sinks and permanent sequestration solutions, guaranteeing the climate integrity of the 2030 objective.

The Action Plan will be updated regularly to integrate new commitments, emerging technologies, regulatory changes and monitoring results. Each iteration will allow for adjustments to priorities, incorporate new interventions, and strengthen coherence between mitigation, adaptation, just transition, and governance.