



Climate change adaptation through urban planning and normative. Technical publication - Action C5

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1. Project background and introduction to Action C5

The present document compiles the major results from the Action C5, *Climate change adaptation through urban planning and normative*, that was developed between September 2018 and April 2019 as part of the LIFE - GOOD LOCAL ADAPT.

The need to adapt to climate change is a reality, and it is being integrated into new national, regional, and local policies within our municipalities. Risks derived from climate change such as floods, torrential rains, heat waves, rising sea levels, among others, are threatening our way of living and, therefore, they must be considered when planning and designing our urban territories.

These climate risks and their consequent impacts in urban areas are generally accentuated by two aspects: the way natural resources are consumed and the way the urban space is conceived. On one hand, future scenarios show that we are driving towards a warmer planet in which water resources will be scarcer and worsen distributed. Most of the human activities do not need the same high-water quality and, therefore, there is a need to find alternative water sources and ways to reuse this water as much as possible. Buildings and public spaces can reduce significantly their potable water consumption if building and urban systems are designed and developed in a more thoughtful way. On the other hand, the way buildings and public spaces have been designed for the last decades, even for centuries, present a challenge in the way they are responding to extreme weather effects like heatwaves or intense precipitation. Typical urban materials currently present in the urban environment are concrete, cement, steel and bricks; materials with a low level of albedo (low capacity to reflect solar radiation) and high impermeability. The result of the current urban design decreases the comfort of citizens, and increases vulnerability of population, health issues, and property loss, among others.

The impacts of climate change and both the use of natural resources and the design of the urban environment need to be addressed in a new normative. Most of the adaptation actions are municipal competence and this is where urban planning and the urban normative play a fundamental role. In this context, one of the objectives of the Life Good-local Adapt project is to facilitate the integration of climate change adaptation into municipal councils' policies and plans. After having analyzed the climate risks and needs of the municipalities in previous actions C1, C2, C3 and C4, action C5, focuses on the integration of climate change adaptation in urban planning and regulation at local level. This has been carried out through the identification of a series of adaptation measures categorized by their climatic risk and the integration into different urban instruments. Because this action focuses on the beneficiary municipalities of the project, the measures are related to the following climatic risks: drought, heat waves and floods.

2. Description of the objectives and process

This action aims to enable City Councils to mainstream climate change adaptation within urban and building-scale planning and solutions. It introduces criteria for climate change adaptation in different urban normative documents and gathers different clauses within the administrative terms of conditions of future tendering processes for design and execution projects.

This action starts analyzing normative documents at a municipal, autonomic, and national level in which to integrate climate change adaptation. It then identifies the 6 urban instruments in which adaptation measures

and criteria will be integrated. These urban instruments are: (i) the general urban planning plans, the detailed development plans such as (ii) the partial plans in developable land and (iii) the special plans in urban and developable land, (iv) the urbanization projects at local scale and , finally, two drafts of ordinances in the two areas that mainly affect climate change, (v) ordinances for urbanization and (vi) ordinances for building. A comprehensive study of adaptation measures divided by 3 climate risks is then developed. The result aims to be a table displaying the 6 instruments and containing all measures that could be integrated in each of them.

After this, a building and urban draft bylaw is developed, containing adaptation measures, criteria and conditions for their implementation. The process is led by a collaborative work with municipal specialist that bring a realistic point of view and the minimum standards to be accomplished by buildings and urban spaces.

Lastly, the project team aims to design terms of reference for tendering processes. These terms of reference will be used for the bidding of new urbanizations, building and housing rehabilitation projects. They will result from the prototypes taking place in two of the beneficiary municipalities.

3. Results and deliverables

The deliverables of this action were the following:

- Table. Measures of adaptation to climate change to be integrated into the different urban instruments. A total of 124 measures divided by climate risk.
- Table. Bylaw draft for the Building Ordinances
- Table. Bylaw draft for the Urbanization Ordinances
- Terms of reference (still waiting for the prototypes to be finished)

General Plans of Urban Planning (PGOU)

According to *Article 19.1* of the Urban Planning Regulation, the General Municipal Planning Plans shall contain the following determinations of a general nature:

- Classification of the land, with expression of the areas assigned to each of the types and categories in which it is divided.
- General structure of the territory integrated by the elements of urban development and by the general communication system and its protection zones (public spaces destined to public parks and green areas).
- Measures for environmental protection, conservation of nature and defense of the landscape, natural elements, etc.

Article 20. 1. The General Plan will classify the land into urban, developable and non-developable land

Article 25.1. The fundamental elements of the general structure of the territory plan will be established by the General Plan taking into account the urban development model adopted:

- The assignment to the different zones of the corresponding global uses whose implementation is foreseen, and the intensity of them.
- The general communication system

- The general system of free spaces
- The general system of community equipment, which will include all those centers serving the entire population destined for uses.

Article 29.1. In urban land, the General Plans will contain, in addition to the determinations of a general nature, the following:

- Assignment of detailed uses corresponding to the different zones, defining in detail the specific use of the lands included in each one of them.
- Delimitation of free spaces and green areas for public parks and gardens, as well as sports, recreational and public areas.
- Detailed regulation of the detailed use, volume and hygienic-sanitary conditions of the land or buildings, as well as the aesthetic characteristics of the building management and its surroundings.
- Characteristics and layout of the galleries and networks of water supply, sewerage, electric power, and of those other services that the Plan may also foresee.

In this context, we can mention as criteria of adaptation to climate change, to incorporate into the General Plans of Urban Planning. For this Technical publication, a few measures are shown as example. All measures are described in Annex 1 within the main deliverable of Action C5. These examples are the following:

- Declassify developable land to non- developable land of special protection affected by climatic risks such as floods.
- Urban planning legislation, both at the state level and at the level of the Basque Country, clearly establishes a criterion of inadequacy for the urban development of lands subject to flood risks or serious accidents, for which the declassification of these floors as undeveloped land of special protection. On the other hand, to foresee more compatible uses and less sensitive to the risk that is faced is another one of the determinations that correspond to the general plans. *Measure 57: Classify as non-developable land of special protection areas vulnerable to floods*
- Define flood risk zones. *Measure 60: Define the flood zones not only those delimited by sectoral regulations but incorporate soils near them that present a greater vulnerability.*
- Establish the regulation and restriction of certain public and private uses in risk areas. *Measure 64: Regulate uses in urban land affected by flooding based on return periods. - in flooded soils in return periods of less than 100 years, it should not be counted for the purposes of endowment reserves - in flooded soils in return periods of less than 500 it is not advisable to allow residential uses*
- Dedicate the areas of greatest flood risk to fewer sensitive uses, such as parks and sports areas. *Measure 58: Dedicate the areas of greatest flood risk to fewer sensitive uses, such as parks and sports areas.*
- To leave out of order those areas already built in which the increase of the risks (especially of flood or landslides) makes it advisable, so that in a prudential time they can abandon their condition as urban areas. *Measure 61: Leave out those areas already built in which the increased risks (especially flooding, instability of the land or fire) make it advisable, so that in a reasonable time they can abandon their status as urban areas.*
- Plan the installation of the large basic infrastructure of supply (such as water, gas, energy and sanitation) and basic equipment such as hospitals and schools in areas not vulnerable to climate change. *Measure 65: Specify the uses in potentially unsafe areas avoiding buildings and equipment.*
- Guarantee the adequate reservation of spaces and green areas. *Measure 8: Insert the*

urban green in the building itself through courtyards, facades and green roofs.

- Establish a compact urban arrangement that foresees mixed uses, according to the characteristics and resources of its surroundings, taking into account the proximity of basic infrastructures and services. *Measure 12: Establish an urban planning in the new developments according to the characteristics of its surroundings, favoring the reduction of the consumption of resources (soil, energy, water, etc.).*
- Plan to incorporate concrete urbanization measures that promote the permeability of soils and areas of retention and infiltration of water. *Measure 83: Install sustainable urban drainage systems (SuDS): environmentally sustainable drainage systems. They include management practices, control structures and strategies to efficiently drain surface water.*

Partial Plans (PP)

Article 45 of the Planning Regulation establishes that the Partial Plans will contain the following determinations in land for development:

- Delimitation of the planning area, covering a sector defined in the General Plan or in the Urban Action Programs.
- Assignment of detailed uses and delimitation of the areas into which the planned territory is divided by reason of them.
- Define land reserves for public parks and gardens, public sports and recreation and expansion areas, also public, in proportion appropriate to the collective needs.

In this context we can cite the following adaptation criteria to be introduced. For this Technical publication, a few measures are shown as example. All measures are described in Annex 1 within the main deliverable of Action C5. These examples are the following:

- Prohibit building uses in areas of its scope of action affected, especially due to the risk of flooding. *Measure 65: Specify the uses in potentially unsafe areas avoiding buildings and equipment.*
- Avoid the location of critical public facilities such as schools, hospitals, fire brigades and police stations, hazardous waste treatment facilities) in risk areas. *Measure 67: Exclude critical generation and distribution facilities from flood-affected areas (unless directly related to water).*
- Guarantee the adequate reservation of spaces and green areas. *Measure 4: Increase existing green areas in the municipality and increase woodland density on public roads.*
- To foresee the development of a compact urban planning that foresees mixed uses, in accordance with the characteristics and supply resources of its environment, taking into account the proximity of basic infrastructures and services. *Measure 12: Establish an urban planning in the new developments according to the characteristics of its surroundings, favoring the reduction of the consumption of resources (soil, energy, water, etc.)*
- Plan to incorporate concrete urbanization measures into the developable land subject to development that promotes the permeability of soils, sewerage and water retention and infiltration zones. *Measure 53: Design infiltration strips of this type of excavation in the field, which is established in areas of low rainfall to accumulate rainwater.*

Special Plans (PE)

Article 76. 1 of the Planning Regulation establishes that Special Plans may be formulated and

approved with the following purposes:

- Development of basic infrastructures related to terrestrial, maritime and air communications, to water supply, sanitation and energy supply and other analogous ones.
- Protection of the landscape, of the communication routes, of the soil, of the urban, rural and natural environment, for its conservation and improvement in certain places.
- Any other analogous purposes.

In addition, according to *Articles 78 to 82* of the Planning Regulation, there are different specific special protection plans, such as the Special Plans for the protection of the landscape and conservation of certain places, the special plans for internal reform, the special plans for the protection of orchards, crops and forest spaces, among others.

In this context, the adaptation criteria that can be integrated by the EPs are practically the same as those of the partial plans, but in the field of urban land:

Urbanization Projects and Ordinances

Article 67 of the Planning Regulation establishes:

- The Urbanization Projects are projects of works whose purpose is to carry out, in urban land, the corresponding determinations of the General Plans and the Complementary and Subsidiary Norms of Planning, and, in developable land, the material realization of the own of the Partial Plans.
- Urbanization Projects may also be drafted for the execution of Special Plans for Internal Reform.
- The Urbanization Projects will constitute, in any case, instruments for the development of all the determinations that the Plan foresees in terms of urbanization works, such as roads, water supply, sewerage, electric power, street lighting, gardening and other analogous
- Independently of the Urbanization Projects, projects of ordinary works that are not designed to develop the set of determinations of an Ordination Plan can be drafted and approved, in accordance with the regulations of the entity concerned.
- Under no circumstances may the Urbanization Projects or the ordinary works projects contain determinations regarding the organization, soil regime or construction.

In this context, the determinations of adaptation to climate change to be introduced in this urbanistic instrument. For this Technical publication, a few measures are shown as example. All measures are described in Annex 1 within the main deliverable of Action C5. These examples are the following:

- Incorporate concrete measures in the land subject to the urbanization project that promotes soil permeability, improvement of the sewage system and creation of retention zones and water infiltration. *Measure 72: Recover and / or use natural runoff channels to reduce the artificialization of the soil and favor natural infiltration in the face of possible floods and torrential rains (adaptation).*
- Incorporate measures that promote saving and efficient water management *Measure 87: Consider situations of prolonged drought in the dimensioning of water storage needs.*
- Incorporate concrete measures in the land subject to the urbanization project that promotes shade and urban acclimatization to heat waves. *Measure 1: Establish ecological corridors that communicate the already existing green areas in the municipality with the new peri-urban natural spaces. Identify those ecosystems that can act as natural and sustainable metropolitan parks, analyze their load capacity and connection routes with urban green networks, both from an ecological point of view and access to them.*



For its part, the *Municipal Building Ordinances* are intended to regulate the technical aspects, and any other conditions, not directly defining the buildability and destination of the land, are required for the authorization of acts of construction, building and uses susceptible to realization in the buildings. They must be adjusted, in any case, to the sectoral regulatory provisions for safety, health, habitability and quality of buildings and buildings, and for the protection of the urban, architectural, historical, cultural, natural or landscape heritage.

We can cite the following as criteria for adaptation within the building ordinances:

- Adapt the existing and new buildings to the bioclimatic and habitability criteria: design and adapt the urban morphology, the building typologies and the design of the exterior spaces according to bioclimatic conditions that take into account especially aspects such as orientation, possibilities of use of solar radiation and shading, interior distribution, natural lighting and ventilation and thermal insulation. *Measure 20: Create microclimates of environmental quality in the environment of the building in accordance with the bioclimatic principles, adapted to the climatic conditions of each municipality, with passive systems such as vegetation and the use of water bodies, as means of thermal regulation.*
- Promote the installation of plant elements in the building. *Measure 29: Promote vegetable facades. Improvement of the performance of the envelope incorporating landscaped elements*
- Measures of separative cleaning and water saving. *Measure 70: Reconfigure the interior installations of the buildings in relation to the water cycle (rainwater collection) to minimize repair costs in case of flooding.*