LIFE my building is green

LIFE17 ENV/EN/000088

Application of Nature-Based Solutions for the Local Adaptation of Educational and Social Buildings to Climate Change

Action: C4. Governance for Active Climate Change Adaptation in Education and Social Services Buildings.

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INDEX

1. SUMMARY

This document is part of action C4. "Governance for the active adaptation of Climate Change in Education and Social Services Buildings".

To achieve the transferability objectives of the project, it is necessary to identify and address the key actors that allow the governance pillars to be sustained within and outside the geographical context of the project.

Action C4 is divided into three sub-actions: C4.1 "Collection of information from responsible administrations and identification of actors"; C4.2 "Data analysis and development of tools for the governance of public works"; and C4.3 "Integration of NBS into enforcement policies and regulations".

This document describes the governance tools at the local, regional and national level identified by sub-action C4.2 based on the documentation generated by sub-action C4.1. These tools can serve as a model for future projects to facilitate their transferability actions. Some of these governance tools were applied during the project development, as included in the "NBS Favorable Report in the Technical Building Code and Municipal Regulations" of sub-action C4.3, facilitating the replication of LIFE-myBUILDINGisGREEN's Nature-Based Solutions (NBS) outside the project.

2. INTRODUCTION

The LIFE-myBUILDINGisGREEN project is a project developed by a group of partners from the Iberian Peninsula, co-financed by the LIFE program of the European Union, and which aims to design, develop and test innovative nature-based solutions - (NbS prototypes) to improve the bioclimatic comfort of educational buildings that allow the well-being improvement of these buildings' users.

The project consortium is led by the Superior Council for Scientific Research (CSIC) through the Royal Botanical Garden (RJB-CSIC) and has the technical support of the Eduardo Torroja Institute of Construction Sciences (IETcc-CSIC). The beneficiary partners are the technological center CARTIF, the Provincial Chamber of Badajoz (DIPBA), the Intermunicipal Community of Central Alentejo (CIMAC) and the Municipality of Oporto (MP).

For the implementation of Nature-Based Solutions (NbS), three pilot buildings were selected under the A1 action of the project, which are children's and primary schools located in Solana de los Barros (Badajoz, Spain), Évora (Portugal) and Oporto (Portugal).

This project comes up to face address one of the most intensified climate change effects detected in recent years because of the consecutive heat waves experienced throughout Europe, but with more adverse effects on the southern region of the continent. For this reason, education and social assistance centers in southern of Europe experienced indoor temperatures above 32°C for several months of the year, making it very difficult to habit these buildings.

For this purpose, the project will implement these NbS in different parts of these buildings, such as roofs, facades or outdoor spaces, aiming the improvement of the air quality and bioclimatic comfort, both indoor and outdoor areas of the buildings, as well as soil permeability.

The project development will allow to achieve several environmental, social, economic and governance outcomes to improve the climate change adaptation of the cities. Among the results related to the achievement of this delivery, the following standout:

- Installation of 19 NBS distributed in the 3 pilot buildings in Spain and Portugal;
- Reduction of at least 4ºC inside the buildings and improvement of the well-being of these buildings' users;
- Reduction of energy consumption for cooling and water consumption for irrigation;
- Reduction of carbon dioxide (CO2) and nitrogen oxide (NOx) emissions;
- Empowering citizens to use NBS as a way to adapt to climate change;
- Elaboration of good practices manuals for the application of NBS as tools for climate change adaptation.

IMPORTANCE OF ACTION C4. GOVERNANCE FOR THE ACTIVE ADAPTATION OF CLIMATE CHANGE IN EDUCATION AND SOCIAL SERVICES BUILDINGS

The state of assets and the management and maintenance of the pilot buildings of the project have different jurisdictional statutes in terms of responsibility and performance of public administrations in Spain and Portugal. In the case of Spain, the patrimonial status of education and social services buildings falls on the autonomous communities which have assumed their competences through the Ministries of Education and Health. This situation does not occur with the management and maintenance of these buildings, which is mostly up to the municipalities where they are located. In the case of Portugal, it is the municipalities together with the State that assume responsibility for the management, maintenance and property of these buildings.

In this sense, the project works with different administrations that have different levels of competence (national, regional and local) and that are responsible for these buildings. Therefore,

action is needed to enable the generation of consensus, synergies, team work and a positive flow between institutions at various levels of competence. In this way, it is about centralizing and incorporating the climate problem of temperature rise in the educational and social buildings of southern Europe and the application of the NBS as a solution for adaptation to this problem in the agenda of the different political positions and citizens responsible for decision-making.

The prototypes and NBS implemented in this project are multidisciplinary. This allows a continuous interaction with the different public administrations and allows the participation of the target groups and stakeholders, such as the public administration which are responsible for the educational centers, their users (staff, students, families of the students, etc.), construction sector, training schools, among others. These target groups are fundamental to achieve the objectives of the project and to be able to transfer and replicate its results.

DATA ANALYSIS AND DEVELOPMENT OF TOOLS FOR PROJECT GOVERNANCE

Based on the documentation generated and stored in the documentary platform developed in sub-action C4.1, the project work team held a set of meetings with key stakeholders in the objectives of LIFE-myBUILDINGisGREEN. As a result of these meetings, we sought to reach a series of agreements that would allow the transferability of the project actions and facilitate the subsequent use and implementation of the project's NBS in other contexts. These types of agreements and the mechanisms that facilitate the transferability of the project's NBS have been called **Governance Tools.**

The **Territorial Agreements** promote synergies between communities, municipalities and institutions of the territories, enabling elements of negotiation and joint action. The overall objective is to favor the territorial articulation between the different local, national and international institutions. Through open participatory sessions, the community presents the specific problems to be solved and then the agreement is proposed and formalized.

With the creation of participatory and negotiation processes, it is intended to strengthen the practices of social dialogue in the project area of operation. It seeks to promote environments of trust between the main social actors, strengthen social cohesion and promote systemic territorial and development. For this, the project team has been working on the search and identification of territorial mediators.

The participation and use of the resources and capacities of the different responsible regional authorities have been encouraged to promote dynamics of collaboration between the different social agents, the ones integrated into the project, as well the external ones.

The methodology of "adaptive governance" developed in several climate change adaptation projects has been used, which facilitates the creation of institutional agreements capable of generating social capital between different actors and transforming them into key agents for the development of resilient ecosystems, while adapting institutions to the service of basic resources (environmental comfort and well-being inside buildings).

3. GOVERNANCE TOOLS

LOCAL LEVEL

SPAIN

In Spain the main types of entities and key actors identified at the local level are government teams of municipalities, teams of leadership and management of education and social buildings, groups of local and provincial entities: either of a regional nature such as FEMPEX, Federation of Municipalities and Provinces of Extremadura or of a national character such as the Spanish Federation of Municipalities and Provinces (FEMP), which integrates all the local and provincial entities of Spain and transfers the agenda from the local level to the General Administration of the State. DIPBA is a member of FEMPEX, as well as FEMP and two of its thematic networks.

With regard to FEMPEX, the Federation of Municipalities and Provinces of Extremadura, it is an association constituted by the Local Entities of the Autonomous Community of Extremadura that voluntarily decide to join it for the protection of their common interests and, especially, for the defense of local autonomy (412 members). It represents the municipalities before the Administration of the Autonomous Community and is integrated at national level in the Spanish Federation of Municipalities and Provinces (FEMP), with which it has signed a charter of the operation. It was established in September 1989. Currently, practically all the municipalities of Extremadura are part of FEMPEX. They also adhere to the two Provincial Councils (Badajoz and Caceres).

At the level of the Autonomous Community, the objectives of FEMPEX are:

- The promotion and defense of Local Autonomies;

- The representation of the interests of Local Entities before the political-administrative bodies of their territory for the achievement of the political and social objectives that are theirs;
- the development and consolidation of the European democratic spirit at municipal level, based on autonomy and solidarity between local authorities;
- The promotion and conduct of studies for a better understanding of the problems and circumstances in which local life develops;
- Seek the best functioning of Public Services:
- Provide services and management of common affairs;
- Disseminate the knowledge of the local institutions, promoting the participation of citizens;
- Promote other activities that, not specified in the previous points, are similar to them.

With regard to FEMP, the Spanish Federation of Municipalities and Provinces, is a Spanish association of local entities that brings together municipal councils, provincial municipalities and island municipalities in a total of 7,412 entities.

The founding and statutory objectives of the FEMP are the promotion and defense of the autonomy of the cultural and provisions; the representation and defense of the general interests of the and international interests vis-à-vis other public administrations; the development and consolidation of the European spirit at local level, based on autonomy and solidarity between the authorities. locals; the promotion and promotion of relations of friendship and cooperation with the local and their organizations, especially in the European, Ibero-American and Arab spheres; the provision, directly or through companies or entities, of all types of services to the Local companies or entities dependent on them and any other purpose that directly or indirectly affects the entities of the Federation.

FEMP was born in the assemblies, held in Torremolinos (Malaga) on 13 and 14 June 1981, and was incorporated under the provisions of the Fifth Additional Provision of Law 7/1985, of 2 April. Subsequently, the association of public property was declared by agreement of the Council of Ministers on June 26, 1985. It is the Spanish section of the Council of European Municipalities and Regions (CMRE), and is the official headquarters of the Ibero-American organization for Intermunicipal Cooperation (OICI).

FEMP maintains relations with federations of local entities at the regional level following a voluntary standard, and a protocol is signed that specifies the relationship. There are 16 federations with which this type of protocol has been signed:

- Andalusian Federation of Municipalities and Provinces;
- Aragonese Federation of Municipalities, Municipalities and Provinces;
- Asturian Federation of Counties;
- Federation of Local Entities of the Balearic Islands;
- Canary Federation of Municipalities;
- Federation of Municipalities of Cantabria;
- Regional Federation of Municipalities and Provinces of Castile and León;
- Federation of Municipalities and Provinces of Castilla-La Mancha;
- Federation of Municipalities of Catalonia;
- Federation of Municipalities and Provinces of Extremadura;
- Galician Federation of Municipalities and Provinces;
- Federation of Municipalities of Madrid;
- Federation of Municipalities of the Region of Murcia;
- Federation of Municipalities and Councils of Navarre;
- Riojana Federation of Municipalities;
- Valencian Federation of Municipalities and Provinces;
- In addition to these, it also maintains relations with the Association of Basque Municipalities-EUDEL.

For the national thematic networks promoted by the FEMP, DIPBA is a member of the following networks:

A) **The Spanish Network of Cities for Climate**, which is the Section of the FEMP formed by the Local Governments that are integrating climate change mitigation and adaptation into their policies, as well as by the Spanish Office of Climate Change, under the Ministry of Ecological Transition and the Demographic Challenge.

The Network arises from the need detected between City Councils and Provincial Councils for coordination in the fight against climate change. Since its inception, it has coordinated and promoted local policies to combat climate change in Spanish cities and towns, allowing better results in the fight against climate change and in mitigating its effects.

The Network is a technical support tool that provides tools for Local Governments to achieve their goals. It is also the main means of transferring the objectives of national climate change policy and energy management to the local scale. To this end, the Network has developed projects, technical documents and manuals to promote the implementation of more effective actions in the fields of energy, mobility, waste management and building and urbanism, both in the field of mitigation and adaptation, which can be applied in cities.

To be part of the Network, Local Governments must meet some formal requirements, the most important of which are the municipal agreement to join the Network, the appointment of a political and technical representative and the payment of an annuity; and some sectoral requirements, which may vary depending on the degree of commitment that municipalities want to assume when joining the Network.

The municipality must determine a set of actions with minimum criteria for its adhesion, which must be integrated into an Action Plan, approved by the municipality, which includes measures in the fields of energy, transport, building and urbanism, with the aim of laying the institutional foundations for the progressive reduction of greenhouse gas emissions in the municipality.

In addition to the specific requirements for action, cities participating in the Network must assume the commitments made in the Paris Agreement, approved at COP 21, which establishes the global framework for combating climate change and promotes the transition to the economy, low in emissions and resilient to climate change.

Currently, more than 60% of the Spanish population resides in the Local Governments of the Network (364 local entities).

B) **The Network of Local Governments + Biodiversity**, created in 2007, is the Section of the Spanish Federation of Municipalities and Provinces (FEMP) that brings together 252 cities and towns committed to sustainable development and the protection of biodiversity. The activity of this Network aims to promote local policies for the conservation and increase of biodiversity and natural resources, the improvement of the aquatic environment, the safeguarding of ecosystems and the improvement of ecological connectivity.

The goal of the Network of Local Governments + Biodiversity is to become an instrument of technical support to Local Corporations, offering them tools to achieve sustainable development. The basic fields of action of the Network are flora, fauna, habitats, the aquatic environment, public awareness, the recovery of degraded natural spaces, the fight against invasive species, spatial planning, the improvement of ecological connectivity and Biodiversity as an engine of economic dynamization.

To be part of the Network, Local Governments must meet some formal requirements, the most important of which are the municipal agreement to join the Network, the appointment of a political and technical representative and the payment of an annuity; and some sectoral requirements, which may vary depending on the degree of commitment that municipalities want to assume when joining the Network.

The Network establishes a series of lines of action, among which the following stand out:

- The implementation of plans, programs and activities for better knowledge and monitoring of biodiversity;
- Technical support to municipalities;
- Creation of a web page;
- Creation of a forum for the exchange of experiences;
- Promotion of training on conservation and promotion of biodiversity;
- Implementation of joint awareness actions, aimed at municipal managers and society, on sustainable development;
- Publication and dissemination of materials;
- Organization of a Citizen Forum to inform the population about the measures that the municipality will adopt to achieve the objectives of the Network, promoting its participation in the application of these measures.

The Network's lines of action are structured through four working groups: Green infrastructures and nature-based solutions, Spatial Planning, Invasive Alien Species and Urban Species, and Environmental Education and Dissemination.

With regard to governance in the provincial territory, the relationship between the DIPBA and the local entities of the province of Badajoz is based on what is established in Law 7/1985, of April 2, which regulates the Bases of the Local Regime, which in article 31 defines the province:

1. The Province is a local entity determined by all the Municipalities, with its own legal personality and full capacity for the pursuit of its purposes.
2. The Province's own and specific objectives are to guarantee the principles of inter-municipal solidarity and balance within the framework of economic and social policy, and in particular:

a) Ensure the full and adequate provision throughout the provincial territory of the services of municipal competence;
b) Participate in the articulation of the local administration with the Autonomous Community and with that of the State;
3. The government and the autonomous administration of the Province correspond to the Provincial Council or other Corporations of a representative character.

The DIPBA relates to the municipalities of the province through different forms, among which stands out its own governing body, the Plenary, composed of deputies of territorial extraction, as well as through the Office of Attention to the Mayors of Badajoz.

PORTUGAL

In Portugal, in the Central Alentejo, the Intermunicipal Community of Central Alentejo (CIMAC), without prejudice to the attributions transferred by the Central Administration and the municipalities, aims to pursue the following public purposes:

- Promotion of the planning and management of the economic, social and environmental development strategy of the Central Alentejo territory;
- Articulation of municipal investments of intermunicipal interest;
- Participation in the management of programs to support regional development, namely within the scope of the National Strategic Reference Framework – QREN;
- Planning of the public entities' actions, of a supra-municipal scope.

The Intermunicipal Community also ensures the articulation of the actions between the municipalities and the services of the Central Administration, in the following areas:

- Public supply networks, sanitation infrastructure, wastewater treatment and municipal waste;
- Health equipment network;
- Education and vocational training network;
- Spatial planning, nature conservation and natural resources;
- Civil security and protection;
- Mobility and transport;
- Public facilities networks;
- Promotion of economic, social and cultural development;

- Network of cultural, sports and leisure.

The Intermunicipal Community corresponds to the Level III TERRITORIAL UNIT (NUT III) of Central Alentejo, according to Decree-Law No. 68/2008, of April 14, being composed by the following municipalities, identified as key actors at the local level:

- Municipality of Alandroal;
- Municipality of Arraiolos;
- Municipality of Borba;
- Municipality of Estremoz;
- Municipality of Évora;
- Municipality of Montemor-o-Novo;
- Municipality of Mora;
- Municipality of Mourão;
- Municipality of Portel;
- Municipality of Redondo;
- Municipality of Reguengos de Monsaraz;
- Municipality of Vendas Novas;
- Municipality of Viana do Alentejo;
- Municipality of Vila Viçosa.

In the case of municipalities, these have as their primary attributions the promotion and safeguarding of the own interests of their respective populations, acting a set of domains that stand out some as:

- Rural and urban equipment;
- Energy;
- Housing;
- Civil protection;
- Environment and basic sanitation;
- Spatial planning and urbanism;
- External cooperation.

In concrete terms, and within the scope of the LIFE-myBUILDINGisGREEN project, the Municipality of Oporto is responsible for:

- the management, maintenance and conservation of the school park of the public network corresponding to the 1st Cycle of Basic Education;
- the pursuit of a set of regulations arising from spatial planning;
- the conservation and improvement of green and blue infrastructure;
- the management of the urban water cycle in its multiple functionalities;
- the promotion of energy efficiency.

For more information on the type of key entities identified at the local level, you can consult the Document Platform.

The following is a set of governance tools at the local level that were identified through the meetings held with key entities and actors under the C4 action of the LIFE-myBUILDINGisGREEN project.

3.1 NBS IN BUILDING CONSTRUCTION AND MAINTENANCE REGULATIONS

DIPBA

Within the framework of FEMP Red and + Biodiverse, of which DIPBA has been a member since 2021, it participates in its annual meetings, as well as in the Green Infrastructures working group, transferring the experience gained from the implementation of the LIFE Project – My building is green and knowing the experiences in this area of the network partners. Several recommendations for the contracting of the services of conservation and maintenance of the Green Infrastructure are also addressed.

The dissemination of the network's actions in the territory of the province of Badajoz is carried out through the Office of Attention to the Mayors of the DIPBA, dependent on the Presidency Area of the Provincial institution.

The Network + Biodiversity is a governance instrument that facilitates the inclusion of the NBS in the agenda of municipalities, since, so far, most local entities of medium or small size do not have a sufficiently broad implementation or knowledge. In addition, it is a source of good practice at local level, promoted through its annual awards.

On the other hand, another governance tool is the Official College of Surveyors and Technical Architects of Badajoz (COAATBA), which forms a wide network of professionals who can serve as advice for the development of regional green infrastructure strategies, including NBS as alternatives.

CIMAC

CIMAC has promoted the awareness and dissemination of knowledge about NBS through meetings with its associated municipalities, which are responsible for the elaboration of regulations for the construction and maintenance of buildings on their territories. Each municipality is responsible for the elaboration of its own instruments and to define, the rules to be followed in the construction/rehabilitation of buildings, along with other documents at national level.

All the municipalities in the region, due to the high temperatures recorded in the summer, are interested in introducing, in the building regulations, measures that minimize the impact of climate change and that provide comfort and well-being to their users. With regard to public buildings, it is up to the mayors and municipal technicians to consider the use of more sustainable solutions, such as NBS. In private buildings, it is up to the Architects responsible for the elaboration of the projects to include NBS as an alternative standard of construction. But to achieve this goal, it is necessary that each municipality creates its strategy of dissemination and awareness, starting by giving the example, applying NBS in public buildings.

MUNICIPALITY OF OPORTO

As a result of the review process of the Municipal Master Plan, the Municipality of Oporto sought to instill sustainability and climate resilience criteria in the definition of the guiding principles of the environmental system that resulted in the following:

- Protect and enhance natural resources by promoting biodiversity and native vegetation, the balance of the hydrological cycle, privileging the denaturalization of water lines and the increase of green spaces available for their enjoyment;
- improve protection and adaptation to natural hazards, in particular those arising from climate change;
- Ensure acoustic levels that allow the improvement of the quality of the urban environment;

- Promote the use of natural-based, energy efficient and bioclimatic solutions in all interventions, namely those provided for in the regulation of the Índice Ambiental do Porto (IAP).

In this context, of promoting principles of construction and requalification sustainable, efficient and resilient, the Municipality of Oporto has invested in the implementation of sustainable solutions in the construction and requalification of municipal buildings, such as the Campanhã Intermodal Terminal, the headquarters building of Oporto Ambient and GO Porto and the requalification process of the Municipal Housing Park, with the implementation of energy efficiency solutions to increase bioclimatic comfort and reduce the energy bill of the most vulnerable families in economic and social situations.

All the information related to the meetings held is contained in the Alfresco platform and in the Documentary Platform.

3.2 COMMITMENTS AND PROPOSALS FOR MUNICIPAL REGULATIONS

DIPBA

The Network of Local Governments + Biodiversity of FEMP frequently collaborates with the Spanish Association of Public Parks and Gardens (AEPJP) also in the elaboration of models of municipal ordinance of Green Infrastructure. Currently, they also have the collaboration of the Association of Green Infrastructure Management Companies (ASEJA) and the Ministry of Ecological Transition and Demographic Challenge (MITECO), for the elaboration of a draft ordinance that as of 10/2/2023 was in the drafting phase.

The existence of a standardized ordinance that serves as a model for Spanish municipalities facilitates the planning and execution of the NBS at the local level. It is a transversal tool that involves different areas of management of a local entity and has the potential to ensure the replication of the results of the project LIFE - My building is green in the territory of the province of Badajoz. In this sense, any action in the matter can be disclosed through the Office of Attention to Mayors and the DIPBA, dependent on the Presidency Area of the Provincial institution.

CIMAC

Currently, most of the 14 associated municipalities are in the process of defining strategies and reviewing their Municipal Master Plans.

Along with the project LIFE- My building is green, the project "Adapta.Local.CIMAC - Planning of Municipal Climate Adaptation in Central Alentejo" is taking place at CIMAC, which also addresses the theme of climate adaptation.

The Adapta project is in the operational strategy phase and aims to integrate, in the instruments of territorial management, climate adaptation measures. Some municipal technicians are already working, together with CIMAC, on this project.

In the meetings promoted by CIMAC, within the scope of the project LIFE - My building is green, all municipal technicians agreed that, along with other climate adaptation measures that are currently being worked on by municipalities, it would also be interesting to include in this study the implementation of NBS as a strategy.

With regard to public buildings, it is up to mayors and municipal technicians to consider the use of more sustainable solutions, such as NBS. Regarding private buildings, it is up to the Architects responsible for the elaboration of the projects to include as an alternative the NBS.

MUNICIPALITY OF OPORTO

As mentioned earlier, the Municipality of Oporto recently published its Municipal Master Plan whose regulation points to the promotion of the use of sustainable solutions in the processes of construction and urban requalification, as well as the promotion of green and blue infrastructures with a view to the resilience of the territory and the built.

It should be noted that the Municipality of Oporto is preparing its Municipal Climate Action Plan that stems from the process of updating and operationalizing the Municipal Strategy for Adaptation to Climate Change, published in 2016, and that will respond to the provisions of the Basic Law of Climate, Law No. 98/2021 of December 31.

In terms of energy efficiency, the Municipality is still running the Oporto Solar project, in partnership with the Oporto Energy Agency and Domus Social, a municipal housing company for the installation of photovoltaic systems with 29 municipal buildings, including 25 primary schools.

Also, for the improvement of energy efficiency, the Municipality together with the Oporto Energy Agency are implementing the project "Oporto Energy Elevator" (PEER), a European project whose

central objective is to combat energy poverty by promoting energy efficiency in buildings and promoting self-consumption of energy from clean sources.

Also, the collaboration of the Energy Agency of Oporto the Municipality provides the "Oporto Energy Hub", a space for the promotion of energy savings and increased comfort in housing. The Municipality intends the PEH to be a space of proximity, with the objective of providing families with the necessary information to reduce their energy costs through the implementation of energy efficiency measures and decentralized production of renewable energy.

3.3 TAX INCENTIVES OF CITY COUNCILS

DIPBA

The Spanish tax system is organized as a set of taxes, which are required by the different levels of the Public Treasury of Spain (State, Autonomous Communities and Local Entities) to obtain coercive revenues to finance public spending.

The original competence to impose taxes corresponds exclusively to the State by law, but the Autonomous Communities and Local Entities may also institute and demand taxes, in accordance with the Constitution and the laws.

In the case of Spain, the set of resources available to local authorities is contained in Article 2.1 of the Consolidated Text of the LRHL Local Treasury Law, which derive from:

(b) own taxes classified as fees, special contributions and surcharges payable on taxes of the autonomous communities or other local entities.

The implementation of the NBS in Spain is supported, among other instruments, by the National Strategy for Infrastructure and Green Connectivity and Ecological Restoration, which responds to the requirements established by the European Union and is the strategic planning document that regulates the implementation and development of Green Infrastructure in Spain. The Strategy establishes a harmonized administrative and technical framework for the entire Spanish territory. It entered into force on July 14, 2021 through Order PCM/735/2021, of July 9, which approves the National Strategy for Green Infrastructures and Connectivity and Ecological Recovery.

The development of a system of tax incentives is associated with the approval and implementation of the Regional Green Infrastructure Strategies, which are currently being

approved in the different Autonomous Communities. In the case of Extremadura, its approval is scheduled for the first half of 2023.

At this time, local knowledge of the NBS is beginning to be incorporated into municipal management, so it is premature to establish a system of tax incentives based on this.

As relevant tools to work in municipalities in relation to the delimitation of tax incentives at the local level, FEMP, FEMPEX and DIPBA are identified through their Autonomous Organization for Collection and Management of Taxes (OAR), which is a service of management, collection and supervision of taxes and other revenues of the Municipal Chambers and other Delegating Entities.

CIMAC AND MUNICIPALITY OF OPORTO

The basis and the main guiding principles of the tax system Portuguese are described in the Constitution of the Portuguese Republic, resulting in particular the principle of tax legality, the prohibition of retroactivity of the tax law and the principle of tax equality. In this regard, the Constitution assumes as its main purpose the raising of revenue by the State without, however, neglecting objectives of an extra fiscal nature.

In the Municipal Councils, one of the tax revenues at your disposal is the Municipal Property Tax (IMI). The IMI revenue reverts to the City Council where the property is located, being one of the main sources of direct financing of the Portuguese municipalities.

The IMI focuses on the patrimonial value of the buildings. This tax came into force with Decree-Law no. 287/2003 of November 12 and reformed the Land Contribution Code. The IMI focuses on rustic, mixed and urban buildings and the rate charged every year is defined annually by each municipality based on the limits established by the Government.

In Oporto, the publication of the new Municipal Master Plan opened the door to the inclusion of incentives for the implementation of NBS and other efficiency and sustainability measures in the building, and that and provide for the reduction of fees and other charges associated with the licensing of urban operations. This instrument, the Environmental Index of Oporto is still in the process of regulation, as well as the definition of the weighting criteria and the clarification of the financial benefits to be applied, and the expected will reside in the reduction of municipal taxes.

Another measure that is being implemented in the Municipality of Oporto and present in the PDM is the creation of a municipal fund for the allocation of own revenues to invest in the implementation of solutions with a view to increasing the climate resilience of the territory. This

fund called the Municipal Fund for Environmental and Urban Sustainability has as objectives the following:

- Operationalization of the processes of redistribution of capital gains according to principles of equity and justice, provided for in this Plan;
- Land and financial support for the implementation of the Plan, namely environmental and /or urban safeguarding and enhancement operations;
- Provision of land for infrastructure, equipment and public green spaces and the development of municipal housing policy.
- This fund will have as revenues pecuniary compensation charged to urban operators that result from non-compliance with the PDM, as well as other funds that the Municipality intends to allocate in order to comply with the environmental recovery operations that are associated with it. With these measures, the Municipality of Oporto intends: On the one hand, encourage the improvement of private buildings and green infrastructures for public use, through financial incentives for the implementation of sustainable solutions;
- And on the other hand, take advantage of the funds collected through the non-implementation of these solutions by the private, to finance operations to be carried out by the Municipality itself, as a way of guaranteeing the resilience of the municipal territory, to occur voluntarily by the private, or to be implemented by the Municipality, but financed by the non-compliant operators.

In national terms, the implementation of NBS in Portugal is supported, among other instruments, by the National Strategy for Adaptation to Climate Change (ENAAC).

ENAAC 2020, now extended until 31 Dec 2025, sets out objectives and the model for the implementation of solutions for the adaptation of different sectors to the effects of climate change: agriculture, biodiversity, economy, energy and energy security, forests, human health, safety of people and goods, transport, communications and coastal zones.

To this end, ENAAC aims to improve the level of knowledge about climate change and promote the integration of climate change adaptation into sectoral policies and territorial planning instruments. ENAAC also aims to help central, regional and local government and policy makers to find the means and tools for the implementation of adaptation solutions based on technical-scientific knowledge and good practices.

ENAAC integrates six thematic areas transversal to all sectors: research and innovation, financing and implementation, international cooperation, communication and dissemination, adaptation in spatial planning and adaptation in the management of water resources.

It is up to the Portuguese Environment Agency (APA) to coordinate the implementation of ENAAC and promote its updating in the light of the evolution of scientific knowledge and Community and international guidelines in this area.

At this time, local knowledge of the NBS is beginning to be incorporated into municipal management, so it is premature to establish a system of tax incentives based on this. Within the scope of the project LIFE - My building is green, it is intended that municipalities adopt strategies that enable the implementation of NBS in both public and private buildings. In public buildings, the starting point is the awareness of municipal mayors and technicians for the adoption of these measures in the projects of their buildings. At the particular level, the starting point is the dissemination of knowledge and the creation of strategies that lead property owners to choose these solutions over other less sustainable ones.

3.4 RECOMMENDATIONS FOR PRIVATE BUILDINGS

DIPBA AND CIMAC AND MUNICIPALITY OF OPORTO

Currently, local knowledge about the NBS is beginning to be incorporated into the municipal management, so that the phase that would allow the establishment of recommendations for private housing has not yet begun. The potential advances in the inclusion of these in the Technical Code of the Building, would serve as a normative basis for the delimitation of the activities in the matter, within the scope of municipal competences.

As relevant tools to work in the municipalities in relation to the recommendations of private housing at the local level, in Spain, the FEMP, the FEMPEX and the DIBBA itself, through the Development Area that works on the creation, improvement and maintenance of the infrastructures that belong to the Badajoz province. In addition, another governance tool is the Official College of Surveyors and Technical Architects of Badajoz (COAATBA), which makes up a wide network of professionals who can advise on the development of regional green infrastructure strategies, including NBS as sustainable alternatives.

In the Alentejo, the Commission for Coordination and Regional Development of the Alentejo (CCDR), the Regional Directorate of Culture of Alentejo (DRCAlentejo), the Institute for the Conservation of Nature and Forests (ICNF), the Centre for Studies and Regional and Urban Development (CEDRU) and CIMAC are identified to support the municipalities in the definition of strategies for the inclusion of NBS in private housing. However, these entities do not intervene directly in urban processes. The municipality is responsible for defining the plans covering its territory, within the normative context Portuguese.

In Oporto, the Municipality intends to regulate proposals for sustainability and efficiency solutions to be implemented in urban operations, having defined the Oporto Environmental Index in its PDM. However, this regulatory processes on the listening and inclusion of contributions by a wide range of stakeholders. In the process of regulation, local entities and organizations representing different sectors with an interest in the building were heard. Thus, different municipal units and departments, municipal companies and external organizations such as:

- Departments of the Municipality of Oporto related to Environmental Planning and Management, Green Spaces and Infrastructure Management and Urbanism;
- Águas e Energia do Porto – municipal company;
- GO Porto – Municipal Company of Public Works Management;
- Domus Social – Municipal Housing Company;
- Oporto Energy Agency;
- National Green Roofing Association;
- Order of Engineers;
- Order of Architects;
- AECOPS – Association of Construction Companies and Public Works and Services;
- Real estate developers;
- And other companies and organizations in the construction sector or related sectors;

3.5 NBS INTEGRATED INTO MUNICIPAL GREEN INFRASTRUCTURE STRATEGIES

DIPBA

Currently in Extremadura, the definition of the Municipal strategies for Green Infrastructures is pending the approval of the Regional Strategy for Green Infrastructure. In this sense, the Junta de Extremadura, through the Ministry of Ecological Transition and Sustainability, has opened a governance process with local entities, in which the DIDBA participates, to elaborate the Extremadura Strategy for Green Infrastructures, Connectivity and Ecological Stability.

On the other hand, another governance tool is the Official College of Surveyors and Technical Architects of Badajoz (COAATBA), which makes up a wide network of professionals who can serve as advice for the development of regional green infrastructure strategies, including NBS as alternatives.

To date, it is not known of the existence of Municipal Green Infrastructure strategies that integrate NBS in the province of Badajoz.

CIMAC

Along with the project LIFE- My building is green, the project "Adapta.Local.CIMAC - Planning of Municipal Climate Adaptation in Central Alentejo" is taking place at CIMAC, which also addresses the theme of climate adaptation.

The Adapta project is in the operational strategy phase and aims to integrate, in the instruments of territorial management, climate adaptation measures. Some municipal technicians are already working, together with CIMAC, on this project.

The implementation of the NBS should also be understood by municipalities as a measure of adaptation to climate change. As such, it is intended that it will also be part of this study and that it will be included in the instruments of territorial management.

To date, there are no Municipal Green Infrastructure strategies that integrate the NBS in the Alentejo.

MUNICIPALITY OF OPORTO

At the level of the implementation of natural based solutions and the enhancement of green and blue infrastructures, the Municipality of Oporto has in execution wide range of initiatives and related projects, with the following highlighting:

- Fifth Elevation of Oporto Project – this project, in collaboration with the National Association of Green Roofs, consisted of the implementation of the set of roofs and green roofs existing in the Municipality and the identification of the potential of the existing built park for the installation of green roofs. This project resulted in the identification in 2017 of 131 green roofs existing in the city of Oporto, which correspond to 11 ha and in the recognition of a potential of 25% of buildings in the city with the capacity to receive a green roof.
- The Municipal Climate Change Adaptation Strategy includes a wide range of adaptation options focused on the implementation of natural-based solutions to increase and improve the permeability of the territory, to enhance the afforestation of streets, to requalify and denaturalized the margins of water lines, to increase municipal gardens, to expand green roofs in the city and to improve the bioclimatic of Buildings.
- Plan for the Valorization and Rehabilitation of Water Lines, led by the municipal company Águas e Energia do Porto, has as its main objective to promote the protection and enhancement of the rivers and streams of the city of Oporto with a view to a better adaptation to the effects of climate change and the reduction of the vulnerability of the territory, through the implementation of natural-based solutions.
- The Municipal Master Plan defined as one of the great options of the plan the valorization and expansion of the green and blue infrastructures of the city, essential for the adaptation of the territory to climate change as well as for the sequestration of carbon, predicting by 2030 to double the area of green spaces for public use.

In more operational and specific terms, the Municipality of Oporto is resorting to the dissemination and massification of the use of natural-based solutions in municipal projects. Among these, and along with LIFE-myBUILDINGisGREEN, the following stand out:

- Campanhã Intermodal Terminal – an essential space for the design of a new paradigm of mobility in the city of Oporto, it had 5 ha of implantation area with 90% of green cover and 1600 trees planted, and with capacity for 120 thousand passengers / day.

- Asprela Park corresponds to a green area of 6 ha that allowed the requalification of the Granja stream and the creation of a retention basin with a capacity of up to 10,000 m3 and thus avoid surface flooding and the closure of the metro tunnel in situations of extreme precipitation.
- Requalification of Rio Tinto and Parque Oriental allowed the requalification of an expectant area of the city, and the depollution of one of the most polluted rivers in Europe. This park with more than 20 ha and 3000 trees follows the Rio Tinto to its mouth on the Douro River and represents an important green area of the city.
- Expansion of the Oporto City Park made it possible to add another 10 ha of green area for public use in a project that included the creation of wetlands and ponds, shade areas and a set of new trees.
- URBiNAT is a European project that aims to create a healthy green corridor to boost social inclusion in social housing neighborhoods through the co-creation of social and environmental NBS. From this project will be born the future park of the alameda de Cartes, a space of 4 ha of permeable area and full of solutions of natural base.

The University of Oporto was also selected by the European Commission to be part of the Climate Change Adaptation Mission, being one of the 150 European cities that signed the Mission Charter where it is committed to the adoption and implementation of solutions to increase the resilience of the territory to future climate risks.

3.6 NBS INTEGRATED INTO MUNICIPAL URBAN PLANNING REGULATIONS

DIPBA

In this matter, at the local level, the Associations of Municipalities that intervene in the urban processes together with the municipalities are relevant entities to work in the municipalities with regard to the integration of the NBS in the urban process. (Junta de Extremadura - Ministry of Agriculture, Rural Development, Population and Territory - General Directorate of Urbanism and Spatial Planning).

On the other hand, another governance tool is the Official College of Surveyors and Technical Architects of Badajoz (COAATBA), which forms a wide network of professionals who can serve as

advice for the development of regional green infrastructure strategies, including NBS as alternatives.

Both the Associations of the province of Badajoz and the Official College of Surveyors and Technical Architects of Badajoz (COAATBA) will be contemplated in the dissemination / demonstration actions of the project to promote the knowledge of NBS in the area of small and medium municipalities.

CIMAC

In the Alentejo, the Commission for Coordination and Regional Development of the Alentejo (CCDR), the Regional Directorate of Culture of Alentejo (DRCAlentejo), the Institute for the Conservation of Nature and Forests (ICNF), the Center for Studies and Regional and Urban Development (CEDRU) and CIMAC are identified to support municipalities in the integration of NBS into municipal regulations. However, these entities do not intervene directly in urban processes. Each municipality is responsible for defining the plans that cover its territory, within the normative context Portuguese.

MUNICIPALITY OF OPORTO

In the PDM headquarters, the Municipality of Oporto defined a set of projects for the expansion of the permeable area and the increase and requalification of green spaces for public use that can be consulted in the PDM Implementation Program and Financing Plan.

3.7 NBS AS REFERENCE TOOLS FOR ASSOCIATIONS OF MUNICIPAL ENTITIES

DIPBA

FEMP, through the Spanish Network of Cities for Climate and the Network + Biodiversity, promotes the knowledge and implementation of NBS at the local level, especially through training actions and manuals/guides: Economic Study for the Competition for Conservation and Maintenance Services of Green Infrastructures: models and case study; Municipal Green Infrastructure Guide; Recommendations for contracting services of conservation and

maintenance of Green Infrastructure; City Requalification Program; Nature-Based Solutions as a tool against climate change; among other actions.

At the level of the Autonomous Community of Extremadura, the Federation of Municipalities and Provinces of Extremadura, FEMPEX, has the capacity to report on the NBS and transfer the progress and results of the LIFE project - My building is green to all local entities in the region, so it becomes a very useful tool.

On the other hand, the Covenant of Mayors for Climate and Energy is a European initiative that brings together municipalities that voluntarily commit to meet the objectives of combating climate change, including reducing greenhouse gas emissions by 40%, increasing the use of renewable energy by up to 27%, or adapt municipalities to the effects of climate change. DIPBA is the coordinator of the Pact in the province of Badajoz, through the Rural Development and Sustainability Area. Therefore, it offers the municipalities the technical assistance necessary in their process of adhering to the Pact and monitors the steps elaborated by them. In terms of governance, the Covenant of Mayors can be used to generate synergies with the actions of the LIFE project – My building is green.

Similarly, the network of services dependent on the Department of Education and Employment of the Junta de Extremadura, which integrates public schools and secondary education institutes, together with teacher and resource centers, can be a tool for transferring and knowledge about the project and about the NBS.

CIMAC

CIMAC, through the project LIFE – My building is green has promoted knowledge about NBS at the local level, especially through the meetings that have been held over the last 3 years.

Along with the project "Adapta.Local.CIMAC - Planning of Municipal Climate Adaptation in Central Alentejo" that brings together all the municipalities that voluntarily commit to meet the objectives of combating climate change, CIMAC has sought to show the progress and results in the LIFE project to all the municipalities that make up the Central Alentejo.

MUNICIPALITY OF OPORTO

In terms of networks and dissemination potential, the Municipality of Oporto is part of the Covenant of Mayors for Climate and Energy, similar to DIPBA, so we can jointly enhance synergies for LIFE-myBUILDINGisGREEN.

The Municipality has also joined the Green City Accord, a movement of European cities committed to improving the quality of life of all citizens and accelerating the implementation of relevant EU environmental laws and improving environmental systems in the field of air, water, nature and biodiversity, circular economy and waste and noise.

In climate terms, Oporto participates in two missions of Horizon Europe, the Mission Adaptation to Climate Change and the Mission 100 Smart and Carbon Neutral Cities, in which the Municipality has made the commitment to become neutral by 2030. Participation in these initiatives gives the Municipality the added responsibility to disseminate its good practices and projects in order to reinforce the need to strengthen green and blue infrastructures for adaptation, but also for water and energy efficiency are important for bioclimatic comfort and emission reduction.

Parallel to the participation in the Horizon Europe Missions, the Municipality of Oporto launched a local initiative, the Oporto Climate Pact, in an innovative initiative that seeks to bring together all local actors in the design of making Oporto resilient and adapted to climate change. The Oporto Climate Pact has more than 200 subscribers from the most varied sectors of society, which makes it an essential governance tool for everyone's commitment to sustainability.

COLLABORATION PLATFORM FOR CLIMATE NEUTRALITY IN SPANISH CITIES

This is an initiative launched in October 2022 to help Spanish cities become climate neutral by 2030. This initiative aims to define together the type of solutions available to achieve this goal. The platform is designed as a public action infrastructure and aims to provide services to localities to facilitate and accelerate their transition to decarbonization and resilience.

In this way, the main beneficiaries of the platform will be the Municipal Councils of Spanish cities with more than 50,000 inhabitants or provincial capitals that are willing to achieve full or partial climate neutrality by 2030.

The platform will develop training, learning and capacity building initiatives and facilitate citizen participation and activation processes. It will provide support and accompaniment to cities in the search for financing formulas and raising financial resources in their territories. It will also provide support, for the elaboration of portfolios of transformative projects for mitigation and adaptation to climatic changes, to municipalities in the search for financing and fundraising formulas.

In this sense, the LIFE project – My building is green can play a key role in this platform by sharing its experience in the design, implementation and testing of the project's Nature Solutions, facilitating their subsequent replicability in other cities and building typologies.

At the end of 2022, members of the LIFE – My building is green project met virtually with representatives of Climate – KIC to explore possible synergies between both initiatives. Due to the fact that the Platform is currently in the planning phase, the possible collaborations between both initiatives cannot be defined concretely. However, it is planned to continue the work between the platform and the partners of the LIFE project, exploring the possibilities of involving the DIPBA, as well as contributing with the technical knowledge of the Royal Botanical Garden (RJB-CSIC), the Eduardo Torroja Institute of Construction Sciences (IETcc-CSIC) and the CARTIF technological center, in matters related to the implementation of the Solutions Based on the Nature of the project.

The Fiscal Council of this platform is made up of the Biodiversity Foundation and the Spanish Office for Climate Change of the Ministry of Ecological Transition and Demographic Challenge. For its part, EIT Climate - KIC is responsible for its operation, in collaboration with the Polytechnic University of Madrid.

NATIONAL STRATEGY FOR ADAPTATION TO CLIMATE CHANGE (ENAAC 2020) – PORTUGAL

ENAAC 2020, now extended until 31 Dec 2025, sets out objectives and the model for the implementation of solutions for the adaptation of different sectors to the effects of climate change: agriculture, biodiversity, economy, energy and energy security, forests, human health, safety of people and goods, transport, communications and coastal zones.

To this end, ENAAC aims to improve the level of knowledge about climate change and promote the integration of climate change adaptation into sectoral policies and territorial planning instruments. ENAAC also aims to help central, regional and local government and policy makers to find the means and tools for the implementation of adaptation solutions based on technical-scientific knowledge and good practices.

ENAAC integrates six thematic areas transversal to all sectors: research and innovation, financing and implementation, international cooperation, communication and dissemination, adaptation in spatial planning and adaptation in the management of water resources.

It is up to the Portuguese Environment Agency (APA) to coordinate the implementation of ENAAC and promote its updating in the light of the evolution of scientific knowledge and Community and international guidelines in this area.

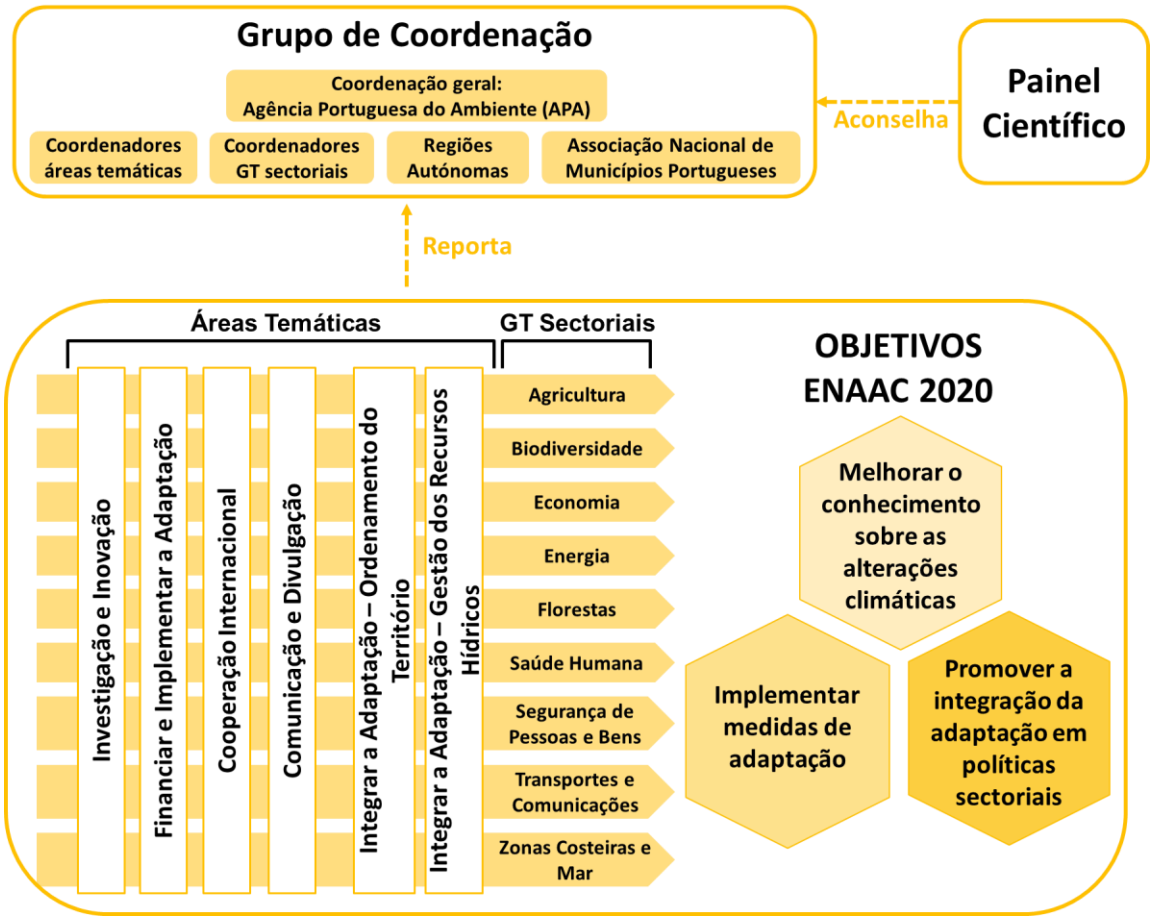

Image 1: Structure of ENAAC. Source: https://apambiente.pt/clima/estrategia-nacional-de-adaptacao-alteracoes-climaticas.

REGIONAL LEVEL

For more information on the type of key entities identified at regional level, see the Document Platform.

DIPBA

The DIPBA, since the beginning of the project, has maintained frequent contacts with the Junta de Extremadura, in particular, with the different Ministries competent in matters of NBS:

- Ministry of Education and Employment and General Secretariat of Education;
- Ministry of Ecological Transition and Sustainability - General Directorate of Sustainability;
- Ministry of Mobility, Transport and Housing - Directorate-General for Architecture and Construction Quality and Directorate-General for Housing;
- Ministry of Agriculture, Rural Development, Population and Territory - Directorate-General for Urbanism and Spatial Planning.

In addition, meetings have been held with the heads of these entities to define the location of the prototypes of the LIFE – My building is green project, as well as to address the possibilities of including NBS in the agendas of the respective organizations.

Briefly, the reasons on which the suitability, in terms of governance, of the entities referred to is based:

- **General Secretariat of Education**: These are the regional bodies responsible for the coordination and supervision of non-university education subjects with competences in the preparation, monitoring and evaluation of general action plans. Among his competencies are the planning and management of teacher training programs and the research of educational innovation, so that the regional use of NBS in educational centers can be promoted.
- **General Directorate of Sustainability**: It is responsible for the promotion, execution and control of the conservation of nature and the environment, programming and proposing actions in relation to protected natural areas and biodiversity. In addition, it is responsible for the planning, management and control of activities and projects with repercussions on the environment, for the environmental assessment of plans, programs and projects, as well as for the granting of environmental authorizations to which projects and activities are subject. Likewise, it is responsible for the functions of air quality and protection of the atmosphere, landscape protection, as well as noise, light and radiological pollution.
- **Directorate-General of Architecture and Quality of Construction and Directorate-General of Housing**: The first corresponds to the exercise of powers over architecture, with special emphasis on the constructive quality, efficiency, technical control of the building and promotion of new types of construction, as well as the adaptation of housing to people with reduced mobility, regeneration, rehabilitation and urban renewal and its normative development. Corresponds to the second, the exercise of competences in the field of housing with a special focus on programmers and benefits that enforce the constitutional right to dignified, quality and adequate housing, proposing and adopting the necessary measures to avoid the risk of social exclusion in housing and mitigate its consequences; to promote diversity and social cohesion in the residential sectors of cities and towns, also supporting the Housing Agreement.
- **Directorate-General of Urbanism and Spatial Planning**: It is responsible for exercising the functions in matters of spatial planning and urbanism, for the rational use of the land,

according to its social function. In addition, it coordinates, directs and ensures the functioning of the Commission for Urbanism and Spatial Planning of Extremadura. It also promotes, elaborates and processes the instruments of spatial planning, without prejudice to the competences attributed to other organs of the Administration.

On the other hand, another governance tool at the regional level is the Official College of Architects of Extremadura (COADE)), which forms a wide network of professionals who can serve as advice for the development of regional green infrastructure strategies, including NBS as sustainable alternatives.

Similarly, the network of Centers and Services dependent on the Department of Education and Employment of the Junta de Extremadura, which integrates public schools and secondary education institutes, together with teacher centers and resources, can constitute a tool for transfer and knowledge about the project and NBS.

CIMAC

CIMAC, since the beginning of the project, has maintained contacts with the regional entities, namely:

- **Commission for Coordination and Regional Development of Alentejo (CCDR Alentejo):** It is a peripheral service of the direct administration of the State and endowed with administrative and financial autonomy. Its mission is to ensure the coordination and articulation of the various sectoral policies of regional scope, as well as to implement the policies of environment, spatial planning and cities, and technically support local authorities and their associations, at the level of their geographical area of operation. The attributions of the CCDR Alentejo are: To contribute to the definition of regional development policy within the framework of the country's economic and social development policy, boosting and participating in the strategic planning processes of territorial basis, as well as fostering partnerships between regional agents, developing studies of articulation of sectoral policies in the regional space and developing integrated programs aimed at territorial cohesion and competitiveness; Ensure the articulation between institutions of the direct administration of the State, local authorities and similar entities, and boost cross-border interregional cooperation, contributing to the European integration of the regional area and to the strengthening of its competitiveness, based on

sustainable development strategies at regional and local levels; Promote and ensure an adequate intersectoral articulation between deconcentrated services of regional scope, in terms of strategic coordination and planning of interventions of an environmental, economic and social nature in a perspective of Regional development; Technically support local authorities and their associations; Implement, evaluate and supervise, at regional level, environmental and spatial planning policies; Ensure the preparation, monitoring and evaluation of territorial management instruments, ensuring their articulation with national and regional territorial management instruments; Ensure compliance with the management responsibilities entrusted to them within the framework of the European Union's cohesion policy in Portugal; To stimulate and promote, in the respective region, the necessary public policies with the objective of contributing to its economic and social competitiveness and sustainability; Implement the measures relating to the application of the State's incentive schemes to the media, as well as ensure the supervision of their compliance, in accordance with the law.

- **Regional Directorate of Culture of Alentejo (DRCAlentejo)**: It is a peripheral service of the direct administration of the State, endowed with administrative autonomy. Among other attributions, DRCAlentejo aims to accompany the actions related to the safeguarding, valorization and dissemination of the architectural heritage.
- **Institute for the Conservation of Nature and Forests (ICNF**): It is a body of the indirect administration of the State Portuguese with the mission of contributing to the valorization and conservation of aspects related to forest resources and Nature and Biodiversity in Portugal. It is invested in the functions of national forestry authority and national authority for the conservation of nature and biodiversity, being supervised by the ministries of Environment and Agriculture, Forestry and Rural Development. Among others, its duties are to manage the implementation of national policies for the conservation of nature and biodiversity, applying in Portugal various Community legislation and international agreements and conventions in the field of forests and nature conservation.

In conclusion, regional governance should address the following realities to complement the NBS:

- Disseminate the concept and benefits of NBS among municipalities, in order to sensitize managers to their potential;
- Facilitate the availability of training tools, directed to the training of managers and promoters of NBS focused, in particular, on the solutions and prototypes developed by the project LIFE – My Building is Green;
- Articulate the implementation of the NBS at the local level with the objectives and priorities established by other territorial policies such as those related to the fight against climate change, as well as the strategies of green infrastructure and biodiversity.

AT LOCAL LEVEL

MUNICIPALITY OF OPORTO

For the implementation of the project the Municipality of Oporto maintained a close relationship with representatives of the various entities and municipal units with participation, namely with the Municipal Department of Education, responsible for school management, but also with entities and organizations with an important importance for the implementation of the project, and which we highlight:

- Domus Social, Municipal Housing Company and which has the responsibility of conservation and maintenance of the school park. One of the important factors to take into account are the maintenance and conservation costs and care that natural-based solutions require. In this sense, it is essential that the entities or organizations responsible for maintenance, as well as the quantification of the fixed costs with the maintenance of the solutions are considered together, in order to provide the necessary monitoring and extract as much of the benefits as possible. It should also be noted that the pilot school of Oporto had an energy production component, through the implementation of photovoltaic panels, so the role of Domus Social, or entity responsible for energy efficiency is involved whenever there are solutions in the energy sector.
- GO Porto, Empresa Municipal de Obras Públicas is the entity owned by the Municipality of Oporto that holds the competence to contract and manage public works. In this sense, it is important to involve entities with knowledge and experience in public procurement, for careful management according to public procurement criteria.

- The National Association of Green Roofs accompanied the project in Oporto in order to align the solutions designed for the pilot school with the city's strategy and objectives for green roofs. It is an organization with recognized know-how and experience in the design, development and implementation of green roofs and walls that allowed to strengthen the prototypes designed, as well as to ensure the monitoring of the installation of prototypes.
- Agência de Energia do Porto participates in the Oporto Solar project, which allowed photovoltaic panels to be installed in the Oporto pilot school and thus integrate different solutions and incorporate multiple benefits into a single prototype. It is essential to look for partners who can leverage the potential of solutions by integrating multiple valences and functionalities that best serve the proposed objectives.
- Falcão Basic School and Cerco Schools Group represent the end customer. They are the users and beneficiaries of the solutions and therefore must be involved in the decision-making and design of the solution. It is the students and users of the buildings who experience the comfort or lack thereof, so they reflect reality and the desirable, and thus are essential contributors to any solution design to be implemented.

In conclusion, local governance should address the following realities to implement NBS:

- Disseminate the concept and benefits of NBS among the various technicians and municipal managers with responsibility for the management and regulation of the building or infrastructures and municipal equipment, in order to raise awareness of the multiple advantages and benefits of NBS for the climatic comfort and sustainability of the building;
- Disseminate the concept and benefits of NBS among the various users, in order to raise awareness of the advantages and benefits of NBS for climate comfort, in particular for air quality;
- Massify and facilitate the availability of training tools, directed to the training of managers, technicians and real estate developers to enhance the use and dissemination of NBS in their projects;
- Articulate the implementation of the NBS with the strategic objectives and priorities established by local authorities, seeking to harmonize with the policies and instruments of territorial management, combating and adapting to climate change, promoting green

infrastructures and biodiversity, among others. In order to put the NBS at the service of the city and the citizens.

3.8 TERRITORIAL AND INTER-MUNICIPAL AGREEMENTS

DIPBA

DIPBA provides detailed information on the LIFE Project – My building is Green to all municipalities in the province (175), through different tools and, in particular, through the Office of Mayors. Agreements were signed by the municipalities with the objective of promoting initiatives for the implementation of the SBN.

At the regional level, a flow of information on the implementation of the Project was established with the Junta de Extremadura, specifically with the Ministries and Directorates General mentioned above.

CIMAC

CIMAC and the 14 associated municipalities signed the Agreement of Principles on the use of NBS in adapting to climate change on May 28, 2021.

The Agreement defines the terms to establish broad lines of collaboration to promote the joint implementation of consultative or other activities that result in the climate adaptation of school centers through the implementation of nature-based solutions described in the European project LIFE17 CCA/ES/000088 – LIFE My Building is green.

Collaboration between the parties to the Agreement, to be promoted by either Party, may include the following types of actions:

- Encourage knowledge of Nature-Based Solutions among teachers and students as climate adaptation tools;
- Expert advice for the energy rehabilitation of school centers through the implementation of nature-based solutions;
- Collaborate and advise in the diagnosis of the energy audit of all school centers in Central Alentejo as a necessary contribution to decision-making in favor of a just and sustainable energy transition of school centers;
- Properly evaluate climate adaptation plans and school center projects;

- Promote mitigation, adaptation and compensation actions in school centers in Central Alentejo;
- Collaborate in awareness actions and dissemination of nature-based solutions as climate adaptation tools in education buildings and social services.

To ensure the momentum of the Partnership Agreement, a one-member Monitoring Committee was set up for each of the parties. This Commission will be the decision-making, monitoring and evaluation body of the actions arising from the agreement and will present reports and proposals to the bodies of both parties.

3.9 NBS INTEGRATED INTO REGIONAL GREEN INFRASTRUCTURE STRATEGIES

DIPBA

The Ministry of Ecological Transition and Sustainability of the Junta de Extremadura, through the General Directorate of Sustainability, is competent in terms of promotion, implementation and control of nature and environmental conservation, programming and proposal of actions in relation to protected natural areas and biodiversity. In addition, it is responsible for the planning, management and control of activities and projects with repercussions on the environment, for the environmental assessment of plans, programs and projects, as well as for the granting of environmental authorizations to which projects and activities are subject. Likewise, it is responsible for the functions of air quality and protection of the atmosphere, landscape protection, as well as noise, light and radiological pollution.

The Directorate General for Sustainability is responsible for the elaboration of the Strategy of Extremadura for Green Infrastructures, connectivity and ecological restoration, for which it developed a consultation process that involved local entities in the region, including DIBPA.

Other governance tools at the regional level are the General Secretariat of Education; the General Directorate of Sustainability; the Directorate-General for Architecture and Construction Quality; the Directorate-General for Housing and the Directorate-General for Urbanism and Spatial Planning.

On the other hand, the Official College of Architects of Extremadura is identified as a governance tool at the regional level, which makes up a wide network of professionals who can serve as advice for the development of regional green infrastructure strategies, including NBS as sustainable alternatives.

Similarly, the network of Centers and Services dependent on the Department of Education and Employment of the Junta de Extremadura, which integrates public schools and secondary education institutes, together with teacher centers and resources, can constitute a tool for transfer and knowledge about the project and NBS.

CIMAC

The following entities are identified in the Alentejo, which can support municipalities in regional green infrastructure strategies: Commission for Coordination and Regional Development of Alentejo (CCDR Alentejo; Regional Directorate of Culture of Alentejo (DRCAlentejo) and Institute for the Conservation of Nature and Forests (ICNF).

Also, the groupings of schools can be a tool for disseminating knowledge about the project and about the NBS.

NATIONAL LEVEL

SPAIN

The main entities and key actors identified at national level are ministerial units competent in the field of environment, climate change and energy efficiency (e.g. Spanish Ministry for Ecological Transition and Demographic Challenge), ministerial units with competences in green infrastructures (e.g. Sustainable Construction Unit of the Ministry of Transport, Mobility and Urban Agenda), national entities accredited for the certification of sustainability criteria in buildings (e.g. Green Building Council Spain).

PORTUGAL

Main entities and key actors identified:

- Portuguese Environment Agency (APA);
- National Association of Green Roofs (ANCV);
- National Association of Portuguese Municipalities (ANMP);
- Portuguese Association of Environmental Education (ASPEA);
- Portuguese Confederation of Environmental Defense Associations (CPADA);
- National Council for the Environment and Sustainable Development (CNADS);
- Directorate-General for Energy and Geology (DGEG);
- Directorate General of Schools (DGEstE);
- Environmental Fund;
- Institute for Nature Conservation and Forests (ICNF);
- Institute Portuguese of the Sea and the Atmosphere (IPMA);
- Ministry of Environment and Climate Action;
- Zero – Sustainable Earth System Association.

For more information on the type of key entities identified at national level, see the Documentary Platform.

3.10 NBS INTEGRATED IN THE TECHNICAL BUILDING CODE (CTE)

SPAIN

One of the most relevant governance tools for the effective transferability of Nature-Based Solutions (NbS) designed, implemented and tested by the project is their inclusion in the Technical Building Code for later use in buildings directed to Climate Change.

In the case of Spain, the Technical Building Code (CTE) is the regulatory framework that establishes the basic quality requirements that buildings must meet in relation to safety and habitability established in Law 38/1999, of November 5, of the Construction Regulation (LOE).

The ETC shall apply to public and private buildings whose projects or technical reports, signed by competent technicians, require a permit or authorization.

Within the CTE there are documents in which references are made to solutions such as NBS. In documents that correspond to the basic energy saving requirements. And there are sections such as HE0 - Limitation of energy consumption, HE1 - Conditions for the control of energy demand and HE2 - Conditions of thermal installations, which can include NBS and aspects derived from this type of strategies. Article 15 of the ETC sets as a target the rational use of energy in buildings and that part of that energy comes from renewable sources. In this way, elements such as roofs and green facades can achieve this goal through the thermal improvement of the surroundings, the biological processes that manage solar energy and dynamic solar control from vegetation. This inclusion starts from the consideration that these elements are efficient construction systems for energy reduction, and there is a bibliographic base that supports it.

On the other hand, the CTE support documents remain up to date, which facilitates the incorporation of new constructive concepts such as NBS.

Among the documentation and programs available at the ETC is the Computer Catalogue of Constructive Elements (CEC). The purpose of this is to provide users with a database that gathers information on the characteristics of materials, the hydrothermal and acoustic performance of the constructive elements and the constructive specificities related to the basic requirements of the ETC.

The catalog is updated as new data becomes available. Currently, it consists of the following aspects related to NBS:

- DB-HE. Section HE 1: Thermal transmittance, Internal surface temperature factor.
- HR DB. Value of the mass of the Constructive Element, Acoustic insulation against airborne noise (values for pink noise, automobile and aircraft noise), Acoustic insulation against impact noise, Acoustic absorption.
- DB-HS Section HS 1: Degree of impermeability (Facades).

From the project LIFE – My building is green, meetings were held with those responsible for the Sustainable Construction Unit of the Ministry of Transport, Mobility and Urban Agenda of Spain (MITMA) to discuss the possibilities of including in the CTE the NBS developed and implemented by the project.

The conclusions of these meetings, as well as the next steps to follow to integrate the NBS into the CTE can be found in the deliverable C4.3 "Favorable report on the integration of NBS into the

Technical Code of Buildings and municipal regulations". In summary, we highlight the following aspects:

- It is proposed that the type of solutions implemented by the LIFE project – My Building is Green, which contemplate the subsequent maintenance of the associated vegetation, is not promoted only at the level of temperature reduction inside buildings, but in a broader sense, which involves evidencing benefits such as the reduction of pollutant emissions, the increase in biodiversity, the associated educational purposes, the visual improvement of the environment or the simplicity of its installation.
- In order to include the NBS of the project in the CTE Construction Elements Framework, it is proposed the characterization and prior standardization of these NBS so that they can be incorporated as alternative solutions in energy assessment tools, such as the official HULC (Unified Leader Tool Cleaner) program of the CTE, which facilitate the later use by users who wish to implement them.
- The way to integrate the project NBS into the CTE by modifying it, including the NBS as usual solutions, is not feasible at this time due to the very incipient nature of the tested NBS. To address this path in the future, it is proposed to export the project NBS to other spaces, not necessarily educational buildings, to test and evaluate their effectiveness.

In section C4.3 "Favorable report on the integration of NBS into the Technical Code of Buildings and municipal regulations", the possibilities of treatment of NBS within the CTE are discussed in detail.

PORTUGAL – LEGISLATION

Legal issues of municipal licensing of urban subdivisions and urbanization works and private works:

- Legal regime of urbanization and edification (RJUE) – **Decree-Law no. 555/99 of 16 December;**
- Approves the General Regulation of Urban Buildings (RGEU) – **Decree-Law no. 38 382, of August 7, 1951;**

Other important legislation for public and private buildings:

- **Decree-Law no. 118/2013, of 20 august –** Approves the Energy Certification System of Buildings, the Regulation of Energy Performance of Residential Buildings and the Regulation of Energy Performance of Commercial and Service Buildings, and transposes Directive no. 2010/31/EU, of the European Parliament and of the Council, of 19 May **2010,** on the energy performance of buildings.
- **Decree-Law no. 101-D/2020 –** Establishes the requirements applicable to buildings for the improvement of their energy performance and regulates the Energy Certification System of Buildings, transposing Directive (EU) 2018/844 and partially Directive (EU) 2019/944.

Parallel to the legal regimes, the National Association of Green Roofs has released a technical guide for green roofs that defines the specifications of the roofs for a correct installation. The diversity of roofs and the multiple typologies of green roofs must contemplate not only the desired benefits, but also the structural characteristics of the building, so it is essential that the technical specifications are met.

3.11 NBS INTEGRATED INTO THE NATIONAL STRATEGIES FOR CLIMATE CHANGE AND GREEN INFRASTRUCTURE

At the national level, there is a set of Strategies with direct and indirect effects on the adaptation of urban environments to the adverse effects of climate change. Two examples of this type of Strategies are the National Strategy for Climate Change and the National Strategy for Green Infrastructure, with different denominations depending on the country that develops it. In the case of Spain, these strategies are articulated through the National Plan for Adaptation to Climate Change and the National Strategy for Green Infrastructure and Connectivity and Ecological Restoration. In the case of Portugal, it is called the National Strategy for Adaptation to Climate Change.

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. The main goal is to prevent or reduce the present and future damage of climate change and to build a more resilient economy and society. The PNACC Work Programmer 2021-2025 details the measures to be implemented in the first five years of PNACC development and reports on the

entities responsible for its implementation. It also specifies the associated mechanisms for information, monitoring and evaluation.

Regarding the integration of Nature-Based Solutions (NBS) in the PNACC, these are contemplated in several areas of activity of the Plan such as a) natural heritage and biodiversity; b) forestry and desertification; (c) the coasts and marine environment; d) disaster risk reduction; and (e) city, urban planning and construction.

The PNACC also includes NBS in urban areas in two of its lines of action against climate change:

- Line of action 8.2. Integrating climate change adaptation into territorial and urban planning:

  In addition to advancing the integration of risks derived from climate change in territorial and urban planning, it is necessary to incorporate in planning the concept of green and blue urban infrastructures, such as nature-based multifunctional solutions that solve urban problems such as improving biodiversity, managing flood zones, reducing heat islands, fighting climate change or improving air quality. It is also necessary to promote the incorporation of urban climate mapping into urban planning and management tools, which can promote the creation of climate refuges.
- Line of action 8.4. Communication, dissemination and citizen participation in the urban area:

  It is appropriate to draw up regulations to guide how to introduce Nature-based Solutions and green urban infrastructure into urban policies, funding mechanisms and frameworks and certain standards and indicators, as well as specific campaigns to raise awareness of their benefits.

At the beginning of the LIFE – My building is green project, meetings and working communications were held with the Spanish Workshop on Climate Change and the Biodiversity Foundation of the Ministry of Ecological Transition and Demographic Challenge, both bodies responsible for the elaboration of the National Plan for Adaptation to Climate Change 2021-2030. In these meetings and communications was presented the project LIFE – My building is green, as well as other projects led by the other two entities, such as the LIFE-SHARA project of awareness and knowledge for adaptation to climate change. In addition to sharing the expected results of both

projects, ways of collaboration between the three parties were explored to address the issue of governance for climate change adaptation.

Although the LIFE project – My building is green was not present in the collective process of analysis, reflection and public participation, due to the incipient character of the project during the process, it has contributed to make visible the importance of NBS in the urban environment to the relevant entities in the design of Work Plans and National Programs for Adaptation to Climate Change, contributing in some way to the integration of NBS in this type of Strategies related to climate change.

The National Strategy for Green Infrastructure and Connectivity and Ecological Restoration entered into force in July 2021 and is the strategic planning document that regulates the implementation and development of Green Infrastructure in Spain, establishing a harmonized administrative and technical framework for the entire Spanish territory, including maritime waters under national sovereignty or jurisdiction.

The Strategy conceives of Green Infrastructure as an ecologically coherent and strategically planned network of natural and semi-natural spaces and other environmental elements, designed and managed for the conservation of ecosystems and the maintenance of the services they provide us.

While the Strategy focuses primarily on natural and semi-natural ecosystems, it also contemplates the identification and promotion of solutions for ecological restoration between urban and peri-urban areas, which is one of the specific objectives of Objective 2 of this Strategy: "To restore habitats and ecosystems of key areas to foster biodiversity, connectivity or the provision of ecosystem services, prioritizing nature-based solutions."

This objective is intended to be achieved through the action line 2.06. which sets out the following guidelines:

- Local Administrations, within the scope of their competences, may contemplate rehabilitation projects in key areas for connectivity between rural and urban areas, especially in connecting areas identified in spatial planning.
- Promote land custody agreements.
- Promote the development of the figure of the Nature Conservation Banks.
- Promote the recovery of sustainable traditional activities that favor connectivity.

Although the Strategy includes the influence of the urban environment on the national green infrastructure network in Spain, a more specific link and more explanatory detail on the importance and effects of nature-based solutions implemented in cities, such as reducing the heat wave effect or creating urban green corridors, is needed, among others. This is a need to be taken into account so that future projects in the LIFE – My building is green line of action can be addressed through dialogue with the institutions and agents that develop the future National Green Infrastructure Strategies.

The National Strategy for Green Infrastructure and Connectivity and Ecological Restoration includes a specific section on governance that may be of interest to future NBS implementation projects in urban environments by addressing the key actors needed for the development of these projects. This section on governance defines the responsibilities of each Public Administration in the implementation of Green Infrastructure, as summarized below:

- Competencies of all Administrations: each Public Administration must assume its responsibilities with regard to the identification, mapping and protection of green infrastructure, and the strengthening and improvement of connectivity and ecological restoration.
- Competences of the General Administration of the State: the territorial integration of the Spanish Green Infrastructure with initiatives and coordination functions at European level, ensuring compliance with common criteria, cooperation and integration of the actions undertaken in the field of protection of Green Infrastructure, ecological connectivity and recovery by the autonomous communities, the implementation and management of Green Infrastructure in the territory of its competence.
- Competence of the autonomous communities: The autonomous communities will be responsible for the elaboration of their own Regional Strategies for Green Infrastructures and ecological recovery, with the creation of functional ecological networks, as well as for the coordination, cooperation and integration of the actions developed with local entities, preferably through the Federations of Municipalities of the different autonomous communities.
- Competences of Local Administrations: It will be up to the Municipal Councils and other local entities such as Island Councils and Provincial Councils, as the case may be, the delimitation and identification of the elements of the Green Infrastructure in their areas

of action, their planning and management, and their intermunicipal coordination. Likewise, the management may be delegated to private entities through a land protection contract and, when applicable, the Administration will exercise a tutelary function.

COUNCIL FOR ADAPTATION TO CLIMATE CHANGE IN CENTRAL ALENTEJO - ENTITIES INVOLVED

Local authorities

- City Hall (relevant municipal divisions);
- Parish Councils.

Agriculture, Forestry and Biodiversity

- Agricultural associations;
- Associations of producers and cooperatives;
- Regency associations;
- Regional Directorate of Agriculture and Fisheries of Alentejo;
- Enterprises;
- Regional Directorate for Nature Conservation and Forests of the Alentejo.

Economy

- Trade associations;
- Business centers;
- Alentejo Tourism – ERT;
- Companies with greater economic relevance.

Education and Higher Education

- School clusters;
- University of Évora.

Water Resources

- Portuguese Environment Agency – ARH Alentejo;
- Municipal Water and Sanitation Services;
- Águas Públicas do Alentejo, S.A./ Águas do Vale do Tejo, S.A.

Health and Social Sector

- Local Health Authority;
- Hospital Administration;
- Main entities of the social sector (IPSS, Foundations, Santa Casa da Misericórdia, Caritas, ...).

Security of People and Goods

- National Authority for Emergency and Civil Protection;
- Fire Departments;
- Republican National Guard;
- Public Security Police;
- Municipal civil protection services.

CLIMATE CHANGE ADAPTATION PROJECTS AT CIMAC

PROJECTS	Execution State	CIMAC	Notes	Typology
PIAAC-AC: Intermunicipal Plan for Adaptation to Climate Change	Done	Promoter/Leader	Partnership with the 14 municipalities of AC	Planning Adaptation
Adapta.Local.CIMAC: Planning of Municipal Climate Adaptation in Central Alentejo	Ongoing	Promoter/Leader	Partnership with the 14 municipalities of AC	Planning Adaptation
GIS-GO: Production of Geographic Information to Support Adaptation to Climate Change	Done	Promoter/Leader	Partnership with the 14 municipalities of AC; ICNF; Civil Protection; GNR; PSP	Planning Adaptation Monitoring
LIFE - myBUILDINGisGREEN: Nature-based solutions for the local adaptation of buildings to climate change in Central Alentejo	Ongoing	Partner	Leader: AGÊNCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS; Parceiros: CARTIF FOUNDATION, CIMAC, Diputación de Badajoz, Município do Porto	Adaptation Mitigation
Public Lighting: Strategy and Energy Efficiency in Central Alentejo	Ongoing	Promoter/Leader	Energy Efficiency Management Contract under DL 29/2011	Adaptation Mitigation
AlémRisco: Natural-based solutions to minimize the effects of heat waves	Ongoing	Partner	Leader: Science Retreats; CIMAC participates with a social contribution of € 30,000 corresponding to the national counterpart	Adaptation Mitigation
Living Laboratory for the Decarbonization of Évora	Ongoing	Partner	Leader: CM Évora; Partners: CIMAC, DECSIS, ADRAL; LOGISTEMA; SIGNIFY; University of Évora; ALTICE; GO WITH FLOW	Planning Adaptation Mitigation
Control of Water Losses in Central Alentejo	Done	Promoter/Leader	Protocol of Collaboration with EPAL and partnership with the 14 municipalities of the AC	Adaptation Mitigation

Table 1: Climate Change Adaptation Projects at CIMAC.

IN PORTUGAL

National Strategy for Adaptation to Climate Change 2020 – ENAAC

In 2010 Portugal approved its National Strategy for Adaptation to Climate Change (ENAAC), through the Resolution of the Council of Ministers no. 24/2010, of 18 March. The first phase of ENAAC's work took place between 2010 and 2013 with the following objectives:

Information and knowledge: keep scientific knowledge up to date and available;

- Reduce vulnerability and increase response capacity: in an integrated way, define measures that Portugal will have to adopt, like the international community, in order to minimize the effects of climate change;
- Participate, raise awareness and disseminate: raise awareness of climate change and its impacts;
- Cooperate at international level: supporting the most vulnerable countries, including within the framework of the CPLP.

The work of the various sectoral groups and a progress report were developed which highlighted the strategic nature of the work carried out, and identified the limitations in the implementation of the strategy. From the experience gained, the revision of ENAAC was promoted, bridging the gaps and capitalizing on the strengths and opportunities identified. The Resolution of the Council of Ministers no. 56/2015, of 30 July comes to approve ENAAC 2020, framing it in the Strategic Framework for Climate Policy (QEPiC), which establishes the vision and objectives of national climate policy in the 2030 horizon, reinforcing the commitment to the development of a competitive, resilient and low-carbon economy, contributing to a new development paradigm for Portugal.

In this way, it is assumed as ENAAC's vision: "A country adapted to the effects of climate change, through the continuous implementation of solutions based on technical-scientific knowledge and good practices". ENAAC defines an organizational model where the articulation between the various sectors and stakeholders is clearly promoted with a view to pursuing priorities of certain thematic areas and the three objectives of the strategy:

- Improve the level of knowledge about climate change;
- Implement adaptation measures;
- Promote the integration of adaptation into sectoral policies.

The thematic areas (TA) promote the coherent vertical integration of the different scales necessary for adaptation (from international to local) and horizontal integration (of the different sectors) through the coordination and development of specific work of a multisectoral nature.

Horizontal integration is promoted with the development of activities and specific work in nine priority sectors through sectoral working groups (WGs). Each WG is chaired by the relevant body(ies) of the central administration that streamlines the involvement of the various sectoral agents. Taking into account ENAAC's vision, objectives and TAs, each WG has the following competencies:

- Identify impacts, vulnerabilities and adaptation measures;
- Integrate adaptation into sectoral policies;
- Identify knowledge needs and gaps;
- Promote sectoral studies, identify sources of funding and monitoring mechanisms;
- Prepare plan and activity report;
- Contribute to the work of the Thematic Areas;
- Articulate, when necessary, with other WGs.

Coordinating bodies of the work

	DESIGNATION	COORDINATION
AREAS THEMATIC	Research and Innovation	Foundation for Science and Technology; APA, I.P.
	Financing and Implementing the Adaptation	APA, I.P.
	International cooperation	Camões – Inst. Cooperation and Language, I.P.; APA, I.P.
	Communication and Dissemination (National Platform for Adaptation)	Institute Portuguese of the Sea and the Atmosphere, I.P.; APA, I.P.
	Integrate Adaptation into Spatial Planning	Directorate-General for Territory; National Association of Portuguese Municipalities; APA, I.P.
	Integrate Adaptation into Water Resources Management	APA, I.P.
GROUPS IN WORK SECTORAL	Agriculture	Office of Planning, Policy and General Administration; Directorate-General for Agriculture and Rural Development
	Biodiversity	Institute for Nature Conservation and Forests, I.P.
	Economy (industry, tourism and services)	Directorate-General for Economic Activities
	Energy and Energy Security	Directorate-General for Energy and Geology
	Forests	Institute for Nature Conservation and Forests, I.P.
	Human Health	Directorate-General for Health
	Security of People and Goods	National Civil Protection Authority
	Transport and Communications	Institute of Mobility and Transport, I.P.; National Communications Authority
	Coastal Areas and Sea	APA, I.P.; Directorate-General for Sea Policy

Table 2: Coordinating Entities of the Works. Source: https://apambiente.pt/clima/estrategia-nacional-de-adaptacao-alteracoes-climaticas

National System of Inventory of Emissions by Sources and Removal by Sinks of Air Pollutants (SNIERPA)

Within the framework of several international agreements Portugal must ensure the regular sending of information on the emission of greenhouse gases (GHGs) and air pollutants, in order to allow the study of the goals to be established and the verification of their compliance, with the aim of promoting the protection and preservation of ambient air quality and the fight against climate change, the Portuguese Environment Agency, I.P. (APA) is the entity responsible for preparing the various reports and communications arising from the obligations under the United Nations Framework Convention on Climate Change (UNFCCC) as well as the European Union (EU), pursuant to Regulation (EU) No. 525/2013 of the European Parliament and of the Council of 21 May 2013, on the establishment of a mechanism for monitoring and reporting greenhouse gas emissions and for reporting at national and EU level other information relevant to climate change.

For the purpose of preparing reports and other communications, the APA relies on the contribution of several public institutions, such as the Directorate-General for Energy and Geology (DGEG), and private, of a sectoral nature, under legal mechanisms, protocols or voluntary agreements, and the basic information provided is decisive for the adequate reporting to international institutions on climate change.

3.12 CERTIFICATION OF SUSTAINABILITY CRITERIA IN BUILDINGS

Official certification of buildings that meet sustainability criteria validates the social, economic, and environmental performance that a building can have. Currently, the available certifications focus on the standardized measurement of indicators related to constructive innovation, project quality, social and economic aspects, the quality of the indoor environment, the type of land and location of the building, the associated natural resources, as well as aspects related to energy and atmosphere. The calculation methodologies, although very complete, present some deficiencies in the measurement of parameters directly related to biodiversity.

In the case of pilot buildings where the NBS developed by the LIFE project – My building is green are implemented and tested, submit these buildings to certification processes using national and European calculation methodologies not only will it allow buildings to obtain these certificates, but it will also make it possible to discover certain deficiencies in the biodiversity indicators included in these certifications. In this way, it will be possible to draw up and issue reports of recommendations to official certifying bodies, which will allow for the inclusion in the future of a greater number of criteria related to biodiversity or improving existing ones.

At the Spanish level, the LIFE – My building is green project has met on several occasions with the Council for Sustainable Construction in Spain (GBCe), which is the leading sustainable construction organization in Spain and the reference in the transformation to a sustainable model in the building sector. GBCe belongs to the international network of the World Green Building Council and offers tools for evaluation and certification of buildings, specially adapted to the Spanish market, considering social, environmental and economic aspects for a complete analysis of the life cycle of the building. With the support of GBCe, it has been possible to make approximations to the existing certifications and analyze the feasibility of applying them to the specific projects developed. The different tools that may be suitable for studying sustainability indicators are briefly discussed below:

The GREEN tool is a methodology for assessing the sustainability of buildings in Spain. This methodology evaluates a set of criteria accessible to the public through the website www.gbce.es where the tools are located and you can also download the manuals that describe each of the criteria to be evaluated and the respective calculation methodology. In this way, any technician can count on these tools when approaching a construction project without having to be accredited as a GREEN evaluator.

However, if you want to certify a building and ensure the quality, veracity and independence of a certification, it is essential to have a GREEN accredited evaluator who has passed the training developed by GBCe. In this way, two objectives are achieved: to disseminate knowledge and good practices among the actors involved in the construction sector and to develop a methodology that guarantees sustainable buildings in the environmental, social and economic aspects.

The certification process is structured in the following steps:

- Step 1: Contact an accredited evaluator and carry out the evaluation of the building (it is desirable that this process begins in the early stages of the project, even before having the project basses);
- Step 2: Registration and submission of the evaluation and supporting documentation. It can be delivered for a pre-certification with the finished execution project or for the final certification with the finished building;
- Step 3: Technical supervision of the certification application and the assessment carried out, communication of the preliminary results to the applicant and deadline for submission of additional documentation of improvement.
- Step 4: Certification proposal and decision making;
- Step 5: Issuance of certificates.

The buildings certified by the GREEN tool are included in the database available on the GBCe website: https://gbce.es/edificios/?wpbdp_view=all_listings.

The Level(s) is a voluntary evaluation framework to improve sustainability and drive the demand for better buildings in Europe. It provides a common approach to the construction transformation process in line with the European Union's sustainability initiatives.
Level(s) offers an extensive and proven system for measuring and supporting improvements, from design to the end of a building's life cycle. In addition, it supports professionals, investors and decision makers related to sustainable construction in a variety of ways:

- It allows professionals in the area of green construction to use consistent indicators for all phases of the project, based on the best practices of the sector, favoring the comparison of project options and encouraging the monitoring of the actual performance of these options;
- It is based on a method proven throughout the European Union and serves as the basis for the future policy of the European Union, allowing public authorities to develop and implement policies and actions;
- It offers coherence, accountability and therefore confidence to investors, while supporting value communication based on environmental, social and governance (ESG) factors.

For more information on the Level(s)methodology, see the European Commission's portal: https://environment.ec.europa.eu/topics/circular-economy/levels_en.

The European Union (EU) Regulation on Taxonomy of Sustainable Economic Activities is a new European regulation that proposes a clear and transparent classification system to identify activities that are sustainable. This initiative has been proposed as a key instrument for Europe to achieve its ambitious climate and environmental goals and for future generations to enjoy a more livable and sustainable world.

The taxonomy includes a series of technical selection criteria for activities that contribute substantially to climate change mitigation and adaptation. The construction sector has its own set of indicators, which should ensure that in the future urban developments and buildings are more sustainable.

In Spain, the European Taxonomy verification service for the real estate sector developed by the Climate Positive Europe Alliance (CPEA) is managed through the GBCe Taxonomy Portal. This portal allows you to check the compliance of properties with the criteria of the EU Taxonomy. This verification service, intended for the three branches of activity defined in the Taxonomy – new construction, rehabilitation and acquisition and ownership – is based on the criteria of the Taxonomy currently in force. Thanks to the joint European development led by the EAPC, this verification adheres to uniform principles and is applicable throughout Europe.

For the analysis of the applicability of sustainability assessment systems, LEVEL(s) was selected because it is a consolidated tool in this type of task, which through macro-objectives divided into indicators evaluates the sustainability criteria in three stages of the project ("Conceptual design", "Detailed design and construction" and "Performance according to construction and in use").

The proposed analysis is not intended to address the indicators in detail or to take into account obvious facts about the basic architectural work. The historical context and the lack of regulation of the thermal conditions of the building, such as the NBE-CT-79 standard in Spain, led to the pilot buildings not meeting the sustainability criteria evaluated in the design phases considered by LEVEL(s). Therefore, in this analysis are mentioned only some indicators that can be impacted by the renovations, disregarding the criteria, studies and other aspects related to the original projects of the building.

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