

WHITE BOOK OF THE IMPROVED OSS MODEL FOR THE BASQUE REGION

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1. EXECUTIVE SUMMARY

Task T.3.6, “Development of the improved model of OSS for the Basque Region”, aims to compile the work carried out during the project to define the optimised model for the neighbourhood office (OSS) of the BIRTUOSS Project, establishing the framework for comprehensive urban regeneration in the Basque Country in accordance with the Opengela model.

As a result of this task, the document D.3.6. “White Book” is presented, the purpose of which is to provide knowledge and best practice in supporting the Opengela network, facilitating the implementation of “*comprehensive urban regeneration*” projects that enable, amongst other objectives, energy savings of over 60 per cent and compliance with European decarbonisation targets (EPBD 2024/1275).

The optimised OSS model developed in the BIRTUOSS project is not merely theoretical; it has been validated through the practical experience of the Torreurizar Living Lab in Bilbao. As a real-world testing ground characterised by heritage protection and social vulnerability, Torreurizar has enabled the incorporation of certain proposals, such as nature-based solutions, digital monitoring tools and processes for public participation, which serve as a benchmark for the continuous improvement of the model.

Thus, the work carried out by the BIRTUOSS consortium partners and tested in the project’s *living lab* has enabled the development of this document for effective use as a best-practice guide, which explores five critical dimensions in depth. The findings from these dimensions serve as a basis for optimising future regeneration projects:

- **Technical Dimension:** Industrial solutions for building envelopes and active systems are analysed, alongside the use of urban energy models and the Building Renovation Passport to plan for climate neutrality in phases.
- **Economic and Financial Dimension:** A cost structure is analysed in which the office’s support service (estimated at 5 per cent of the investment) mobilises large volumes of private and public capital, achieving an average success rate of 84 per cent in engaging owners’ associations.
- **Legal Framework and Protocols:** The existing regulatory framework and its impact on the work of local offices are identified, as well as the need for regulatory adjustments and the creation of new protocols to provide legal certainty for the management of the offices and for owners’ associations operating under the horizontal property regime.
- **Social Dimension:** Vulnerability indicators and mediation strategies have been systematised to ensure that regeneration is inclusive, linking the refurbishment to the neighbourhood’s social protection systems to ‘leave no one behind’.
- **Training and Role Definition:** Multidisciplinary professional profiles and a modular training structure have been defined to ensure that community office staff possess the technical and social skills required for efficient community-based management.

Through a detailed analysis of the technical, economic, legal and social dimensions, this document demonstrates how the community-based office optimises each phase of the intervention, ensuring that the cost of support — estimated at 5 per cent of the total investment — acts as an effective lever for mobilising private capital and public funding.

Finally, this document is aimed at public authorities, housing management bodies and multidisciplinary technical teams that require a proven methodology to manage the technical, social and administrative complexities of neighbourhood-scale regeneration using the Opengela approach.

2. CONTEXT AND BACKGROUND

Urban regeneration in the Basque Country is currently facing an unprecedented challenge in terms of scale, driven by the need to achieve climate neutrality by 2050 in accordance with the European Climate Law and the recent Energy Performance of Buildings Directive (EPBD 2024/1275). Compliance with the ERESEE 2020 Strategy requires a qualitative and quantitative leap, moving from the current 30,000 refurbishments per year to 350,000 by 2030, which necessitates transforming refurbishment into a large-scale, widely accepted and technologically advanced activity. In this context, the OSS emerges as the key element in improving the quality and success of regeneration projects, acting as a driving force that professionalises management and reduces administrative, technical and social barriers.

Based on the experiences to date, it can be concluded that the implementation of this community-based office model enables urban regeneration projects to overcome the usual fragmentation, achieving an average success rate of 84 per cent thanks to the comprehensive support provided, which stabilises communication with homeowners' associations.

3. SUMMARY OF DELIVERABLES BY AREA. METHODOLOGY USED

3.1 TECHNICAL ASPECTS

The technical part of BIRTUOSS analyzes technical solutions for improving the energy efficiency and sustainability of buildings within the Opengela model. It considers the sector's challenges, the current regulatory framework, the characterization of the building stock in the Basque Country, and the technical limitations of existing buildings.

Context and Objectives:

The sector faces the need to significantly increase the pace of energy renovation of buildings. Directive (EU) 2024/1275 introduces tools such as the renovation passport and the digital building logbook, which must be implemented at the national level before 2026 in order to achieve climate neutrality by 2050.

Developed Methodology:

The characterization of the housing stock in the Basque Country is highlighted through Urban Building Energy Models (UBEMs). This powerful tool not only enables the calculation of energy consumption and carbon emissions before and after interventions but also estimates their economic cost. Additionally, it includes functionalities such as the ability to divide interventions into phases and stagger financing over different periods.

The data obtained from UBEMs will serve as the foundation for the development of each building's Renovation Passport, providing key information for the planning and execution of energy renovation strategies.

The document reviews the various technical solutions available to improve energy efficiency and classifies them into:

- Passive systems: Thermal insulation for façades, roofs, and floors, window replacement, solar protections, and air infiltration control.
- Active systems: Optimization and decarbonization of thermal installations (heat pumps, ventilation with heat recovery) and the integration of renewable energies (photovoltaics, aerothermal, geothermal).

Innovative industrial solutions are also explored, such as prefabricated façades and roofs, modular balconies, and modular thermal systems, which enable faster and higher-quality renovations.

The Torre Urizar building is being used as a testing laboratory to assess the feasibility of these solutions in a real-world setting.

Conclusions:

The analyzed solutions will serve as a basis for future interventions, considering economic, social, legal, and operational factors. The combination of active and passive solutions in deep renovations will enable energy savings of 60% or more, contributing to the sustainability of the building stock in the Basque Country.

3.2 ECONOMIC AND FINANCIAL ASPECTS

The economic and financial part of BIRTUOSS analyses the cost structures, investment dynamics and operational performance of the proximity offices within the Opengela model. On this document we provide aggregated information due to the sensitiveness of the data. It examines how public resources are transformed into renovation activity, how social and territorial conditions shape efficiency, and what benchmark values can guide future planning.

Context and Objectives:

The renovation of multi-family buildings requires significant coordination, financial planning and the mobilisation of public and private resources. Within the Opengela model, proximity offices play a central role in guiding communities through decision-making, administrative procedures and access to subsidies.

The objective of this analysis is to quantify the economic impact of these offices, assess the leverage effect of public expenditure, and understand how social, technical and territorial conditions influence efficiency and outcomes. The updated assessment builds on previous work by incorporating an expanded dataset and refining the comparative framework used to analyse differences between districts.

Developed Methodology:

The analysis integrates financial, operational and social variables from all offices with complete data. Indicators were harmonised per dwelling—both targeted and renovated—and investment values were aligned according to comparable categories of building works.

The data structure combines:

- Cost indicators: expenditure per targeted dwelling and per renovated dwelling, distribution of personnel and operational costs.
- Operational indicators: success rate, number of dwellings activated, timelines and workloads.
- Investment indicators: volume of renovation investment mobilised at district and dwelling level, and weight of operating costs relative to total works.
- Social indicators: distribution of subsidies and presence of vulnerable households.

Cross-referencing these variables enables the identification of patterns linking economic performance with social complexity, building morphology and governance conditions. All results are presented in aggregated form to preserve confidentiality.

Conclusions:

The aggregated results demonstrate that the proximity office model generates a strong leverage effect, with relatively modest operating costs enabling significant renovation investments. Across the network, the cost of the accompaniment service averages €3,122 per renovated dwelling and €2,386 per targeted dwelling, while the relative weight of operating expenditure typically represents 3.8% of total district investment and around 5% of building-level renovation costs.

The offices collectively achieve a high 84% success rate, confirming the value of professional accompaniment in supporting decision-making within homeowners' associations. Investment levels vary depending on district characteristics, but the network mobilised approximately €145.6 million, with a central district value around €8.5 million.

Social vulnerability, building typology and governance conditions shape the effort required and partially explain the variability observed across offices. Nonetheless, the model performs consistently well when staffing is balanced, workflows are stable and local administrative processes are aligned.

3.3 LEGAL AND PROTOCOL FRAMEWORK

This section analyzes the legal and regulatory framework of the BIRTUOSS project, with the aim of defining the necessary conditions for the implementation of Proximity Offices (OSS) and the development of urban regeneration and building rehabilitation projects.

Context and Objectives:

The OSS aim to promote urban rehabilitation from a comprehensive perspective, aligning with the Euskadi Urban Agenda Bultzatu 2050 (Basque Country Urban Agenda 2050) and fostering energy efficiency, accessibility, and social cohesion. To achieve this, it is essential to identify the relevant technical regulations that impact the implementation of the OSS.

Methodology and Regulatory Framework:

This document examines the legislative framework preceding the project, including a contextual analysis of the Hiross4all precedent project, as well as the tasks outlined in WP2. It details the key programmatic advancements recently identified in the regulatory and policy framework, which are fundamental to driving sustainable urban rehabilitation in Euskadi. These include:

- The Energy Sustainability Law of Euskadi (Law 4/2019, of February 21)
- The Roadmap for the Decarbonization of the Building Sector.
- The new Energy Performance of Buildings Directive (EPBD).
- The revision of the National Integrated Energy and Climate Plan (PNIEC).
- The National Rehabilitation Plan.

Additionally, the current regulatory framework impacting the BIRTUOSS project is analyzed in the following areas:

- Urban planning and housing.
- Technical regulations: Among them, the regulations that govern the CTE (Technical Building Code), the ITE (Building Technical Inspection), and the minimum standards for habitability and energy efficiency stand out.

Regarding access conditions for financial aid to property owners, a need has been identified for a new decree to regulate the actions carried out through the OSS and the eligibility for subsidies.

Conclusions:

Regulatory adjustments have been identified as necessary to maximize the impact of the BIRTUOSS model, especially in the regulation of the OSS and accessibility to financial aid. The effective implementation of these measures will contribute to a more efficient, sustainable, and accessible rehabilitation process.

3.4 SOCIAL DIMENSION

The document presents two models of social and vulnerability indicator tables to assess and improve the work of the Opengelas. The social diagnosis obtained from the neighborhood study will include the socioeconomic situation, vulnerability elements, sociopersonal situation, and relational context. These data, gathered through dialogue and coordination with local protection systems — Employment and Social Services — allow us to accurately understand the population profile and, similar to the previous project, determine the scale of the intervention.

Context and Objectives:

The goal is to establish and systematize the various social indicators to be incorporated, quantified, and developed in the OSS during housing/building rehabilitation and urban regeneration processes in areas with vulnerable populations.

Methodology and Types of Indicators:

The social indicator models developed in the tables are as follows:

1. Quantitative Social Indicator Table Model: This table includes general social indicators as well as those specific to the Opengela, to be completed by them throughout the project. It presents 6 key areas: Communication, accessibility, support, participation, personalized appointments, and community involvement. The proposed table crosses these key areas with 6 phases of the rehabilitation process.
2. Vulnerability Indicator Table Model: These indicators are generic and are established based on different cases of disadvantage or risk of social exclusion, such as young populations, foreign-origin individuals, single-parent families, etc.

Conclusions:

The indicators allow for measuring the social impact of the Opengelas, ensuring the inclusion of residents, and replicating the model in other projects. They also help connect social needs with rehabilitation policies, ensuring that urban regeneration leaves no one behind.

3.5 TRAINING AND ROLE DEFINITION FOR THE OSS

The document presents an analysis of the staff required for the OSS and proposes a training and support program that will help teams manage and effectively develop their roles within these offices.

Context and Objectives:

The objective of this deliverable is to define the professional profiles and functions necessary for the proper operation of the One-Stop Shop Offices (OSS) within the BIRTUOSS project framework, as well as the additional training required for each role.

Methodology and Types of Indicators:

The OSS aim to support and drive the urban rehabilitation process, which requires the definition of multidisciplinary profiles that integrate technical, administrative, social, and legal knowledge. The study conducted, based on the experience of the HIROSS4all project and the analysis of the offices in the Opengela program, has identified the following key roles:

- Urban Rehabilitation and Regeneration Technician
- Administrative and Accounting Manager
- Social Mediation Specialist
- Expert in Legal Management and Regulations

Each profile performs specific functions in the different phases of the urban regeneration process, from identifying needs to managing aid and mediating with communities.

Regarding the training program, an analysis of the existing training offer allowed for the design of a program based on a complementary modular structure with two levels of training:

- Basic Training: A course in Rehabilitation Management with thematic and practical modules.

- **Specialized Training:** Advanced modules adaptable to the needs of each office and professional, addressing specific topics of rehabilitation and urban regeneration.

The training design is based on a combination of theoretical learning, practical cases, and participatory workshops, promoting the cross-disciplinary exchange of knowledge among the various professional profiles. Additionally, a flexible approach is proposed to adapt to new needs.

Conclusions:

The BIRTUOSS model seeks to professionalize the management of the OSS through a training structure that ensures the acquisition of key competencies for urban regeneration. The modularity of the program allows for adaptable and continuous training, ensuring the preparation of multidisciplinary teams to face the challenges of neighborhood and building rehabilitation.

The program will be reviewed and adjusted as the project progresses in the following work packages.

ATTACHED DOCUMENTS

“TECHNICAL PARAMETERS FOR THE MODEL”

4. EXECUTIVE SUMMARY

The main goal of this document is to analyse and determine integral solutions for the various typologies of buildings present in the Opengela model and their adjacent urban areas. To improve those buildings' efficiency and sustainability, numerous innovative approaches have been evaluated.

In the process of analysing all the solutions and their eventual integration in the Opengela model, the challenges the sector faces due to the volume of interventions needed in coming years were considered. To that end, current regulations affecting eventual interventions were examined, along with the regulatory obligations we should address after their recent implementation. Furthermore, the need to adapt the production sector to facilitate a leap toward large-scale renovation was identified, based for that purpose on the development of tools that enable a scaling up of interventions. The characterization of the building stock in the Basque Autonomous Community (BAC) was taken up again along with the work developed in the previous project, HIROSS4ALL. Finally, it was deemed of interest to identify the technical limitations seen in prior interventions under the Opengela model, the aim being to reflect and consider them during the analysis and subsequent selection of technical solutions for the model.

This analysis of technical solutions includes the improvement of energy efficiency, exploring and proposing methods that optimize buildings' energy consumption using active and passive measures. Industrial rehabilitation solutions were also identified; they facilitate the renovation of buildings, improving the solutions' quality while also bettering users' comfort and living standards, achieving shorter intervention times.

The integration of advanced technological solutions was also analysed, both software and hardware, applicable at building level and in the urban environment. These solutions have the potential to transform the management and operations of buildings, boosting their efficiency and functionality. Nature-based solutions were likewise analysed, as they include natural elements in architectural and urban interventions, promoting sustainability and improving the quality of life in urban environments.

Finally, to analyse these solutions' eventual integration in the Opengela model, the Torre Urizar was used as a reference, as a living lab of the project itself. In this context, a multi-sector multi-agent workshop was developed, with experts from various fields participating, to evaluate the real possibilities offered by the previously identified solutions. This collaborative approach enabled a more complete and accurate view of the viability and impact of the proposed interventions in a real environment to be obtained.

From all this analysis conclusions were drawn about which solutions that could eventually be included in the Opengela model, considering the conditioners of the building stock itself, the residential user typology and current market conditioners. These conclusions can serve as a guide for future interventions, ensuring that they are effective, sustainable and appropriate for the specific needs of each environment.

The solutions analysed and the conclusions drawn will supply essential information for development of the remaining tasks of WP3. These solutions will be reassessed for their integration in the Opengela model, considering all analysed factors, such as the economic, social, legal, operative and educational aspects. This process will ensure meticulous and appropriate incorporation of the proposed solutions, facilitating their efficient and sustainable implementation in the building stock.

5. CONTEXT

5.1 THE CHALLENGE OF THE SECTOR

The long-term Strategy for Energy Rehabilitation in the Building Sector in Spain (ERESEE 2020), the document that currently determines the energy efficiency needs of the building stock within the 2050 horizon, establishes that the current 30,000 annually rehabilitated residences should increase to 350,000 annually rehabilitated residences as from 2030, to ultimately reach 7.1 million rehabilitated main residences.

And that is the challenge: **to make a major leap in the scale of rehabilitation.**

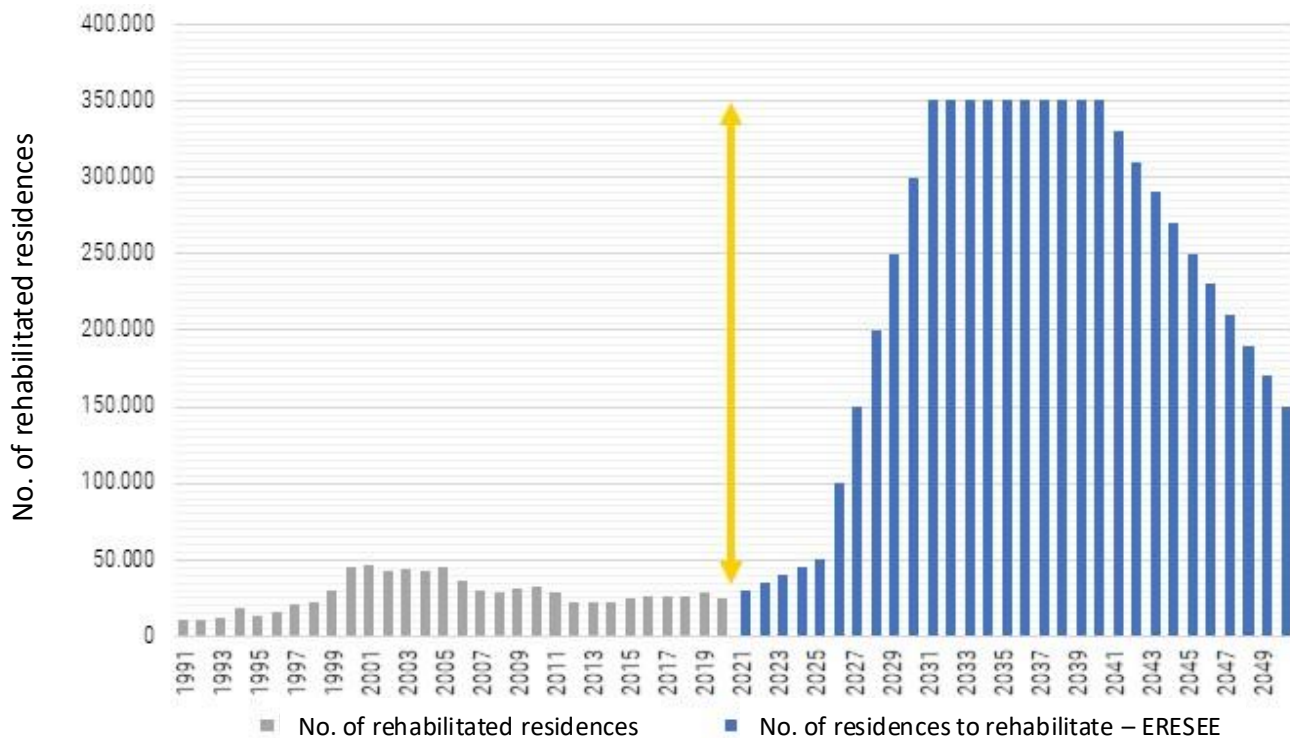


Figure 1. Annual number of approved residences in the rehabilitation sector (1991-2022) and forecast of rehabilitated residences per ERESEE 2020 (2023-2050). Source: UPC/CICLICA, using data from the Ministry of Transport, Mobility and Urban Agenda, 2023.

This major leap, i.e. the deployment of energy rehabilitation as an accepted and widespread activity, entails the overcoming of a series of obstacles that we can classify in four large groups: i) economic and financial; ii) regulatory; iii) organizational; and iv) social.

5.2 DIRECTIVE (EU) 2024/1275 ON ENERGY PERFORMANCE OF BUILDINGS (EPBD), DIGITAL BUILDING LOGBOOK AND BUILDING RENOVATION PASSPORT. THEIR TRANSPOSITION AT NATIONAL SCALE

Directive (EU) 2024/1275 on energy performance of buildings (EPBD) took force in May 2024, with a two-year transposition period in the member states. Before that deadline various measures must be implemented to promote the rehabilitation of buildings. Although these measures should be understood as a set (some instruments complement others), this section will explain the novelties with respect to the renovation passport.

According to the EPBD, the renovation passport is a “tailored roadmap for the deep renovation of a specific building in a maximum number of steps that will significantly improve its energy performance”. Hence, the aim is to schedule (on a technical, financial and social basis) a series of energy interventions that enable achievement of the directive’s objective: climate neutrality in 2050.

The passport’s content is determined in Annex VIII of the EPBD, as follows:

Compulsory	Voluntary
- Information on current energy performance - Relevant energy performance requisites - Graphic representation with the renovation steps and explanation of optimal sequencing - Information about each step: measures, energy savings, emission reduction, estimated bill savings and estimated energy performance class - Potential connection to district networks, energy communities and self-consumption - General information about sustainability, available funding and technical assistance services (one-stop shops)	- Timing of the steps - Information about each step: detailed description of measures, comparison of state with the required energy performance requisites, estimated cost of execution, estimated payback period, reference values for equipment and material emissions, lifetime and maintenance - Additional modules with more information. - List of major enclosure renovations - Information on seismic safety - Information on adaptability of spaces

To that end, each member state should develop a system of passports with the following features:

- The renovation passport is a voluntary instrument, unless the member state decides to make it compulsory. Its access to vulnerable homes should be facilitated;
- It should be digital and printable. In any case, it should be stored in the national database on energy performance of buildings (defined in the EPBD) and coordinated with the digital building logbook, and the member states should provide digital tools for its development;
- It can be produced and issued along with the energy performance certificate (EPC). In this case, the passport will replace the EPC’s recommendations;
- The member states are allowed to develop complementary tools that enable simulation of a simplified passport, which can then be updated when a renovation is carried out.

Regarding the digital building logbook, the EPBD notably defines it as being a “common repository for all relevant building data (...) which facilitates informed decision-making and information sharing within the construction sector, and among building owners and occupants, financial institutions and public bodies”. However, even though it has been defined by the EPBD, the latter does not establish a framework for its implementation, nor does it require one.

The EPBD’s implementation in Spain nevertheless requires that rehabilitation policies be stepped up, though the sector does not seem prepared for this. New tools are thus needed which can be suitably combined to encourage the sector to increase from under 30,000 rehabilitated residences to 350,000 residences annually from 2030 on.

As indicated above, the new Energy Performance of Buildings Directive, duly conceived with the specific aim of increasing the rate and depth of rehabilitations to a level enabling the achievement of climate neutrality in 2050,

contributes some of the tools most needed to overcome two of the key organizational barriers that prevent that change of scale: on the one hand, the improvement of information, its quantity and quality, and its use to determine a strategic vision and enable the respective monitoring and compliance; and, on the other, the absence of a vision coordinated and communicated among different levels of the sector, from state level until building level.

These two tools at building scale are accordingly: i) the renovation passport, which determines a strategic vision for the long-term stepped deep rehabilitation process for the building; and ii) the digital logbook, which consists of a common record for all relevant actions and data throughout the building's life cycle.

- **The building renovation passport**, established on a voluntary basis for owners, is meant to promote phased renovation of the building, transforming the upward path to energy qualification A in a process over time that facilitates progressive compliance with the minimum energy efficiency standards. Phased renovation is a key tool enabling the building's energy rehabilitation to not occur at a specific time but rather be a process shaped for the owners' possibilities as well as the interim and final objectives, which should extend to the whole building stock.
- **The digital building logbook**, digital repository of all relevant data on the building, including those concerning energy, which should be interlinked with the energy performance database and should allow access to data on the building by actors in the sector (safeguarding data protection). Although not a tool directly established by the EPBD, the digital building logbook is an effort to make credible, consistent and updated information available regarding each existing building.

The EPBD also envisages the development of two other tools that will complement and be coordinated with the previous ones at national scale: iii) the national building renovation plan, which will set out a long-term roadmap and overall vision to ensure a decarbonized and highly efficient national building stock; along with iv) the national building database, a public repository of data on the national building stock open to all actors and connected with the EU observatory.

In view of the foregoing, the goals set by international bodies and current rehabilitation capacity, **the need to radically transform the production sector's model to enable integration of the use of new tools such as the renovation passport and digital logbook (by May 2026 at the latest) and to make the leap toward large-scale renovation** merits consideration: nearly 75% of the building stock is inefficient according to current construction standards, and between 85% and 95% of currently existing buildings will still be standing in 2050; yet the annual weighted energy renovation rate continues to be low, around 1%¹.

5.3 CHARACTERIZATION OF THE BUILDING STOCK (BAC – BASQUE AUTONOMOUS COMMUNITY)

5.3.1 GENERAL ASPECTS

As already commented, one of the main obstacles to the development of energy rehabilitation in the building stock is the inability to access or absence of accurate and referenced information on that stock, concerning the respective architecture, construction and technology, as well as the real energy consumption of homes.

Census data (now statistics) heretofore used as the main source of information do not allow identification of different buildings. Although this statistical treatment does enable general policies to be drawn up and the establishment of the eventual scopes for rehabilitation policies, it is not enough to make systematic roadmaps that allow consideration of all residential buildings in the stock and work with policies that may specifically cover each specific building.

¹ DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the energy performance of buildings (recast).

However, to meet future international requirements concerning rehabilitation and the need to step up the respective implementation in the sector, in recent years the government of the Basque Country has made progress in developing more information about its residential building stock.

5.3.2 URBAN BUILDING ENERGY MODELS (UBEMs)

In the areas of urban building energy models (UBEMs), more accurate information sources with more regular updating have been used in our country for some time (censuses are carried out every ten years), considering each building in the stock, as in the cadastre. The cadastre is a source that contains alphanumeric data (surface area, uses, etc) on each building and precisely situates them in the territory. But it also provides graphic information which, suitably processed, enables the respective translation into a virtual model of the building.

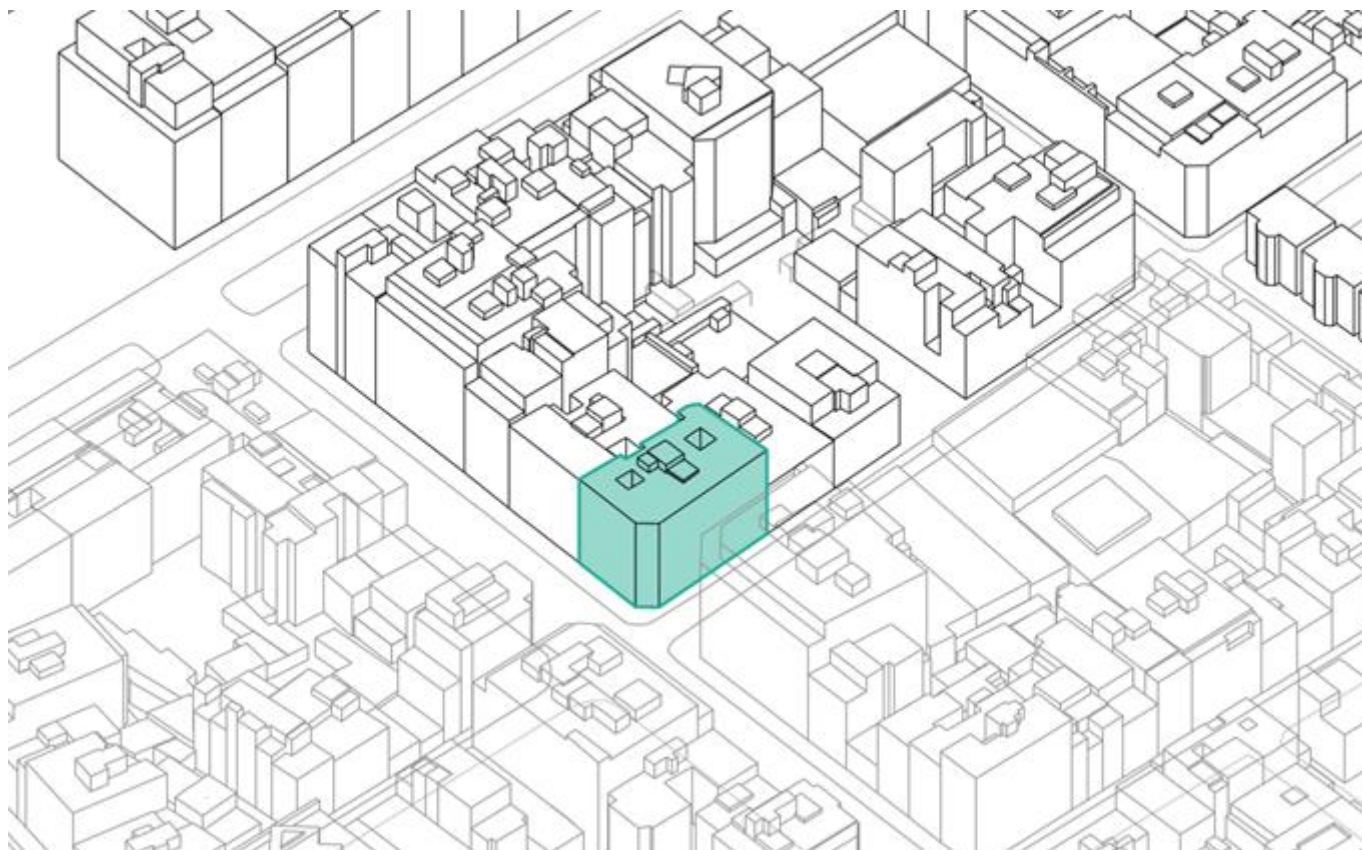


Figure 2. A new generation of tools: urban building energy models (UBEMs). Source: UPC/CICLICA.

If that virtual model is assigned data on the qualities of the building's different closures (façades, windows, roofs, floors, party walls, courtyards, etc), knowing the respective use as well as the weather affecting the building makes it possible to calculate energy demand with the precision of a standard energy certification, though with the possibility of doing so at large scale, with building-to-building data and using a homogeneous method for the entire stock.

5.3.3 ARCHITECTURAL, ENERGY AND ECONOMIC CHARACTERIZATION OF THE HOUSING STOCK

By means of these new UBEM methodologies, and in the framework of research that enabled a first approach to the long-term action plan to improve energy efficiency in the Basque Country's building stock, an architectural, energy and economic characterization of all residential buildings in the Basque Country was done, based in this case on homogenized data from the cadastres of its three territories (Bizkaia, Gipuzkoa and Álava) and generating a database on buildings in the autonomous community.

This triple characterization enables the determination of highly relevant indicators from the standpoint of rehabilitation processes, such as the construction's passive behaviour, energy qualification and demand, energy

consumption, carbon emissions and financial costs per home; this is all done for each construction and installation scenario. It also enables calculation of the actions' financial investment, as well as the emissions embedded in the materials.

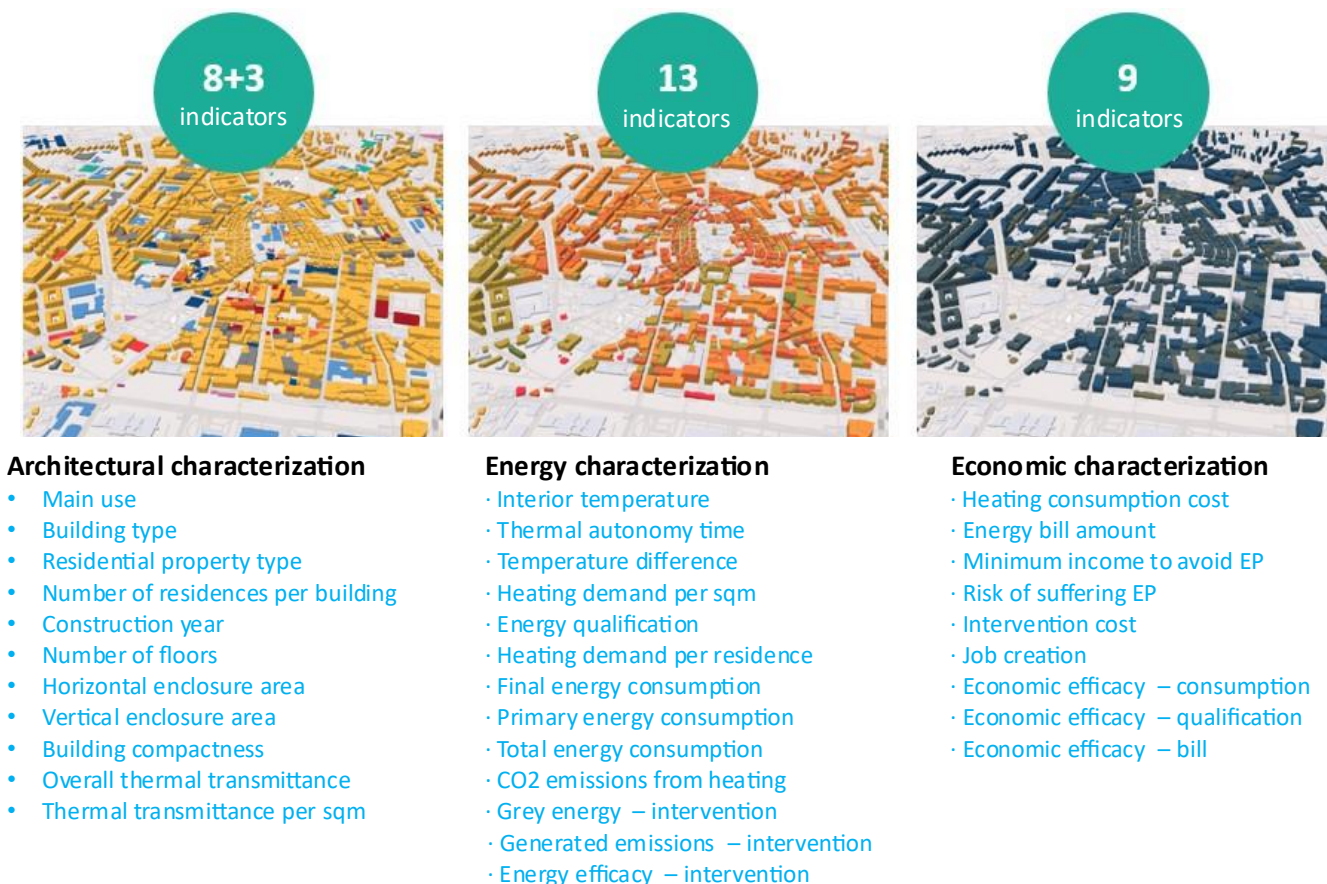


Figure 3. Table of indicators of the architectural, energy and economic characterization. Source: UPC/CICLICA.

For each building, besides the data extracted from the cadastre and the allocation of closures, this database contains the menu of interventions proposed by the Basque government to achieve a certain degree of energy efficiency over the long term, in 2050. And it is divided into five different interventions: façade, windows, roof, courtyards and party walls, and floor or separation with premises.

Each of those interventions assures that once all are applied the building's final energy efficiency goal is achieved in accordance with current regulations. But they can be done separately, independently of each other. It is not necessary to do them all at the same time, nor (above all) to intervene on several occasions in the same element (façade, windows, etc) before 2050.

REFCAT	Zona	Municipio	Orden de las actuaciones	Trimestre de intervención definitivo	Demanda energética del inmueble				Reducción demanda energética		IMPORTE TOTAL INTERVENCIÓN															
									Final	Acumulada					1	2	3	4	TOTAL							
					1	2	3	4			1	2	3	4												
184381008	Txonta	Eibar	P F C V	2024.75 2020.25 2022.00 2024.25	81.779 52.115 38.671 27.197	18.478	-	18.478	-77.2%	-57.8%	113.636	39.983	15.692	44.698	-	-	-	-	-	-	-	-	-	-	-	214.009
184381015	Txonta	Eibar	V F P C	2024.50 2020.25 2023.75 2025.50	100.457 68.978 42.332 26.223	10.526	-	10.526	-80.6%	-58.7%	116.119	60.914	48.447	8.888	-	-	-	-	-	-	-	-	-	-	-	223.568
184381021	Txonta	Eibar	F C P V	2023.00 2025.75 2028.75 2023.25	45.637 34.044 25.048 16.849	9.921	-	9.921	-78.3%	-62.6%	35.043	12.616	34.473	39.603	-	-	-	-	-	-	-	-	-	-	-	121.735
184381050	Txonta	Eibar	F C C V P	2023.50 2027.00 2030.75 2024.75	65.510 46.489 30.700 18.902	13.563	-	13.563	-79.3%	-62.5%	57.257	21.310	64.712	23.667	-	-	-	-	-	-	-	-	-	-	-	166.467
184381054	Txonta	Eibar	P C C F V	2025.00 2030.50 2032.50 2024.75	56.432 35.937 21.646 15.793	12.416	-	12.416	-78.0%	-58.4%	75.399	19.333	16.663	18.834	-	-	-	-	-	-	-	-	-	-	-	130.229
184381055	Txonta	Eibar	F C P V	2022.25 2025.25 2028.50 2023.00	68.424 26.393 16.856 12.326	8.553	-	8.553	-77.0%	-66.2%	11.389	13.077	13.318	21.857	-	-	-	-	-	-	-	-	-	-	-	59.640
184381056	Txonta	Eibar	F V C P V	2022.75 2026.75 2029.25 2021.00	49.639 37.778 30.082 22.945	17.177	15.977	15.977	-67.8%	-54.6%	34.904	39.448	9.686	23.118	-	-	-	-	-	-	-	-	-	-	-	140.631
184381057	Txonta	Eibar	F C C V P	2023.25 2026.50 2030.00 2024.25	37.571 28.461 21.208 15.335	11.290	-	11.290	-70.0%	-55.1%	26.928	9.876	30.396	16.417	-	-	-	-	-	-	-	-	-	-	-	83.618
184381058	Txonta	Eibar	F C C V P	2023.25 2026.50 2030.25 2024.50	37.734 28.714 21.025 15.217	11.290	-	11.290	-70.1%	-55.1%	26.959	10.461	30.031	15.910	-	-	-	-	-	-	-	-	-	-	-	83.361
184381063	Txonta	Eibar	P F C C V	2024.25 2029.25 2031.50 2024.00	92.276 66.563 46.683 32.423	21.039	-	21.039	-77.2%	-57.3%	103.725	52.429	21.891	60.384	-	-	-	-	-	-	-	-	-	-	-	229.429
184381064	Txonta	Eibar	C F P V	2021.75 2024.75 2029.00 2023.50	65.718 50.087 35.675 22.948	14.286	-	14.286	-78.3%	-64.3%	21.347	44.734	51.642	49.063	-	-	-	-	-	-	-	-	-	-	-	166.765
184381065	Txonta	Eibar	P F F V C	2023.75 2028.75 2032.75 2025.25	64.871 47.727 33.208 24.214	15.470	-	15.470	-76.2%	-56.1%	69.932	44.124	40.847	11.866	-	-	-	-	-	-	-	-	-	-	-	175.788
184381072	Txonta	Eibar	F V C C P	2023.50 2029.25 2033.00 2024.75	39.962 29.147 22.138 15.282	12.065	-	12.065	-69.8%	-52.2%	32.407	35.874	9.355	12.894	-	-	-	-	-	-	-	-	-	-	-	90.441
184381168	Txonta	Eibar	V F F P C	2024.75 2031.00 2034.00 2025.25	51.378 33.183 26.122 22.523	19.634	-	19.634	-61.8%	-47.1%	118.277	61.799	26.598	13.827	-	-	-	-	-	-	-	-	-	-	-	220.501
184381192	Txonta	Eibar	F C C P V	2023.00 2026.25 2028.75 2023.25	76.086 57.543 42.489 30.051	18.359	-	18.359	-75.9%	-60.3%	55.139	20.454	43.794	62.313	-	-	-	-	-	-	-	-	-	-	-	181.700
184381203	Txonta	Eibar	V F F C	2027.00 2034.00 2035.25 -	95.952 58.900 36.877 24.372	-	-	24.372	-74.6%	-50.7%	224.797	29.859	15.647	-	-	-	-	-	-	-	-	-	-	-	-	270.603
184381551	Txonta	Eibar	F F V C	2024.00 2030.50 2035.00 -	26.205 18.036 12.811 8.176	-	-	8.176	-68.8%	-51.1%	22.985	27.107	6.296	-	-	-	-	-	-	-	-	-	-	-	-	57.387
187090035	Lasarte	Lasarte-Oria	V F C S	2025.75 2032.50 2034.75 2025.50	323.864 158.813 73.885 52.845	46.934	-	46.934	-85.5%	-63.5%	624.462	257.743	26.037	53.741	-	-	-	-	-	-	-	-	-	-	-	961.983
187090036	Lasarte	Lasarte-Oria	V F C C	2025.75 2032.50 2025.25 -	159.996 91.081 55.615 24.904	-	-	24.904	-84.4%	-60.0%	261.860	108.082	35.279	-	-	-	-	-	-	-	-	-	-	-	-	405.220
187090037	Lasarte	Lasarte-Oria	V F C C	2025.75 2033.00 2025.50 -	86.270 49.317 29.689 19.478	-	-	19.478	-77.4%	-55.8%	137.330	56.688	11.701	-	-	-	-	-	-	-	-	-	-	-	-	205.726
187090135	Lasarte	Lasarte-Oria	V F C C	2025.75 2032.75 2025.25 -	430.103 225.447 120.043 43.994	-	-	43.994	-89.8%	-64.2%	790.707	326.363	89.144	-	-	-	-	-	-	-	-	-	-	-	-	1151.289
188667003	Caballero Blanco	Pasaia	V F C C	2025.75 2032.75 2025.25 -	62.301 35.242 20.898 12.902	-	-	12.902	-79.3%	-57.3%	100.506	41.484	9.299	-	-	-	-	-	-	-	-	-	-	-	-	151.289
188667004	Caballero Blanco	Pasaia	V F C C	2025.75 2032.75 2025.25 -	116.947 63.053 34.789 18.904	-	-	18.904	-83.8%	-60.6%	200.734	82.852	18.598	-	-	-	-	-	-	-	-	-	-	-	-	302.184
188667010	Caballero Blanco	Pasaia	V F C C	2025.75 2032.75 2025.25 -	219.405 116.113 62.233 30.635	-	-	30.635	-86.0%	-62.1%	386.728	159.620	37.195	-	-	-	-	-	-	-	-	-	-	-	-	583.544
188667017	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	69.050 36.350 18.803 16.331	-	-	16.331	-76.3%	-56.1%	122.895	50.725	2.957	-	-	-	-	-	-	-	-	-	-	-	-	176.578
188667034	Poblado	Pasaia	F V C C	2022.25 2026.50 2030.00 2023.25	30.013 16.744 12.272 8.149	7.513	-	7.513	-75.0%	-65.4%	12.930	23.941	5.702	24.118	-	-	-	-	-	-	-	-	-	-	-	66.700
188667035	Poblado	Pasaia	F V C C	2023.25 2030.00 2025.25 -	29.246 14.527 9.647 6.780	-	-	6.780	-76.8%	-63.4%	15.171	28.541	4.206	-	-	-	-	-	-	-	-	-	-	-	-	47.918
188667036	Poblado	Pasaia	F C V S	2022.00 2024.50 2028.00 2023.00	30.794 19.184 12.270 8.399	7.747	-	7.747	-74.9%	-67.2%	10.740	9.493	20.936	24.118	-	-	-	-	-	-	-	-	-	-	-	65.294
188667037	Poblado	Pasaia	F C V S	2022.00 2024.25 2027.75 2023.00	46.904 27.680 17.133 10.782	9.837	-	9.837	-79.0%	-71.4%	17.849	14.529	34.768	38.917	-	-	-	-	-	-	-	-	-	-	-	106.063
188667038	Poblado	Pasaia	F C V S	2022.00 2024.25 2027.75 2023.00	41.043 24.278 15.401 9.845	9.046	-	9.046	-78.0%	-70.4%	15.528	12.205	30.242	32.340	-	-	-	-	-	-	-	-	-	-	-	90.314
188667039	Poblado	Pasaia	F C V S	2022.75 2025.75 2029.00 2023.50	31.186 23.591 16.583 11.677	10.066	10.288	10.288	-67.0%	-55.8%	22.343	9.493	25.252	24.118	1.926	-	-	-	-	-	-	-	-	-	-	83.131
188667040	Poblado	Pasaia	F C V S	2022.75 2025.75 2028.75 2023.50	30.988 23.455 16.425 11.563	10.871	10.239	10.239	-67.0%	-56.0%	22.153	9.522	25.035	24.118	1.799	-	-	-	-	-	-	-	-	-	-	82.627
188667041	Poblado	Pasaia	F C V S	2022.00 2024.50 2028.00 2023.00	38.142 23.353 14.481 9.554	8.755	-	8.755	-77.0%	-69.2%	13.754	12.205	26.791	32.340	-	-	-	-	-	-	-	-	-	-	-	85.089
188667046	Andonategi	Pasaia	V F C C	2025.75 2033.00 2025.75 -	84.829 41.665 24.130 22.595	-	-	22.595	-73.4%	-56.1%	205.880	158.338	9.387	-	-	-	-	-	-	-	-	-	-	-	-	463.625
188667047	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	59.664 31.557 17.074 14.631	-	-	14.631	-75.5%	-55.3%	104.649	43.228	2.938	-	-	-	-	-	-	-	-	-	-	-	-	150.815
188667049	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	60.588 32.431 17.333 14.912	-	-	14.912	-75.4%	-55.3%	106.213	43.840	2.906	-	-	-	-	-	-	-	-	-	-	-	-	152.059
188667050	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	60.119 32.152 17.120 14.710	-	-	14.710	-75.5%	-55.4%	105.601	43.583	2.906	-	-	-	-	-	-	-	-	-	-	-	-	152.065
188667051	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	60.336 32.316 17.290 14.869	-	-	14.869	-75.4%	-55.3%	105.719	43.634	2.906	-	-	-	-	-	-	-	-	-	-	-	-	152.256
188667052	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	68.461 35.868 18.439 16.023	-	-	16.023	-76.6%	-56.3%	122.537	50.576	2.906	-	-	-	-	-	-	-	-	-	-	-	-	176.019
188667054	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	60.039 32.183 17.248 14.827	-	-	14.827	-75.3%	-55.2%	105.113	43.386	2.906	-	-	-	-	-	-	-	-	-	-	-	-	151.405
188667056	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	59.940 32.123 17.107 14.777	-	-	14.777	-75.4%	-55.3%	105.026	43.349	2.906	-	-	-	-	-	-	-	-	-	-	-	-	151.281
188667057	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	71.362 37.874 19.983 16.369	-	-	16.369	-77.1%	-56.3%	125.653	51.864	4.383	-	-	-	-	-	-	-	-	-	-	-	-	181.000
188667058	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	162.147 75.804 30.295 25.291	-	-	25.291	-84.4%	-62.3%	328.725	135.680	6.312	-	-	-	-	-	-	-	-	-	-	-	-	470.717
188667059	Andonategi	Pasaia	V F C C	2026.00 2033.50 2025.75 -	163.482 76.578 30.748 25.498	-	-	25.498	-84.4%	-62.3%	330.703	136.527	6.633	-	-	-	-	-	-	-	-	-	-	-	-	473.863
188667060	Andonategi	Pasaia	V F C C	2026.00 2033.50 -	111.756 51.429 19.521	-	-	19.521	-82.5%	-61.6%	229.572	94.732	-	-	-	-	-	-	-	-	-	-	-	-	-	324.249
188667062	Andonategi	Pasa																								

- Green roof

WINDOWS AND BAYS (Replacement of enclosure recesses):

- Low-emission glazing
- Glazing with solar control
- Triple glazing
- Inclusion of argon gases between glazing

Introduction of SHADE ELEMENTS

- Introduction of awnings (motorized or not)
- Slat systems or elements
- Eaves

5.4.2 ACTIVE SYSTEMS

1.Optimization and improvement of performance:

- Replacement or introduction of new equipment:
 - Aerothermal heat pump
- In existing buildings most are implemented in single-family homes
 - Geothermal heat pump

Compared to the aerothermal heat pump performance is superior, as is the system's overall price, which should include perforations. In existing buildings, besides single-family homes it is also used in commercial buildings

- Condensing boiler

Where there is access to a piped gas network, replacement of a standard boiler by a condensing one improves the system's performance and can sometimes become the most suitable alternative when there is no access to renewable sources (no space for panels or pellet silos and aerothermal or geothermal heat pumps are not possible)

2.Reduce the system's energy losses:

- Insulation in piping,
- Efficient ventilation installations:
 - Introduction of heat recovery
- Efficient lighting installations:
 - Use of LED bulbs
 - Introduction of movement sensors to reduce energy consumption

3.Regulation and control:

- Introduction of thermostatic valves in radiators
- Introduction of variable displacement pumps
- Introduction of individual accounting systems in centralized installations
- Programming of operating hours

4.Monitoring

5.4.3 INCORPORATION OF RENEWABLE ENERGY SOURCES IN ACTIVE SYSTEMS

New and rehabilitated buildings should include per regulations, barring exceptions, a certain use of renewable energies, whether thermal solar energy for hot human consumption water, biomass for heating or geothermal energy for heating and cooling or electric power. Classification can hence be according to the type of energy generated.

1. Generation of thermal energy
2. Generation of distributed electric power

1.Generation of thermal energy:

Individual or centralized equipment within the building.

- Biomass boiler

In the urban environment it is very difficult to introduce individual equipment, hence their suitability in rural environments of single-family residences.

- Aerothermal heat pump

Irrespective of the rural or urban environment, in the case of individual equipment, the need for an exterior unit requires the space of a terrace or similar space for the respective installation.

- Geothermal heat pump

The need to probe or perforate to exchange heat with the ground can be suitable in single-family homes.

- Solar collectors

The occupation of roof space and the upkeep required for them to function well means that they have now been displaced by photovoltaic panels (less need for maintenance).

- Connection to an existing district heating network partially or totally fed by each of them (biomass, aerothermal, geothermal, solar thermal).

A suitable alternative as long as there is one in the area. In that case the only inconvenience is the space needed for the substations within the building.

Considerations that must be taken into account regarding a district heating network in urban renewal and building rehabilitation, with respective opportunities and threats:

- Use and occupation of urban space in the regeneration process:
- Opportunity when there is municipally-owned property, e.g. seek to also cover aspects such as access or communications, etc
- Need for minimum space within the building for the introduction of substations

In the case of buildings without boilers before the rehabilitation, creation of the new service for users' comfort will entail extra spending (prepayment models, etc).

2.Generation of distributed electric energy and energy self-consumption communities

The introduction of photovoltaic panels (on building roofs) to generate electricity for self-consumption.

The possibility of generating electricity for self-consumption should be available for the consumer as an alternative to purchasing electric energy, especially when there is already a suitable technology (photovoltaic) to produce energy locally.

There are different electric generation models, depending on the scale and the type of legal person involved.

Below are indicated several examples of energy community typologies now being developed more frequently in the BAC:

- **Neighbourhood scale:**
 Association of municipalities: Otxarkoaga

 This is a photovoltaic installation on the roof of an EXISTING rehabilitated commercial BUILDING. The excess electric power generated is shared among buildings in the neighbourhood: 75 kW, 226 panels and 450 sqm.
- **Municipal scale**
 TEK-CEL model:

 This is a local energy community model [the Basque and Spanish acronyms are respectively TEK and CEL] which combines several attributes built upon the basis of the SUSTAINABILITY, EFFICIENCY and TRANSPARENCY that singularize them; the following stand out:
 - **Km Zero**
 Installations that produce energy in local urban and business environments less than 2 km from the end consumer
 - **Zero emissions**
 All the energy consumed has a sustainable guarantee of origin
 - **Open**
 To the participation of citizens, small businesses, SMEs and local entities
 - **Contribution to local development**

Both in tenders to implement photovoltaic installations and for their maintenance, the entry of local companies and agents is promoted.

- **COOPERATIVE model**

 The creation of energy communities in the cooperative format which act and play a role within the electric system and are supported by their local and nearby administrations will enable the channelling of different projects for photovoltaic electric power generation installations.

 It is a mass integration model which changes the vision of energy in each municipality where it has been introduced; it integrates the respective community in a system of cooperative self-management and meets the energy needs of all persons who join the project.

The cooperative model is characterized by the following, mainly:

- **Locally self-managed**
 Participate in the generation and management of solar energy for your own supply.
- **Nearby sustainable energy**
 Produce your own energy with your photovoltaic panels, even if you do not own a roof. And always kilometre zero.
- **Government and citizens hand-in-hand**
 With the motto 'Join up with your neighbours and the main public players around you to change the energy map'.

5.4.4 INTERVENTION MENUS: DETERMINATION OF REHABILITATION SOLUTIONS ACCORDING TO REPRESENTATIVE ARCHITECTURAL AND CONSTRUCTION TYPOLOGIES

In 2019 the research group Calidad de Vida en la Arquitectura (Caviar) of the UPV/EHU participated in the research project for a *Prior Study for Development of a Long-term Intervention Strategy in the Building Stock of the Basque Country*. The work was commissioned by the Department of Environment, Territorial Planning and Housing of the Basque government and was carried out in collaboration with a team of UPC researchers led by Albert Cuchi and the company Cíclica.

The research group developed the architectural and construction characterization of the typological segments of residential buildings in the BAC [Basque Autonomous Community] and analysed possible rehabilitation interventions for each of the construction elements, assessing environmental, economic or cultural criteria and proposing a menu of actions for each type. Once the menus were determined, the construction characteristics were described, specifying the dimensions and materials for each solution in order to subsequently develop the energy characterization of the intervened state and calculate the interventions' impacts.

The work done served to obtain generalized knowledge about the architectural and construction characteristics of the entire building stock in the BAC, understand the changes undergone by the structural types and closure elements and ascertain the respective impact on the buildings' energy behaviour.

It must nevertheless be borne in mind that the work was wide-ranging (the entire housing stock in the BAC); the research's level of depth was therefore what was necessary to achieve the set objectives and provide the necessary information to the UPC team. Regarding the characterization, it was based on detailed knowledge of the architectural and construction characteristics of each period; the aim was to be able to define a few representative types that could fit in with the segmentation done based on the available cadastral variables.

Once the more significant typologies were established, the rehabilitation solutions were determined based on the following general criteria:

- **Technical criteria**
 - Suitability of the construction system and materials used
 - Ease of installation and/or execution
 - Opportunity arising from existence of synergic actions in the same building or area
- **Economic criteria**
 - Optimum cost of the intervention
 - Payback period for the action and return on the investment
 - Revaluation of the property
 - Amount of investment to make
 - Direct, indirect or induced employment generated
- **Environmental criteria**
 - Reduction of the building's thermal or energy demand
 - Reduction of energy consumption
 - Reduction of CO₂ emissions
 - Reduction of consumption of primary energy of non-renewable origin
 - Improvement of energy qualification

Improved characteristics according to life-cycle analysis

- **Criteria associated to users' living standards:**

Reduction of energy poverty

Improvement of hygrothermal conditions

Humidity avoidance (thermal bridges, ventilation, etc)

Diminished natural light: increased window recess depth

- **Criteria linked to heritage value**

Conservation of characteristic elements such as:

- Masonry walls
- Quality brickwork façades

Conservation of representative urban landscapes

The existing options for each element were studied, selecting the optimal solution from the technical and economic standpoint while considering environmental aspects and heritage value. The optimum cost method was therefore used; it consists of valuing solutions based on the reduction of demand generated by each invested euro.

However, besides this criterion, when determining the interventions a balance was sought between the various objectives, setting priorities according to the characteristics of each case. These were the general criteria for decision-making:

- Placing value on existing facing brickwork and masonry walls, ensuring that they are still visible from the outside. In such façades the introduction of thermal insulation from the inside is therefore proposed, even though technically it is not the best solution and may be difficult to execute and manage;
- In other cases it is not deemed necessary to conserve the appearance of the façade, which can be insulated from the outside. The first option is EIFS, as it is the best according to the optimum cost criterion;
- Windows are replaced by others that perform better. In the case of buildings from before 1900, wooden frames are proposed to maintain their existing aesthetics, while in the others PVC was chosen for optimum cost reasons;
- In the case of roofs there are wide-ranging possibilities, given that there are very diverse construction types which are furthermore made more complex by the use given to underroof space. The proposed intervention could be different depending on how the underroof space is used:
 - o Underroof space not inhabitable: insulate over the last structural element with layer of mineral wool
 - o Underroof space inhabitable: insulate roof exterior
- With the structural elements something similar happens. Depending on how the ground floor (GF) is used, the intervention would be different:
 - o GF inhabitable: insulate the floor
 - o GF not inhabitable: insulate lower floor slab
- Regarding the floor slab or suspended floors, because they do not greatly impact the calculation of demand, a single solution was chosen for all the typologies;
- Finally, in the exterior party walls and the courtyard façades the same system used on the façades was maintained.

Once the intervention menus were established, the eventual economic and environmental impact of the proposed rehabilitation actions was estimated.

Calculation of the MEB [material execution budget] and total cost of each intervention

In this task the budget for each of the previously defined headings was developed. To that end, the base price for building and urbanization of the Basque government was first used; the costs were subsequently adjusted with real market prices.

Besides the unit price, with the values corresponding to material execution, an estimate was made of the total price of each heading, in which the following items were included:

- Direct costs
- Indirect costs
- Safety and health
- Waste management
- Quality control
- General expenditure
- Industry benefit
- VAT: 21% (though depending on volume in some cases may be 10%)
- Fees
- Licencing, endorsement, insurance rates, etc

Calculation of environmental impact

To obtain the environmental impact of the production stage in the proposed interventions the environmental database of Banco ITeC was fundamentally consulted. The data it provides cover the environmental impact of the extraction, transport to factory and transformation in factory phases for the materials and products in the proposed solutions, though it does not take into account the impact of the phases of transport and implementation, nor the machinery or auxiliary elements required.

In the case of materials or products not considered in the **Banco ITeC** database, even when their name in this study was deliberately generic to avoid mentioning specific commercial brands, the product environmental declaration of a manufacturer was consulted, having been validated by third parties and covered by the Euro-standard EN 15804 (e.g. for the product *corrugated sheet of bituminous cardboard*, the data on energy cost in phases A1, A2 and A3 come from DAP (EPD) EPD-OND-20160087-CAD1-EN, owned by the manufacturer *ONDULINE S.A.*, published by the *Institut Bauen und Umwelt (IBU)* of Berlin).

Ultimately, the work done served to obtain a general knowledge of architectural and construction characteristics throughout the BAC, understand the changes undergone by the structural types and closure elements and learn about the respective impact on the buildings' energy behaviour. The buildings' segmentation by types and their characterization furthered knowledge about the potential of each segment of the stock and was used to estimate the environmental or economic impact the energy rehabilitation strategy might have, depending on the proposed actions.

However, because the analysis spectrum was so wide (the entire housing stock of the BAC), the level of detail of the results was not very high, though it was sufficient to achieve the set objectives and provide the information the UPC team needed within the set deadlines.

5.5 MAIN TECHNICAL LIMITS IN THE BUILDING STOCK

First of all, one of the main problems in the case of building rehabilitations is that they are done without the buildings being vacated by their owners/users, i.e. people have to live amid the ongoing work. This means that the technical solutions put forward have to be as non-disruptive and non-invasive as possible.

Second, the architectural and construction limitations of the building to be rehabilitated should be indicated. In the specific case of constructions included in the HIROSS4ALL project, special emphasis should be given to the small dimensions as well as the existing clearance height. These two questions make many solutions now on the market unviable for execution, such as ventilation ducts and production equipment, etc.

Third, the financial situation of the owners in buildings should be highlighted. As set out in the Law on Horizontal Property, each owner shall undertake the financial investment proportional to their participation in the owners' association, whereby on most occasions people opt to carry out actions that imply less cost in the short term, as it is very complicated to implement measures that amortize in the medium/long term.

With respect to the previous point, owners can reject solutions for community installations due to the risk of non-payment that may arise during their use. Also, such solutions are often technically unviable because the association does not have spaces available to house community equipment and installations.

Finally, and regarding solutions that may interfere with public ground, in such cases it is notably necessary for local authorities (municipal council) to approve those interventions.

In the case of the area used as a LivinLab for the BIRTUOSS project (Torreurizar group), besides the aforementioned limitations, the building's level of protection is noteworthy. It is undoubtedly a singular building, due to the quality of its design as well as its destined use and conservation. It therefore has a 'basic' type C level of conservation, according to the building protection rules in the land-use plan of Bilbao. Many of the interventions now on the market are consequently unviable because they are solutions incompatible with the level of protection; basically, all those solutions that have a direct or indirect relationship with the building's enclosure.

5.6 TOOLS TO STIMULATE REHABILITATION POLICIES IN THE MEDIUM AND LONG TERM

5.6.1 A TOOL FOR PLANNING AND DECISION-MAKING

Using the building database based on the architectural, energy and economic characterization of the housing stock as a support, the **roadmap tool** was developed. It is a program that can manage the data in the database to build rehabilitation roadmaps according to economic, environmental and/or social optimization criteria.

That tool makes it possible to do so by selecting sectors of the stock that are specific (by geographic location – provinces, municipalities and their districts, neighbourhoods, streets – by types, by age, by segmentations previously included in the database such as energy vulnerability, etc) or in an overall manner (by addition or considering it altogether), covering the entire stock.

Working with the entire housing stock or segments thereof naturally implies having instruments that allow a quick view which, beyond series of alphanumeric information, enables viewing the geographic distribution of the building stock's characteristics at various scales.

With the roadmap tool it is possible to build scenarios which depending on the entry data can obtain a rehabilitation roadmap that includes all buildings considered in the section analysed and eventually the entire stock.

These newly generated scenarios can be compared to each other, following their change over time between 2025 and 2050, both in a cartographic depiction and as figures with the most relevant indicators for decision-making.

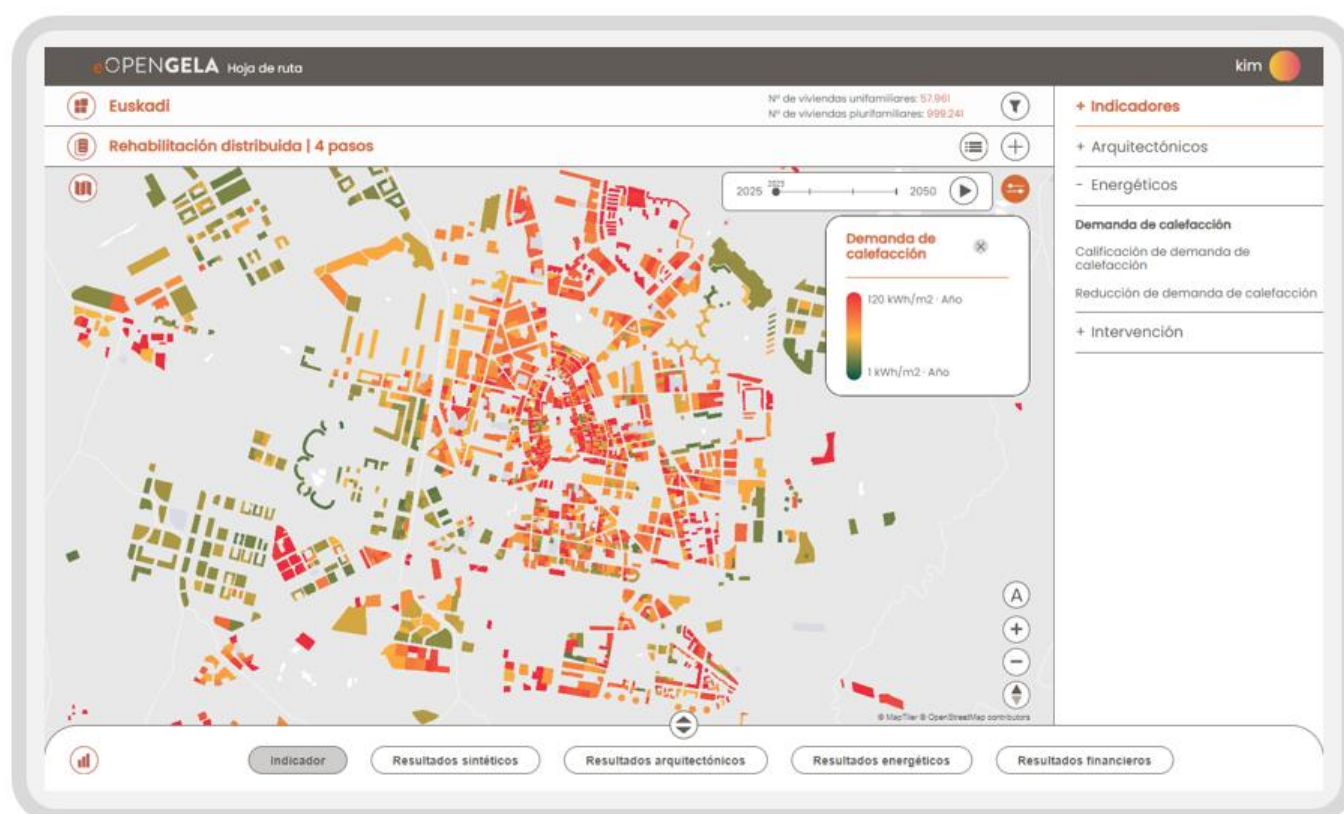


Figure 5. Scenario generation tool. Evolution of energy behaviour. Source: UPC/CICLICA.

5.6.2 A PRIORITIZATION TOOL

The roadmap tool also makes it possible to identify at the scale of each building the worst performing buildings, where, as set out in the EPBD, actions should be prioritised.

The rehabilitation scenarios determined by the competent authority (regional or local) can therefore focus on that 43% of worst performing residential buildings that will require special monitoring in the national renovation plans. This function is unique today on the market.

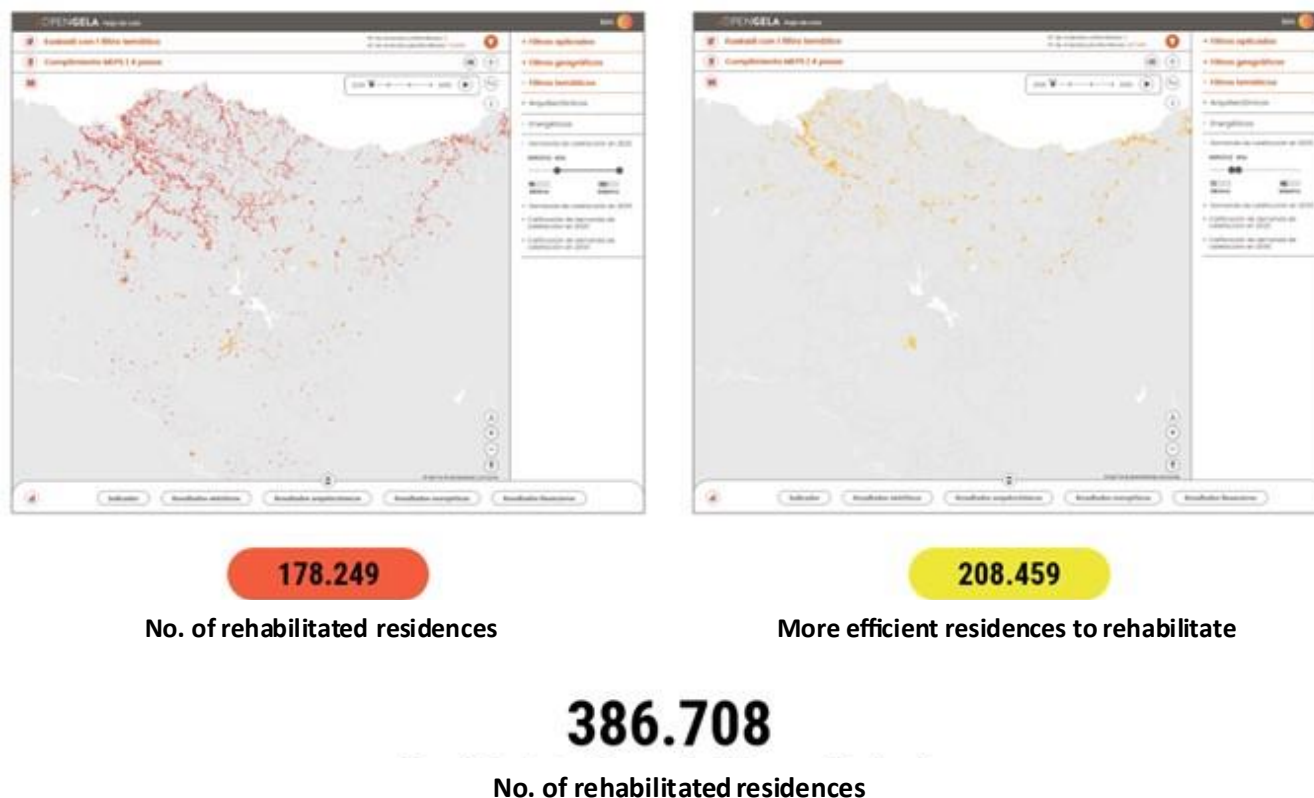


Figure 6. Scenario generation tool. Map of residences to rehabilitate in the autonomous community. Source: UPC/CICLICA.

5.6.3 A TOOL FOR COORDINATION WITH THE SECTOR

The roadmap tool can help address broader questions with a great deal of interest, beyond just energy performance of buildings. Such is the case of the private sector, from manufacturers of materials to construction firms, where the tool can predict demand in the market for products used in rehabilitation projects. Because it works from building to building, and each is therefore modelled, the areas to rehabilitate and the solutions proposed by authorities (or those eventually decided by the owners in their renovation passport) can depict the changing demand for materials according to the phased rehabilitation of the various buildings.

Ensuring orderly demand to avoid episodic problems (strong fluctuations in demand with consequent price peaks and risk for the survival of local industry) should be one of the functions of the roadmaps promoted by authorities. Also, for manufacturers and builders the roadmaps and renovation passports supply key information at different scales which can be used to plan offerings and generate proposals (technical, commercial) that make good use of economies of scale and hence reduce costs and speed the rehabilitation.

A market is built which should be as transparent as possible while facilitating communication between players (one of the EU's stated goals).

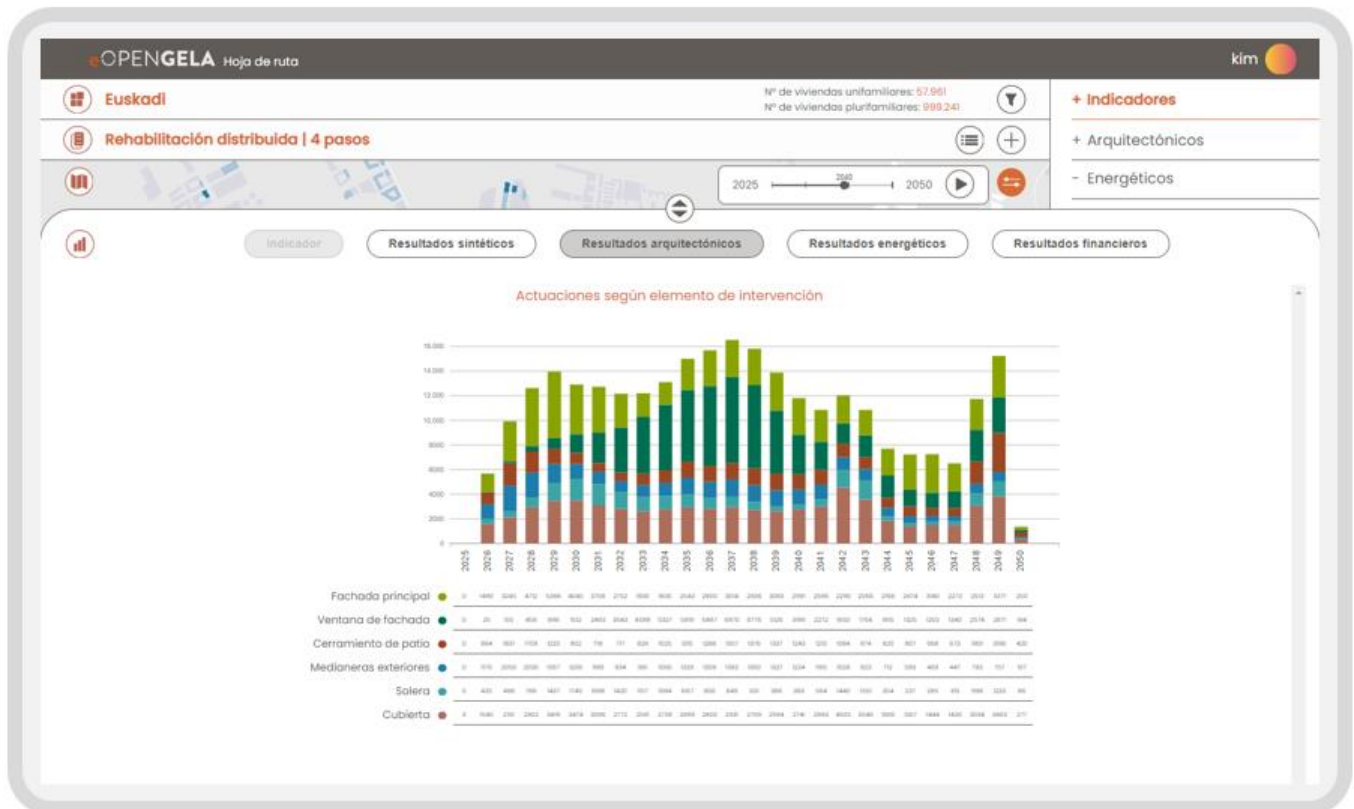


Figure 7. Scenario generation tool. Annual demand for interventions per element. Source: UPC/CICLICA.

6. IMPROVED TECHNICAL SOLUTIONS

In the area of energy rehabilitation, innovations are beginning to be seen which are associated to the industrialization of thermal enclosures and decarbonisation of thermal systems thanks to different European projects and initiatives that have marked out work lines addressing the incipient market of energy interventions in existing buildings.

Furthermore, this section also includes innovative nature-based solutions and ICT integration solutions that are currently used on a widespread basis at urban scale in building interventions. This highlights the special interest that all these solutions may have for their implementation in the Opengela model as an additional solution for current energy interventions in enclosures.

6.1 SOLUTIONS TO IMPROVE ENERGY EFFICIENCY: ACTIVE AND PASSIVE

As a first step in the reflection on optimized technical solutions for interventions in existing buildings, this section reviews the active and passive solutions, though from an integral standpoint. As mentioned in previous sections, the new directive on energy performance of buildings (EPBD) published in May 2024 favours a type of intervention known as **deep renovation** – far-reaching renovations or integral rehabilitations.

Regardless of what they are called, all of them refer to major interventions that seek integral renovation of the construction elements and installations that affect energy demand and consumption. An integral energy rehabilitation or deep renovation of a home implies the simultaneous implementation of multiple measures to save energy that lower consumption by 30% to 70%, while also enhancing the comfort and healthiness of the residence. This approach ensures that the rehabilitated residences function as a unified system, considering all aspects, from the enclosure to the ventilation and heating systems, to achieve the best performance goals and reduce CO₂ emissions.

A rehabilitation of usage, however, consists of adopting one or two energy-saving measures, such as insulation of piping or replacement of windows. Although it may seem profitable in the short term, in the long term it may be less beneficial and more costly if it becomes necessary to redo work to comply with future energy reductions. It is crucial for any measure to form part of a long-term plan to progress toward a deep adaptation without having to repeat previous steps; advice from a renovation expert is accordingly recommended.

6.1.1 PASSIVE SOLUTIONS:

Passive solutions **focusing on integral energy rehabilitations or deep renovation** encompass various strategies designed to optimize the energy efficiency and sustainability of buildings by means of thermal intervention in the construction elements. These strategies include thermal insulation or thermal improvement of façades, roofs and windows as fundamental strategies to substantially reduce heat loss through most of the enclosure's surface, though they also include all less common strategies that also contribute to energy improvement and which should be subject to analysis and intervention in a deep renovation.

6.1.2 ACTIVE SOLUTIONS:

Active solutions can incorporate a wide range of advanced technologies for energy management and generation. Standing out among them in the area of energy rehabilitation are optimization and improvement of thermal systems, due to the major impact their performance has on the building's overall consumption and the beneficial effects of respective decarbonisation. Because heating is the most important consumption in the residential ambit,

properly coordinating active thermal systems with passive energy loss reduction systems is one of the keys for interventions of the deep renovation type and ambitious energy savings.

Following on the above consideration of passive and active systems, this section mentions those tools that can optimize them through advanced management of consumption or related aspects. And even though they may not apparently concern energy, this section has also included optimization of accessibility and incorporation of electric vehicles in integral interventions.

Finally, the suitability of finalizing planning of the integral solutions should be noted, mentioning the contribution of renewable energies that can be implemented in a rehabilitation to support energy generation and as a key influence in reducing dependence on non-renewable energy sources and lowering carbon emissions.

6.1.3 INTEGRAL SOLUTIONS FOR ENERGY REHABILITATIONS OF THE DEEP RENOVATION TYPE

As previously mentioned, the final goal of actions of the deep renovation type is to intervene in a higher number of energy conditioners with a view to achieving ambitious energy savings: the interventions are meant to go beyond solely renovating the façade or just switching boilers, given that the combination and sum of renovations (e.g. façade + windows + roof + thermal systems) is what leads to primary energy savings of more than 60%.

With that objective of multiple intervention, this section jointly presents **active and passive solutions from the deep renovation standpoint**; the solutions mentioned in section 3.4 are therefore broadened with interventions that include energy savings and which ideally should be combined with each other.

Standing out among the solutions that are not usually being considered and implemented in energy rehabilitations, but which are necessary due to their contribution to ambitious energy improvement of the deep renovation type, are shade, airtightness, decarbonized thermal installations, heat recovery ventilation and integration of renewables.

The set of strategies to consider to boost energy savings are accordingly set forth below, in a **non-exhaustive list of elements to renovate with passive and active solutions in integral rehabilitations of the deep renovation type**:

- a) Insulation of the enclosure: façades, roofs and floors
- b) Replacement of framing in existing recesses and windows
- c) Renovation of singular glazed enclosures: galleries and balconies closed by curtain wall
- d) Shading
- e) Airtightness or permeability of building's air
- f) Improvement and decarbonisation of thermal installations
- g) Mechanical heat recovery ventilation systems
- h) Integration of renewables
- i) Electric vehicle
- j) Ad hoc professional services

The aspects associated to regulations and control and monitoring are a vital part of any integral strategy of the deep renovation type and are dealt with in section 4.3.

a) THERMAL INSULATION OF THE ENCLOSURE: FAÇADES, ROOFS AND FLOORS

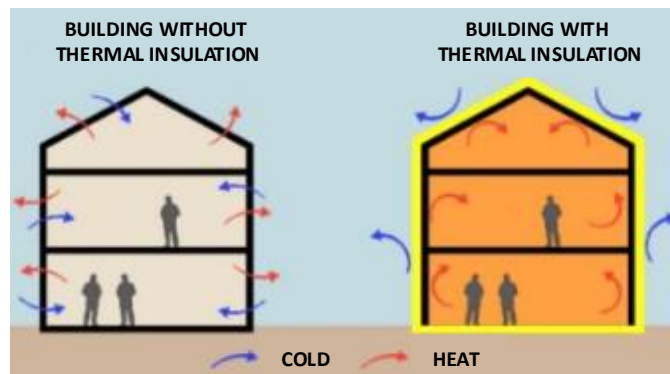
Description: The thermal insulation of the enclosure in façade envelopes, roofs and floors consists of the inclusion of building materials and systems that reduce heat transfer between the interior and exterior of a building. Different types of thermal insulators are used, such as mineral wool, expanded polystyrene and polyurethane, which are

applied to walls, ceilings and floors to create a thermal barrier that minimizes heat loss in winter and heat entry in summer.

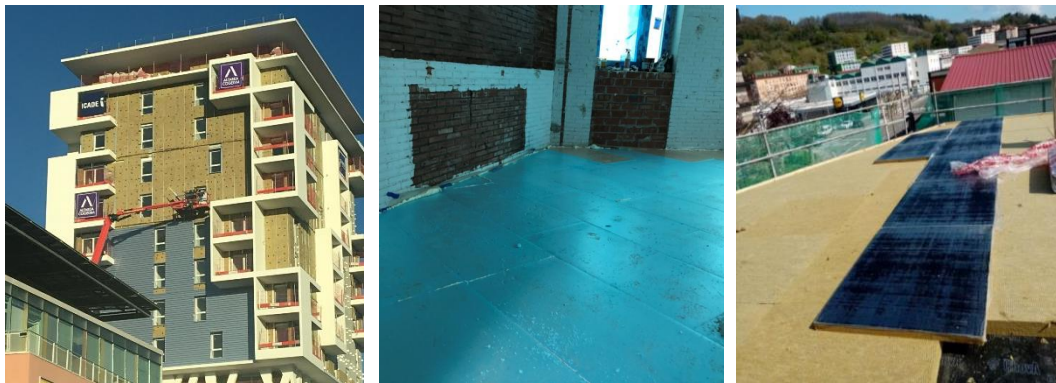
Scope of application: At building level, interventions to improve the thermal enclosure by incorporating insulating materials in façades, roofs and floors.

Functions: Improves energy efficiency, keeps interior temperatures comfortable and reduces the need for heating and cooling.

Diagram/image:



Source: Vanessa Ezquerro



Insulation on façade, floor and roofs. Source: M. Epelde

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the solution for thermal insulation in the enclosure of a building subject to energy rehabilitation considers aspects such as energy efficiency, sustainability, cost, weather conditions, regulation and standards, thermal and acoustic comfort, ease of installation and maintenance, and durability and resilience of materials. The thermal conductivity of the insulators, their environmental impact, return on investment, weather characteristics, condition of the structure, regulatory compliance, improved comfort, simplicity of installation and resistance to environmental factors are crucial for selecting the most appropriate solution, optimizing the building's efficiency, comfort and sustainability.

b) WINDOWS

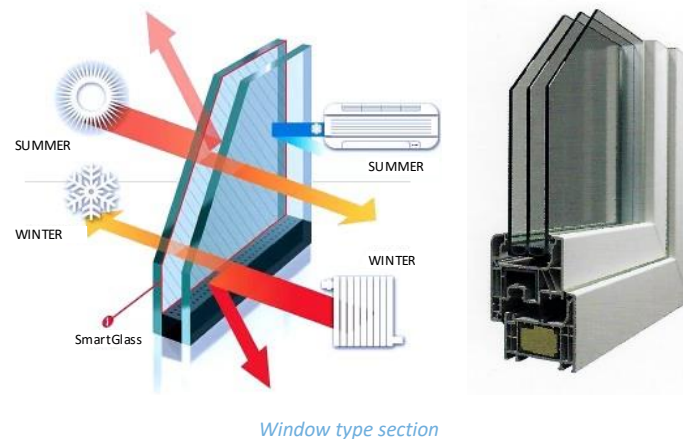
Description: Key components in the architecture that contribute to the lighting, ventilation and aesthetics of a dwelling or commercial space. In this case, they are considered to be fundamental elements of an energy intervention because, along with the façades, roofs and floors, they form part of the energy enclosure and greatly

influence energy loss, solar gain and the building's airtightness. Nowadays there are solutions with high-performance windows that can substantially improve energy loss resulting from previous framings.

Scope of application: At building level, interventions to improve the thermal enclosure by incorporating high-performance windows.

Functions: Improves energy efficiency through the balance between solar gain and energy loss. Essential for integral rehabilitations in combination with actions using insulation in the rest of the thermal enclosure.

Diagram/image:



Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the incorporation of high-performance windows in a building subject to energy rehabilitation encompasses various key aspects that influence their choice and effectiveness. They include energy efficiency, evaluated per its ability to reduce heat loss and improve airtightness; sustainability, considering recyclable and organic materials and manufacturing processes; the initial cost and return on investment through energy savings; local weather conditions, which dictate the type of glazing and solar protection needed; the building's design and aesthetics, especially in rehabilitations of historic structures; compliance with energy efficiency regulations and standards; interior comfort, improved by less noise and temperature control; ease of installation and maintenance; and durability and resistance to factors such as humidity and UV radiation. Evaluation of these factors enables selection of the most suitable windows, optimizing the building's energy efficiency, comfort and sustainability.

c) GLAZED ENCLOSURES

Description: Glazed enclosures of the curtain wall type are non-structural exterior façade systems primarily made of glass which are fastened to the structure using a frame of aluminium or other materials. These systems allow natural light to enter and provide panoramic views, contributing to a building's modern aesthetics. Because they are not structural, their main function is to protect against inclement weather (wind, rain) and improve thermal and acoustic insulation, without bearing the building's weight, which is transmitted directly to the main structure. Curtain walls are common in commercial and office buildings due to their aesthetic and functional properties.

Scope of application: At building level, interventions to improve the thermal enclosure by incorporating glazed closures of the curtain wall type as a solution for discontinuities of the enclosure (closed balconies versus open balconies).

Functions: The innovation consists of their scope of application: use as elements to create a continuous thermal enclosure in areas of balconies and galleries which are currently not uniform, making the generation of a continuous enclosure highly complex.

Diagram/image:



Source: Archdaily, Esfer

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the incorporation of curtain walls to ensure energy uniformity of a façade with complex meetings of open balconies and balconies with closed galleries should consider various critical aspects. First, the curtain wall's energy efficiency, ensuring that the system minimizes heat loss and maximizes thermal insulation, is vital for ensuring uniform performance over the whole façade. Architectural integration, which considers how the curtain wall adapts to the various kinds of balconies without compromising design and functionality, is another crucial factor. Also, the management of heat bridges at meeting points between open and closed balconies should be meticulously planned to avoid energy losses.

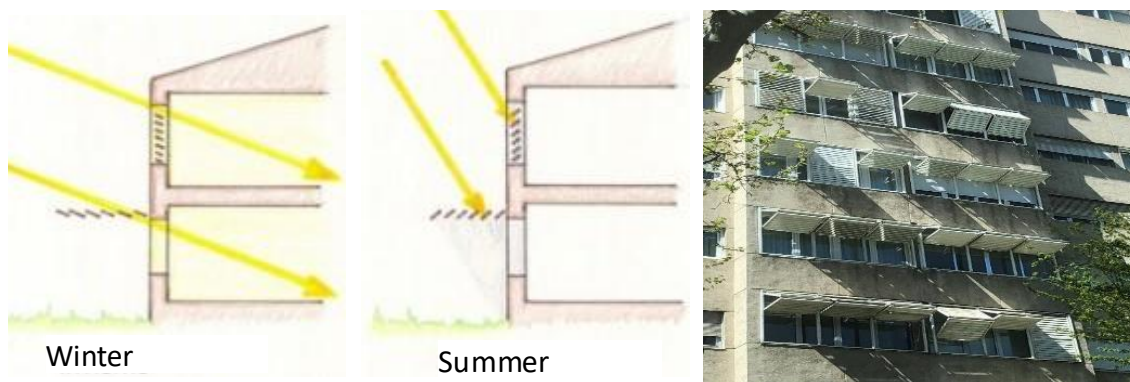
d) SOLAR PROTECTIONS

Description: Devices installed on buildings to control the amount of sunlight that enters the interior, reducing glare and excessive heating while improving energy efficiency. These devices are planned taking into account the façade's orientation (horizontal elements on south façades and vertical elements on east/west façades). They are furthermore planned considering the correct gain of solar radiation in winter months and the correct blockage of excess solar radiation in summer months.

Scope of application: At building level, actions to avoid overheating of buildings subject to an energy rehabilitation intervention.

Functions: Multiple possibilities for adaptation and products: Venetian blinds, roller blinds, vertical blinds, façade awnings, shutters, glazed pergola, hybrid architectural fabrics, etc.

Diagram/image:



Source: María Dolores García Lasanta and M. Epelde

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the incorporation of elements to shade windows and recesses in rehabilitated buildings focuses on avoiding overheating. Energy efficiency is key, as the shade devices should reduce direct solar gain, prevent overheating of buildings with insulation and diminish the need for air-conditioning. The shade should be integrated, preserving aesthetics and historical value. The flexibility and adaptability of shade systems such as adjustable blinds or moveable slats allows solar protection to be adjusted according to the sun's position and weather conditions. Visual comfort should also be considered, ensuring that the shade does not compromise the quality of interior natural light.

e) AIRTIGHTNESS

Description: A building's airtightness refers to the ability of its enclosure (walls, ceilings, floors and above all windows and doors) to prevent infiltration of non-controlled air from the exterior to the interior and vice versa. High airtightness means that the building has little air leakage, which helps maintain a comfortable and constant interior atmosphere, improves energy efficiency by reducing the need for heating and cooling, and prevents problems from undesired draughts and humidity.

Scope of application: At building level, actions to prevent undesired air infiltrations from the exterior which cause discomfort and high energy consumption.

Functions: Improved airtightness in enclosure applicable in rehabilitation before EIFS installation. Airtightness in meeting of windows or fitting of installations.

Diagram/image:



Source: Borja Frutos Vázquez and M.Epelde

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

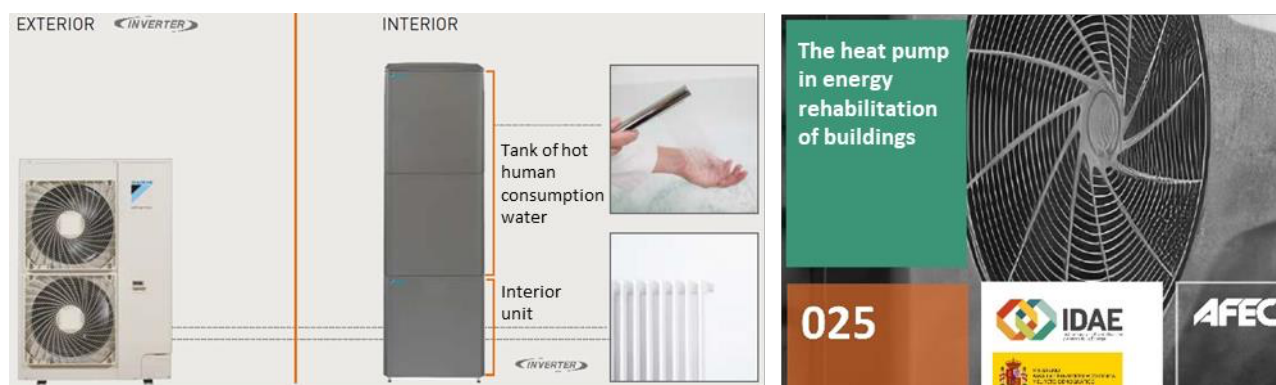
Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the airtightness in an energy rehabilitation as an added strategy for energy savings encompasses several critical aspects. First of all, energy performance is significantly improved by minimizing air infiltrations, thereby reducing heat loss in winter and heat gain in summer, reducing the need for air-conditioning systems. The quality of interior air is optimized, as proper airtightness enables better control of ventilation and air filtration, eliminating pollutants and ensuring appropriate levels of humidity. Thermal comfort is boosted by preventing undesirable draughts and maintaining uniform temperatures throughout the living space.

f) THERMAL INSTALLATIONS

Description: The thermal installations of an existing building comprise all systems and equipment meant to control the temperature, ventilation and quality of air within it. These installations include heating systems such as boilers, radiators or underfloor heating, as well as cooling systems such as air-conditioning units and heat pumps. In existing buildings the renovation of such installations can be crucial for improving energy efficiency and occupants' comfort by integrating more efficient technologies and advanced control systems that optimize energy consumption and reduce greenhouse gas emissions.

Scope of application: At building level, actions meant to optimize the performance of thermal installations and even their decarbonisation. Given the existing difficulty in rehabilitation for replacement of fossil fuel installations by decarbonized installations such as heat pumps, the search for decarbonized thermal installations that enable simple boiler replacements is considered.

Functions: At building level, actions to improve performance and decarbonisation of the main emission sources in existing buildings. Search for heat pump technology that enables replacement of the boiler, while ensuring its compatibility with existing high-temperature radiators.

Diagram/image:


Source: Daikin and IDAE

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis regarding the replacement of thermal installations in existing buildings by installations with better performance and/or which are decarbonized entails consideration of various crucial aspects. First of all, energy efficiency is fundamental, as the new installations should provide better thermal performance with less energy consumption. Environmental sustainability is another key factor, evaluating the reduction of greenhouse gas emissions through the use of decarbonized technologies such as heat pumps, biomass boilers or thermal solar energy systems. The implementation cost and return on investment should be carefully analysed, considering initial installation costs as well as long term savings on energy bills. Compatibility with existing infrastructure is essential to minimize interruptions and additional adaptation costs. Compliance with regulations and local standards is crucial to ensure that the new installations abide by energy efficiency and sustainability regulations. Finally, the ease of maintenance and durability of the new technologies guarantee efficient and profitable long-term operation.

g) VENTILATION INSTALLATIONS

Description: Thermal installations also encompass ventilation systems, both natural and mechanical, which regulate the renewal of interior air and ensure air quality inside residences. Specifically, for existing buildings it is deemed of interest to incorporate mechanical ventilation systems with heat recovery due to the energy improvement they can add in a deep renovation. A mechanical ventilation system with heat recovery is a type of ventilation system designed to renew a building's interior air in a controlled and efficient manner. It consists of a device that uses fans to extract stale air from the interior while introducing fresh air from the exterior. What makes this system different is that it incorporates heat recovery, also known as a heat exchanger, which enables the transfer of part of the heat from the extracted air to the fresh air coming into the building. This heat exchange process helps preheat (in winter) or precool (in summer) the fresh air coming in, thereby reducing the energy burden needed to air-condition the building. There are various types of heat recovery systems, such as those with panels or cross flow, and their efficiency varies depending on the design and type of exchanger used.

Scope of application: At building level, actions to prevent undesired air infiltrations from the exterior which cause discomfort and high energy consumption.

Functions: At building level, decentralized ventilation with heat recovery for façade installation. For rehabilitation, the use of individual systems which can be installed on the façade is proposed, thereby avoiding interior installation of ventilation ducts.

Diagram/image:



Source: Zehnder and M. Epelde

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis regarding the use of mechanical ventilation heat recovery (MVHR) in energy rehabilitations of existing buildings evaluates various key aspects to assure air quality and energy efficiency. Energy efficiency is optimized by recovering the heat from expelled air, reducing the thermal burden in heating and cooling systems. Interior air quality is significantly improved, as the system allows constant and controlled ventilation, eliminating pollutants and maintaining appropriate humidity levels. The implementation cost and return on investment are considered, with MVHR enabling long-term savings in energy consumption. The integration of existing infrastructure is evaluated to minimize modifications and additional costs. Thermal and acoustic comfort is also crucial, as these systems provide efficient ventilation without undesired draughts and with low noise levels. Compliance with local standards and regulations on energy efficiency and air quality is vital to ensure that the implemented solutions are in line with current regulations. Finally, the durability and maintenance of MVHR systems guarantee efficient and sustainable long-term operation. This integral analysis enables the implementation of effective strategies to improve air quality and energy efficiency in rehabilitated buildings.

h) INTEGRATION OF RENEWABLES

Description: Systems that integrate renewables in an existing building include various technologies designed to take advantage of renewable energy sources such as solar, wind and geothermal energy, the aim being to improve energy efficiency and reduce dependence on fossil fuels. Among these systems, photovoltaic and thermal solar panels stand out due to their ability to respectively generate electricity and hot human consumption water, while geothermal heat pumps use underground heat for heating and cooling. Small wind turbines can be installed on buildings with sufficient wind exposure, and energy storage technologies such as batteries enable storage of excess generated energy for later use. Also, the integration of smart energy management systems helps optimize use of these renewable sources, reducing energy consumption and greenhouse gas emissions. These systems can be complemented by energy efficiency techniques such as improved thermal insulation and installation of high-performance windows to maximize the building's overall energy performance.

Scope of application: At building level by installing the technologies on the roof or façades or in attics, though it is also possible to integrate them at urban level so they can feed local buildings.

Functions: At building level they enable renewable energy generation at a same consumption point; they can be a very appropriate fit in energy rehabilitations with passive insulation solutions and active high-performance solutions.

Diagram/image:



Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the solution for installation of renewable energy generation systems in an existing building encompasses various crucial aspects to ensure their viability and efficiency. From the technical standpoint, the compatibility of renewable technologies with the building's current infrastructure is evaluated, as well as its ability to meet energy needs. In financial terms, the initial installation costs are analysed along with maintenance and return on investment, considering long-term savings in energy bills and eventual subsidies or tax incentives. The market analysis includes the availability of renewable technologies, suppliers and price trends, while the heritage aspect considers the integration of such systems in historic or protected buildings, ensuring that interventions respect their architectural and cultural value. The effect evaluates the installations' impact on the immediate surroundings and the occupants' standard of living, such as eventual noise, aesthetic changes and shade generation. This integral approach enables the design and implementation of renewable energy generation solutions that are technically and financially viable, respect heritage and minimize negative effects while maximizing environmental and energy benefits.

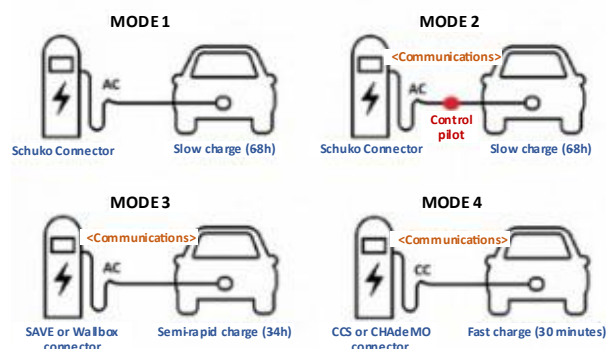
i) ELECTRIC VEHICLE AND SUSTAINABLE MOBILITY

Description: Systems that offer solutions for the requirements of electric cars.

Scope of application: At building level, installing the facilities needed to endow existing buildings with sustainable mobility recharging points.

Functions: Solutions for charging electric vehicles for residential and commercial buildings and fleet use. Applicable in the community residential scope and with interconnection for consumption management. Also, integral green mobility solutions are considered, along with traffic impacts of improvements in residential and urban developments.

Diagram/image:



Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the installation of recharging stations for electric vehicles in existing buildings should consider various key aspects to ensure the respective viability and efficiency. From the technical standpoint, the capacity of the building's electric infrastructure to support the additional demand is evaluated, along with the chargers' compatibility with available electric vehicles and the ease of access and use for residents. In financial terms, the costs of installing and maintaining the recharging stations is analysed, as well as the return on investment and eventual government incentives or subsidies. The market analysis considers the availability and evolution of recharging technology, suppliers and trends in the take-up of electric vehicles. From a heritage standpoint, especially in historic or protected buildings, efforts are made to ensure that installations do not significantly alter the building's architectural and aesthetic value. The effects include evaluation of the impact on residents and in the community, as well as the occupation of parking spaces, eventual rises in electricity consumption and the need to properly manage demand to prevent network overloads. This integral approach enables the design of electric vehicle recharging solutions that are technically and financially viable, respect heritage and minimize effects, thereby optimizing benefits for the building's owners and users.

j) AD HOC PROFESSIONAL SERVICES FOR ENERGY REHABILITATION

Technical assistance in rehabilitation projects.

Description: integral rehabilitation studies of the residence.

Scope of application (building and/or urban environment): integral rehabilitation of residential and industrial buildings. Partial rehabilitations: façades, closures, etc. Residences are rehabilitated to improve some of the following conditions: liveability of the residence, structural and construction safety, protection against the presence of water and damp, installations, accessibility, natural lighting and interior ventilation, and sizes of the interior spaces, among others.

Functions: These actions can be done both inside the residences and in the common areas of residential buildings. When the rehabilitation of homes in a residential building affects its structure, roofs, exterior enclosures, installations, masonry finishes and pavements, framing, etc, it is called integral rehabilitation of the residence.

- Integral rehabilitation of residential and industrial buildings
- Partial rehabilitations: façades, enclosures, etc.
- Rehabilitation of elements of the historic, artistic and cultural heritage

- Actions in urban centres
- Compatibility of new implementations on protected elements

Diagram/image:



Sector representative bodies: BASQUE CONSTRUCTION CLUSTER, BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): construction and specifically rehabilitation constitute one of the economic sectors with evident impacts on the whole society and on cultural values. Quality in buildings is increasingly necessary, in structural safety and fire protection as well as in other aspects linked to people's wellbeing, such as noise protection, thermal and acoustic insulation and access for people with reduced mobility.

6.2 INDUSTRIAL SOLUTIONS FOR REHABILITATION

The industrial solutions for rehabilitation of buildings represent an innovative and efficient approach to renovating and improving existing buildings. These solutions stand out due to the use of advanced technologies, standard processes and prefabricated materials, enabling faster execution times, cost reductions and minimized environmental impact.

Advantages of industrial solutions

Speed and efficiency

Prefabrication of components means that a large part of the work is done in specialized factories, significantly reducing construction time at site. This is especially beneficial in rehabilitation projects, where speed is crucial to minimize problems for occupants and the interruption of normal activities.

Quality and precision

Manufacturing in controlled environments guarantees high quality and precision in components, ensuring that they perfectly fit during installation. This reduces errors and repeated work, improving durability and performance of the rehabilitated building.

Sustainability

Industrial solutions often use more sustainable materials and construction techniques that generate less waste. Also, the use of modular and prefabricated components can improve the building's energy efficiency, helping achieve a smaller carbon footprint.

Support technologies

Building information modelling (BIM)

The use of BIM enables precise planning and design, facilitating coordination among all prefabricated components and other project elements. BIM helps predict and resolve problems before they happen at site, improving efficiency and reducing costs.

3D printing is beginning to play an important role in the fabrication of complex and customized components. This technology enables the accurate creation of single parts, reducing the time and costs associated to traditional manufacturing methods.

Automation and robotics

Automation in manufacturing and robotics in installation of prefabricated components can boost the speed and safety of the rehabilitation process. These technologies also help improve the quality and consistency of the work done.

In conclusion, the industrial solutions for building rehabilitation are a major step forward in the approach to renovation and improvement of existing structures. By combining efficiency, quality and sustainability, these solutions offer tangible benefits for both owners and occupants of the rehabilitated buildings.

6.2.1 TYPES OF INDUSTRIAL SOLUTIONS

- a) **PANEL-TYPE ROOFS AND FAÇADES FOR ENERGY REHABILITATION**
- b) **PREFABRICATED BALCONIES AND BAYS**
- c) **MODULAR THERMAL SYSTEMS**
- d) **LIFTS WITH PREFABRICATED MODULAR STRUCTURE**

a) **PREFABRICATED PANELS WITH THERMAL INSULATION (FAÇADES/ROOFS)**

Description: Components built away from the main construction site and then transported to be assembled. They are made of various materials and are used to build structures such as walls, ceilings and floors. Prefabricated façade panels can include integrated thermal insulation, exterior finishing and windows. These panels are designed and made to measure, then transported to the site and quickly installed, improving the building's energy performance as well as its appearance. Prefabricated roofs can include systems for insulation, impermeableness and upper finishing in one single component. This not only improves the installation's efficiency, it also ensures better long-term performance against inclement weather.

Scope of application: Existing buildings.

Functions: -Insulating structural panels with high energy efficiency. New work or rehabilitation of roofs. -System for insulated light roofs. -EIFS, interior roofs, suspended floor and interior slab. Currently new work, possible adaptation to rehabilitation. Application for roof rehabilitations. –Prefabricated components for façade in new work. Possible adaptation for rehabilitation.

Diagram/image:


Source: BuidUp Offsite renovation

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

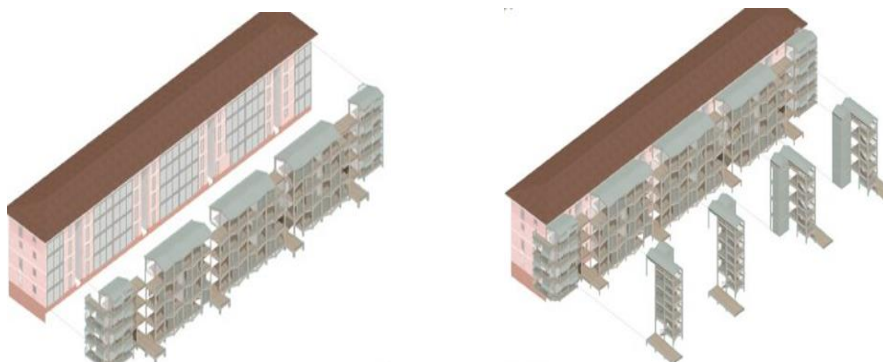
Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of energy rehabilitation with prefabricated façade or roof panels in existing buildings considers various key aspects to guarantee their effectiveness and sustainability. From the technical standpoint, the building's structural compatibility with prefabricated panels is evaluated, along with the thermal efficiency they offer and the ease of installation, which minimizes interruptions for occupants. In financial terms, the costs of producing, transporting and installing the panels are analysed, as well as the return on investment through energy savings and eventual tax incentives. The market analysis covers the panels' availability, the suppliers' reliability and technological trends that can influence the choice of materials. From a heritage standpoint, it is assured that the panels respect and, if possible, improve the aesthetic and architectural value of historic or protected buildings. The effect centres on the impact during the installation process, such as noise, waste generation and temporary disruptions for residents, as well as long-term benefits in terms of thermal comfort and lower energy costs. This integral approach enables the selection of prefabricated panel solutions that are technically and financially viable, respect heritage and minimize effects, thereby optimizing energy efficiency and the occupants' wellbeing.

b) BALCONIES OR BAYS

Description: Balconies: Elements projecting from a building which provide space in the open air. **Bays:** Distance between two parallel walls in a building, dividing the space into rooms or functional areas.

Scope of application: Existing buildings

Functions: -Prefabricated balcony cantilevers for rehabilitation. Aesthetic cladding of balconies. -System for modular transformation by adding new living spaces and exterior galleries.

Diagram/image:


Source: Behark

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the integration of new industrial bays or balconies in existing buildings without much living space or with no availability of balconies encompasses various key aspects to ensure the respective viability and benefits. From the technical standpoint, the building's structural capacity to support the new additions is evaluated, along with the quality of the industrial materials and the ease of installation to minimize interruptions. In financial terms the costs of manufacturing, transporting and installing the bays or balconies are considered, as well as the building's increased property value and potential return on investment. The market analysis includes the availability and choice of credible suppliers as well as the demand for residences with additional exterior spaces. From a heritage standpoint, especially in historic buildings, it is assured that the new structures harmoniously integrate with the original design, preserving the building's aesthetic and culture value. The effect considers the impact on residents during the installation, as well as noise and eventual disruptions and, in the long term, in terms of improving comfort and quality of life by supplying additional exterior spaces. This integral approach enables the implementation of solutions that are technically and financially viable, respect heritage and optimize the functionality and liveability of existing buildings.

c) MODULAR THERMAL SYSTEMS

Description: Prefabricated air-conditioning systems (prefabricated and integrated systems for heating and ventilation and hot water installations). The integrated climate and energy module (iCEM) combines an aerothermal heat pump with a hydronic box, a hot human consumption water tank, a heat recovery ventilation system, a solar inverter and a set of sensors for electricity use and interior air quality.

Scope of application: Existing buildings

Functions: To resolve needs associated to thermal installations in existing buildings.

Diagram/image:



Source: Factory Zero

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the integration of a prefabricated air-conditioning solution prepared for plug-and-play installation in existing buildings addresses various key aspects to guarantee the respective effectiveness and sustainability. From the technical standpoint, the new solution's compatibility with the building's infrastructure is evaluated, along with the energy efficiency of the prefabricated systems and the ease of installation that characterises plug-and-play technology, minimizing implementation time and interruptions. In financial terms, the costs of acquisition, installation and maintenance are considered, as well as return on investment through energy savings and eventually available subsidies.

d) LIFTS WITH PREFABRICATED MODULAR STRUCTURE

Description: Prefabricated construction elements for installation of new lift structures in existing buildings lacking accessibility for their occupants.

Scope of application: Existing buildings

Functions: To resolve accessibility in buildings without lifts by means of a prefabricated structure (of steel or wood) that ensures a short period of disruption for users.

Diagram/image:



Source: Egoín

Sector representative bodies: BASQUE CONSTRUCTION CLUSTER BUILD:INN

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Multifactor analysis of the implementation of a prefabricated solution for the structure of a lift in buildings lacking accessibility involves various crucial aspects to ensure its viability and benefits. From the **technical standpoint**, the prefabricated solution's compatibility with the building's existing structure is evaluated, along with the ease of installation and the integration with the building's electrical and mechanical systems. In **financial** terms, the costs of acquisition, transport, installation and maintenance are considered, as well as the return on investment through increased value of the property and improved quality of life of its residents. The **market analysis** includes the availability of these prefabricated solutions, the reputation and reliability of the suppliers and trends in accessibility and mobility. From a **heritage** standpoint, especially in historic buildings, it is assured that the lift's installation does not significantly alter the building's architectural and cultural value. The **effect** is centred on the installation's impact on residents, such as noise and temporary interruptions, as well as long-term benefits in terms of accessibility and comfort.

6.3 ANALYSIS OF THEIR INCLUSION IN THE OPENGELA MODEL

Analysis of the possibilities of including active, passive and industrial solutions for integral rehabilitation of the deep renovation type in the Open Gela model for managing rehabilitation of the Basque public building stock entails a thorough evaluation of various factors.

Passive solutions, such as improved thermal insulation, installation of high-performance windows and use of sustainable construction materials, focus on reducing energy consumption without the need for mechanical systems, boosting the building's energy efficiency and improving thermal comfort.

Active solutions include the integration of renewable energy systems, such as photovoltaic and thermal solar panels, heat pumps and mechanical ventilation heat recovery systems, which not only reduce energy consumption but can also generate clean energy.

Industrial solutions facilitate fast and efficient implementation through the use of prefabricated components such as façade and roof modules, thereby enabling integral and standardized rehabilitation, reducing job time and minimizing disruptions for residents.

In the context of the OpenGela model, which seeks integral and coordinated rehabilitation management, these solutions should be evaluated in terms of technical viability, implementation and maintenance costs, impact on sustainability and the environment, and improved comfort and quality of life for users. In a first assessment, it is considered optimal to include in OpenGela interventions a review of the solutions provided herein in order to carry out an integral analysis in each building of the possibilities for integrating all of them or most of them. Only by reviewing the possibilities for introducing all of them can integral and energy-ambitious solutions of the deep renovation type be achieved.

Also, compliance with regulations and the preservation of heritage value are fundamental aspects, especially in the Basque public stock, which includes historic and protected buildings. This integral analysis enables the design and implementation of rehabilitation strategies that optimize energy performance, sustainability and residents' wellbeing, all in line with the objectives of the OpenGela model.

6.4 INTEGRATION OF ICTs

Information and communication technologies (ICTs) play a vital role in the implementation of energy efficiency measures through the real-time monitoring of energy consumption and environmental conditions of buildings by means of sensors and energy management systems, among others. These technologies facilitate the design, monitoring and management of the interventions needed to improve buildings' energy efficiency, enabling more efficient and sustainable use of resources and ensuring compliance with regulations such as Directive (EU) 2024/1275 on the energy performance of buildings (EPBD). Below are described some of the ways that ICTs are fundamental in this project.

6.4.1 SOLUTIONS FOR EFFICIENT MANAGEMENT AND MONITORING

Software control of risks

Description: automation software in order to effectively and thoroughly manage any kind of risk that can endanger normal functioning.

Scope of application (building and/or urban environment): tracks actions and reduces response times: disaster recovery plans, emergency plans, contingency plans.

Functions: the tool can make business processes more dynamic, preventing human errors, ensuring that actions can be tracked and cutting response times.

Diagram/image:



Sector representative bodies: GAIA

Multifactor analysis of the solution (technical, financial, market, heritage, effect): this platform enables the efficient development and management of various plans that are essential for safety and operative continuity, such as: self-protection plans (SPPs), which guarantee the safety of people and goods in emergency situations; business continuity plans, which ensure company operations in the event of incidents; disaster recovery plans, which establish measures for recovery of critical data and systems; emergency plans designed to act rapidly in unforeseen situations; and contingency plans, which prepare the organization to face eventualities and maintain vital functions.

Analysis of their inclusion in the Opengela model:

The platform strengthens the capacity for emergency response and management in urban renewal projects in the Basque Country. This automated tool facilitates effective implementation of the different plans put forward. By ensuring that actions can be tracked and reducing response times, it guarantees people's safety, the protection of urban heritage and continual operation in the event of any occurrence, thereby complying with Opengela's safety and efficiency goals.

Integral consulting on physical and logical security

Description: integral monitoring for those in charge of security and infrastructures, supplying strategic consulting services, plans for fire protection and electronic security, cybersecurity, telecommunication systems and physical and logical audits.

Scope of application (building and/or urban environment): electronic security projects – video surveillance, access control, intrusion, GIS, occupation control, intercom, integration software, etc; fire protection projects – detection, dry/wet extinguishing, passive protection, secondary actions and interrelations, self-protection and emergencies, etc.

Functions: the security plans supply the company with security strategies and goals through the planning of actions affecting organization, procedures and governance. They include the management of people flows, controls, task allocation and integration of electronic systems such as access control, video surveillance and intrusion detection systems. Also considered are physical barriers, control centres and suitable lighting to ensure a safe and protected environment.

Sector representative bodies: GAIA

Multifactor analysis of the solution (technical, financial, market, heritage, effect): risk management (TVRA), business continuity plans, fire detection and extinguishing, access control, video surveillance, gap diagnostics and network security. Also developed are IT, fibre optic and radio networks.

Analysis of its inclusion in the Opengela model:

Integral consulting on physical and logical security significantly contributes to Opengela by strengthening safety and protection in urban renewal projects in the Basque Country. This is achieved by implementing advanced electronic security systems such as video surveillance and access control, and the integration of solutions for detecting and extinguishing fires. These services not only streamline management of people flows and ensure protection of urban heritage, they also guarantee operational continuity and effective emergency response, aspects vital for the success and sustainability of Opengela projects.

Fire protection projects:

Description: a disaster recovery plan (DRP) is a set of procedures and strategies designed to restore an organization's technological infrastructure and operations after a disaster or serious incident that interrupts its normal activities.

Scope of application (building and/or urban environment): detection, wet/dry extinguishing, passive protection, secondary actions and interrelations, self-protection and emergencies, etc.

Functions: the disaster recovery plan (DRP) tool aims to minimize inactive time and negative impacts caused by catastrophic events such as fires, floods, earthquakes, system failures and cyberattacks, among others. The plan sets out the steps to take to restore systems and key data, as well as the measures needed to maintain business continuity.

Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): successful implementation of a disaster recovery plan (DRP) is fundamental to address the challenges faced by companies, such as organizational complexity, suitable resource allocation and commitment of senior management. These challenges require a strategic approach, understanding of specific risks, adjustment to the changing environment, management of supplier dependence, regular testing and overcoming resistance to change, and are crucial for ensuring preparation and ability to recover when any crisis occurs.

Analysis of their inclusion in the Opengela model:

The disaster recovery plan (DRP) is closely aligned with Opengela, as it provides advanced fire protection strategies for urban renewal in the Basque Country. This plan covers early detection through effective extinguishing by means of wet or dry techniques, ensuring passive protection and preparation in emergency situations. The DRP's integration in Opengela strengthens the resilience of rehabilitated buildings, minimizing inactive times and mitigating negative impacts, which is vital for ensuring operational continuity and community safety in the event of any incident.

Digital solutions for city mapping

Description: solutions for public and private sector in matters such as urban planning, mapping, infrastructure maintenance, industry, environment and safety.

Scope of application (building and/or urban environment): application in energy efficiency applied to cities, neighbourhoods, buildings, residences, noise maps, mobility applications, pollution maps, water consumption optimization, etc.

Functions: knowledge of areas through continual observation using sensors and UAVs/drones for decision-making concerning mobility, tourism, energy, health assistance, traffic, water control.

Diagram/image:



Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): encompasses technical aspects through the use of drones with advanced sensors to obtain accurate data, financial aspects by reducing operating costs and market aspects by offering innovative solutions for various sectors such as agriculture and mining. It also includes heritage analysis to improve management of cultural heritage and evaluates the effect by considering environmental and social impact of projects to facilitate informed and sustainable decisions.

Analysis of its inclusion in the Opengela model: offers advanced solutions using drones and sensors for energy efficiency and urban and environmental management in the Basque Country. Its platform facilitates informed decisions for urban rehabilitation, resource optimization and regulatory compliance. It contributes financially by reducing operating costs and improving management of cultural and environmental heritage. Airmapping supports the aims of Opengela by promoting sustainable urban development and better quality of life.

Optimization of how a building functions

Description: efficient planning of the automation of buildings and electro-technical systems, monitoring systems, safety, control, regulation and optimization for efficient functioning of a building and optimal use of resources.

Scope of application (building and/or urban environment): public buildings, office complexes, airports, shopping centres – planning of monitoring systems, safety, control, regulation and optimization is an important part of the efficient functioning of a building and optimal use of resources.

Functions: services and software solutions in the fields of electric engineering, automation and mechatronics. Development of one of the world's leading design software solutions for manufacturers of electrical cabinets, plants and machines.

Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Such solutions enable interdisciplinary connections with conventional interfaces, as well as their integration in the infrastructures of your computer systems.

Analysis of its inclusion in the Opengela model: can significantly enhance the Opengela project by offering advanced building and electrical system automation solutions, fundamental for streamlining efficiency and use of resources in public buildings, office complexes, airports and shopping centres that participate in urban renewal promoted by the Basque government. By centralizing the planning of systems for monitoring, security, control and regulation, it helps effectively coordinate arrangements concerning integral rehabilitation of buildings in

neighbourhoods participating in Opengela. This not only improves neighbourhood office operations as a one-stop shop, but also strengthens environmental and financial sustainability of the local communities involved.

Monitoring and energy audits

Description: independent supplier of energy administration services, singularly qualified to help companies identify, prioritize and implement strategies that conserve energy, reduce public service bills and improve their results.

Scope of application (building and/or urban environment): centred on business and organizational environments, in both commercial and industrial buildings.

Functions: optimization of resource use, statistical reports for analysis and management, predictive management of consumption, discovery and correction of erroneous consumption conduct and/or patterns. Offers an integral service for real-time monitoring of energy consumption by means of an accessible web platform. Also facilitates dynamic energy audits that enable continual adjustment of strategies to improve energy efficiency.

Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): In the smart cities context, promotes development of sustainable cities through the implementation of master plans and position studies that not only improve energy efficiency but also create friendlier and more appealing environments for inhabitants.

Analysis of its inclusion in the Opengela model: Opengela would benefit from its ability to offer advanced monitoring and accurate energy audits. Specialized in business and organizational environments, it optimizes the use of energy resources, reduces operating costs and improves energy efficiency by means of detailed statistical reports and predictive consumption management. Its smart cities approach not only promotes sustainability and energy efficiency but also contributes to the development of friendlier and more appealing urban environments, in line with the Opengela goals of urban renewal and infrastructure improvement.

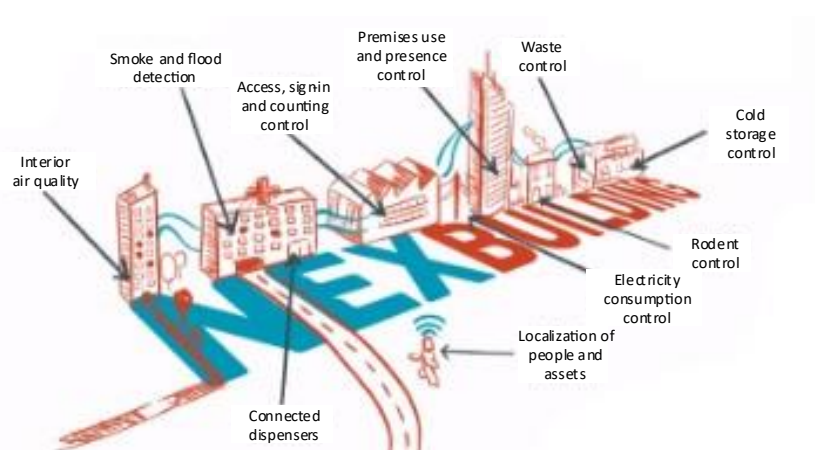
Smart solutions for buildings

Description: offering of smart functional solutions for companies in different areas (industry, facility management, ICTs, energy, agro, etc), operators and municipalities that want to improve, save and offer new services to their clients. The focus is on boosting efficiency, optimizing services and cutting costs.

Scope of application (building and/or urban environment): the scope of application mainly encompasses commercial and residential buildings as well as urban environments requiring advanced and efficient facility management.

Functions: offers an integral platform for advanced management of buildings, highlighted by functions such as air quality monitoring, electricity consumption control and real-time localization of assets and persons. Also provides solutions for flood detection, cold storage control, waste management and counting of people and vehicles. These capacities are designed to improve operating efficiency, safety and sustainability in commercial and residential environments.

Diagram/image:



Sector representative bodies: BUILD:INN, GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): uses advanced monitoring and sensor technology to efficiently manage air quality, electricity consumption, security and other key aspects in buildings.

Analysis of its inclusion in the Opengela model: these are advanced and functional solutions for efficient management of commercial and residential buildings as well as urban environments. Their capacities for air quality monitoring, electricity consumption control, asset management and environmental safety would improve operating efficiency and sustainability of renovated infrastructures in the framework of the Opengela project.

6.4.2 SOLUTIONS FOR DIRECT INTERVENTION IN HOUSING

Monitoring of buildings

Description: installations, services and monitoring of energy-efficient buildings, facility management, local generation of renewable energy and provision of integral services for investment, maintenance and operation.

Scope of application (building and/or urban environment): management of energy-efficient buildings, monitoring, integral services for investment, maintenance and operation, as well as facility management. Also offers services of public lighting, traffic management, access equipment, security systems and sensors.

Functions: in an energy transition context, supports local authorities so that they save energy and offer better lighting so that cities can become safer and more appealing and innovative, promoting integrated contracts (energy performance contracts) and using state-of-the-art solutions to implement projects based on client needs.

Diagram/image:



Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): plays an active role in transforming cities, providing tools for optimized asset management, local energy generation systems and promoting smarter and safer use of urban infrastructures. Convinced that each territory is unique and that end users should be at the centre of the design processes for policies and technology of the future, it offers tailor-made solutions, putting technology to work with an approach centred on the human being.

Analysis of its inclusion in the Opengela model: In the context of the Opengela project, deploys advanced solutions for efficient management of buildings and urban environments. Offers integral facility management services, local renewable energy generation and advanced security systems. Its approach using integrated contracts and custom solutions promotes energy efficiency and urban safety, significantly reducing energy consumption and improving the quality of life in cities.

Solutions for electricity and lighting projects

Description: telecommunication services, building management and connectivity, telecommunication network installations, fibre optics, domotics (home automation), connectivity, image and sound, antennas, CCTV and access control. Saltoki supplies high-quality electric material as well as, among others, advanced energy efficiency solutions, automation, domotics and renewable energy systems, thereby helping improve the functioning and sustainability of modern buildings and urban environments.

Scope of application (building and/or urban environment): encompasses both buildings and urban environments. Its services and products in the field of electricity are designed to meet the needs of installers, companies and professionals in the electric sector who operate in urban contexts and in the building of all types of residential, commercial and industrial structures.

Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): a robust technical solution with its wide range of electric products and advanced energy efficiency and automation solutions, ensuring high standards of quality and functionality. Financially, its services are positioned to capture growing demand for sustainable and efficient technologies in the electric market. Its reputation and diversified offering enhance its heritage value as a credible specialized supplier.

Analysis of its inclusion in the Opengela model: contributes to the Opengela project by means of advanced solutions for the control of acoustic pollution in buildings and urban environments. This not only ensures compliance with acoustic regulations but also improves the quality of urban life by reducing sound interference.

Financially, it offers long-term savings and meets growing demand for improvements in environmental quality. At heritage level it strengthens its imprint by promoting quieter and more sustainable environments, guaranteeing effective integration in urban renewal projects such as Opengela.

Inverters (photovoltaic and for batteries)

Description: a wide range of inverters (photovoltaic and for batteries) that fit any kind of installation: residential, commercial, industrial and large-scale. Ingeteam has designed a wide range of photovoltaic and battery inverters between 5 kW and 7,650 kW.

Scope of application (building and/or urban environment): residential self-consumption service is mainly centred on buildings, specifically individual or collective residences in urban environments. This solution is designed so that residents can generate and consume their own electric power using renewable sources such as photovoltaic solar energy.

Diagram/image:



Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): The self-consumption approach not only promotes energy autonomy at domestic level but also contributes to environmental sustainability by reducing dependence on non-renewable energies and minimizing carbon emissions in densely populated urban areas.

Analysis of its inclusion in the Opengela model: The range of photovoltaic and battery inverters offers advanced technology to optimize solar energy performance in urban environments. This promotes energy self-consumption, reduces long-term costs and enhances environmental sustainability by minimizing carbon emissions.

6.4.3 SOLUTIONS IN CONTAMINATION AND POLLUTION

City noise maps

Description: dynamic noise map based on compulsory regulations.

Scope of application (building and/or urban environment): using IoT sound metering equipment, cameras and various weather stations, real-time municipal noise maps can be made for regulatory compliance. Work is done with neighbourhood associations, municipal councils, provincial councils construction and insulation companies, decorators, architects and architecture studios. They have experience in places as diverse as hotels, restaurants, outdoor cafés, roads and road, rail, port and airport infrastructures.

Functions: they offer the platform and noise equipment needed for any specific case, whether a road noise map, a city noise map, an industrial noise map or an acoustic impact study.

Diagram/image:



Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): The multifactor analysis of the solution includes these areas:

- **Technical:** uses advanced platforms for automatic generation of noise maps in the cloud, complying with standards such as ISO 1996-2 and CNOSSOS-EU.
- **Financial:** offers cost savings due to efficient management and regulatory compliance.
- **Market:** addresses communities, municipal councils, construction firms and sectors such as hospitality and infrastructures.
- **Heritage:** improves acoustic management of heritage and urban environments.
- **Effect:** evaluates noise impact in different areas, facilitating decision-making to minimize negative effects.

Analysis of its inclusion in the Opengela model: It enriches Opengela by offering an advanced tool for acoustic management in urban renewal of the Basque Country. This innovative platform, backed by IoT technology and the powerful Infinity platform, enables automatic real-time generation of noise maps, complying with strict regulations such as CNOSSOS-EU. Acting as a strategic ally, it facilitates accurate planning and efficient implementation of measures to mitigate acoustic impact in rehabilitated urban environments. Besides optimizing costs and time, it strengthens environmental and social sustainability by improving residents' quality of life and preserving the acoustic heritage of local communities.

Solutions in mobility

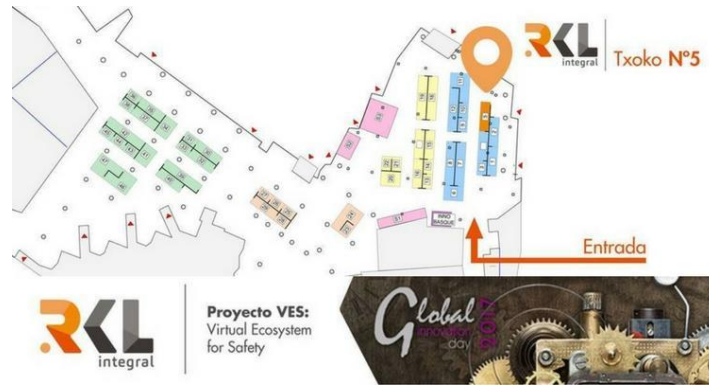
Mobility modelling. Parking policies. Environmental impact.

Description: the VES (virtual ecosystem for safety) encompasses various areas in the field of security, including self-protection, efficiency in processes, optimization in information sharing and management, and management of people and assets. The technological basis of VES is supported by a wide range of existing and emerging technologies such as virtual reality, IoT, big data, NG112 new emergency networks, data analysis, open data sources, gamification, mobility equipment, smart sensors, wearables and MNI.

Scope of application (building and/or urban environment): traffic impacts of new residential, commercial and employment developments. This is reflected in solutions such as virtual self-protection plans, occupation control, evacuation guides, geopositioning of people and assets, personal training and simulations.

Functions: this model is naturally integrated in the smart and friendly city scheme our society aspires for, where technology is placed at the service of citizens and the common good. Only that this model focuses on the field of emergency actions.

Diagram/image:



Sector representative bodies: GAIA

Analysis of its inclusion in the Opengela model:

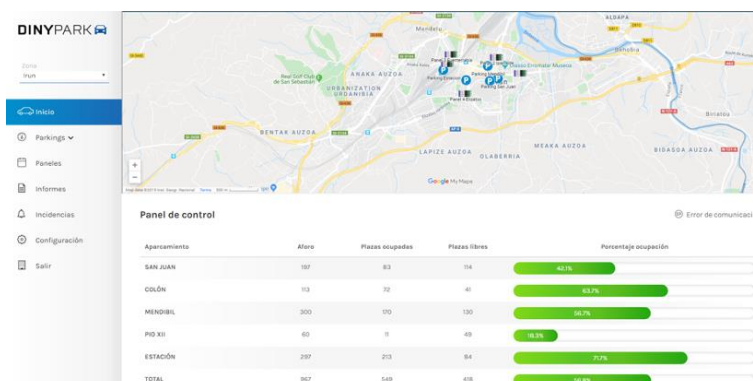
The VES ecosystem integrates in Opengela to enhance urban renewal in the Basque Country by modelling mobility and parking policies. Using advanced technologies such as virtual reality, IoT and big data, it facilitates the optimization of emergency management, citizen safety and environmental impact. Through virtual self-protection plans and occupation control, VES contributes to urban efficiency and community wellbeing, supporting the vision of smart and sustainable cities promoted by Opengela.

Improved mobility

Description: By means of smart cameras, we obtain statistical data on vehicle flows, by hours, vehicle type (bicycle, motorcycle, car, lorry) and days of the week, as well as the saturation level. This resolves the problem of locating free spaces in the city. To do this, information on available free spaces in the different parking zones (rotation, blue zone and dissuasive) is centralized and shown to users by means of information panels in the city, online and in web applications, which guide them directly to the selected parking space. This is a solution to facilitate parking for the group of people with reduced mobility: users can view the distribution of spaces reserved for them in the city and the respective status (vacant/occupied) in real time.

Scope of application (building and/or urban environment): encompasses urban environments and infrastructure areas where mobility and efficient use of parking spaces needs to be improved. This solution focuses on management of vehicle flows and saturation levels using smart cameras and number plate detection systems or Bluetooth. It centralizes information on free spaces in different parking zones, facilitating their location through information panels, the internet and in mobile applications.

Diagram/image:



Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): uses advanced technology such as smart cameras, number plate detection systems and Bluetooth to offer efficient management of traffic and parking spaces. Offers economic benefits by lowering costs associated to traffic and improves operational efficiency of urban infrastructures, enhancing the financial value of property assets.

Analysis of its inclusion in the Opengela model: It could significantly contribute to the Opengela project by improving mobility and efficiency in urban renewal of the Basque Country. Due to its ability to manage vehicle flows and optimize parking space availability in different urban zones, it would facilitate integration of new infrastructures and management of public space. It would also provide specific solutions for people with reduced mobility, ensuring fairer and more efficient access to local businesses and services, thereby promoting social inclusion and improving the urban experience for all residents and visitors.

Building access control

Description: advanced access control platform that can manage and record all access to buildings and spaces by means of various methods, including facial recognition. In the case of COVID-19 detection, it incorporates a device that automatically detects the use of masks and measures body temperature with no contact.

Scope of application (building and/or urban environment): mainly encompasses buildings and interior spaces where advanced control of access and health control measures are required, such as corporate offices, industrial facilities, shopping centres, hospitals and other institutional environments.

Sector representative bodies: GAIA

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): this is an advanced access control solution with technology that ensures security and regulatory compliance in various sectors such as health, education, industry and business. The solution is affordable and adjustable, with variable costs depending on client needs and benefits such as optimization of people flows and operational efficiency.

Analysis of its inclusion in the Opengela model: it could contribute to the Opengela project by providing an advanced technological solution for efficient management of accesses and security in neighbourhood offices. Due to its facial recognition capacity and automated temperature control, it can strengthen security and access control in the Opengelas, assuring a secure environment for residents and employees. Also, its integration with occupation control systems could help effectively manage visits and maintain compliance with health regulations, thereby facilitating daily operations and attention to neighbours in local offices.

Goroldiotek

Description: holistic system grounded on nature-based solutions for installing and monitoring moss panels at bus stops and shelters to increase natural cooling, air quality and pollution reduction and also contribute to urban aesthetics.

Scope of application (building and/or urban environment): the scope of application of Goroldiotek focuses mainly on urban environments, specifically bus stops and shelters.

Functions:

- Reduction of atmospheric pollution – Moss panels, especially with the species *Sphagnum palustre*, act as natural filters by absorbing polluting air particles such as fine dust and nitrogen oxide, thereby helping improve urban air quality;

- Natural cooling – Through transpiration, moss helps reduce air temperature in areas around it, providing a local cooling effect. This helps mitigate the island effect of urban heat and improve thermal comfort at bus stops and shelters;
- Urban aesthetics and architectural functionality – Moss panels not only fulfil a purifying and cooling function, they also improve the aesthetic appearance of urban infrastructures, harmoniously integrating the urban environment and improving the visual experience of citizens;
- Hydric sustainability – The hydroponic irrigation system, managed by an advanced automatic system, efficiently uses stored and recovered water, thereby minimizing consumption of hydric resources and promoting sustainable practices in the design and maintenance of structures;
- Automated maintenance and monitoring – Incorporates technologies such as temperature and humidity sensors and a micro-control system to manage risk and guarantee optimal moss growth conditions. This facilitates maintenance and ensures the project’s continual effectiveness.

Diagram/image:



Sector representative bodies: [GAIA](#).

Multifactor analysis of the solution: (technical, financial, market, heritage, effect): Goroldiotek considers various key aspects:

- Technical – It uses advanced technology to install and monitor moss panels, focusing on improvement of air quality and reduction of pollutants by means of hydroponic irrigation systems and natural filters;
- Financial: Introduces profitable long-term solutions by reducing operating and maintenance costs associated to traditional methods for purifying and cooling urban air;
- Market – Addresses growing demand through sustainable solutions aesthetically integrated in urban environments, providing additional benefits such as improved urban wellbeing and tourism appeal;
- Heritage – Contributes to urban heritage by integrating in existing structures such as bus stops and shelters, improving the aesthetics and functionality of the urban environment.

Analysis of its inclusion in the Opengela model:

The addition of Goroldiotek in the Opengela model is an advanced holistic solution based on innovation and the values of the New European Bauhaus. This initiative is perfectly aligned with the Opengela goals for urban renewal in the Basque Country because it introduces natural systems for air purification in urban environments by installing

moss panels at bus stops and shelters. These panels not only help improve urban aesthetics, they also offer tangible benefits such as reducing atmospheric pollutants and natural cooling of areas nearby.

From the technical standpoint, Goroldiotek uses advanced hydroponic irrigation technology and natural filters that effectively integrate *Sphagnum palustre* moss to improve air quality and reduce environmental impact. Financially it represents a sustainable long-term investment by reducing operating costs associated to traditional methods for urban air purification and cooling. It also improves public wellbeing by reducing atmospheric pollution and promoting a healthier urban environment for citizens. Implemented in the Opengela context, Goroldiotek not only strengthens efforts for urban renewal and sustainable development in the Basque Country, it also sets a precedent for the integration of environmental solutions in large-scale urban projects in line with the ideals of the New European Bauhaus.

6.5 NATURE-BASED SOLUTIONS

NBSs refer to urban interventions that use nature and its processes to mitigate the effects of climate change and to foster the adaptation capacity of the society and its citizens. These solutions, inspired and supported by nature, include both micro-scale interventions in buildings (actions on rooftops, façades and community spaces of the buildings), and other interventions in public spaces (public living areas and urban parks).



Source: Nature-based solutions for local climate adaptation in the Basque Country - Methodological guide for their identification and mapping (IHOB, 2017)

One of the main characteristics of NBSs is their multi-functionality, their capacity to provide multiple functions that go far beyond the scope and objective of climate change adaptation, for which they may have been originally designed and that offer several collateral benefits in environmental terms (regulation of water cycle, improvement of water, soil and air quality, carbon storage, etc.), social terms (improvement of health and quality of life, promotion of recreation and environmental education, etc.) and economic terms (reduction of energy consumption, improving of local employment, etc.). Moreover, searching for synergies between different NBS can also contribute to cutting costs and to increasing total benefits, as they may improve the environment simultaneously. For example, increasing pervious land combined with vegetation may improve water run-off and thermal comfort at the same time.

Furthermore, NBSs may be more efficient in fighting climate change than engineering and technological solutions, both in terms of their investment costs, implementation and resource consumption, and in relation to the diversity of the benefits that they provide. Nevertheless, these solutions in combination with renewable energy production systems and technologies, such as photovoltaic panels, it can create vital synergies that increase their impact and efficiency.

The objective of this chapter is to collect building-scale and public-space NBSs that are already in market and in development, describing the main characteristics, features, impacts associated and other issues related to them.

6.5.1 GREEN ROOFS

Description: A green roof is a roof of a building that is partially or completely covered with vegetation, either in soil or in an appropriate growing medium, with an impermeable membrane. These NBSs can enhance urban ecosystems as well as mitigate biodiversity loss, and their implementation is comparably straightforward where basic conditions are met. Green roofs provide some benefits both to the public (e.g. rainwater storage) and to private users (e.g. thermal insulation and reduction of local storm water fees), and contributes principally to reducing flooding due to extreme precipitation (pluvial flooding) and flooding due to rivers exceeding their capacity (fluvial flooding). It also contributes to reducing the temperature increase and consequential droughts.

Area of application: This NBS is a building-scale intervention as it is mainly concentrated in urban areas.

Features:

Regulates the water cycle

- o Protects biodiversity
- o Carbon storage
- o Reduces energy consumption
- o Increases the value of land and property
- o Ensures health and quality of life.
- o Promotes recreation and environmental education
- o Enhances space for social gathering

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: The technical restrictions are associated to the slope of the roof, which must be of up to 30 degrees, and the available surface. That is why industrial areas with rooftop availability are better than high density urban areas (old quarters of cities, expansion areas, etc). Besides that, the vegetation planted must be selected in accordance with the local climate conditions and species. This NBS requires a significant initial investment, particularly if the green rooftops, regardless of their type, which have not been integrated from the earliest design phases of the building. Apart from the initial investment, the other significant costs are associated to keeping the plant species healthy, replacement of plants and cleaning tasks. Moreover, the green roofs are already in market, nevertheless the demand for this solution in the real estate market is very low, despite the incentives offered. The implementation of the solution may be hampered due to the owners of the buildings and the possible restrictions due to the building being listed under local byelaws.

6.5.2 GREEN FAÇADES, VERTICAL GARDENS

Description: Green façades are vertical surfaces covered with vegetation that optimize thermal and acoustic insulation, improving air and noise quality and providing greater thermal stability to the buildings, by mitigating the heat island effect, and reducing water and energy consumption. This NBS also contributes to reducing pluvial flooding and temperature increase, as well as possible droughts. In addition, these vertical gardens create an aesthetic space, respecting ecological values, and contribute to urban ecological connectivity and the environmental awareness of the general public.

Area of application: This NBS is a building-scale intervention as it is mainly concentrated in urban areas.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Reduces energy consumption
- o Improves local employment
- o Increases the value of land and property
- o Promotes recreation and environmental education
- o Enhances space for social gathering

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: The façades of the building have to be suitable from a structural point of view to install support elements for the vegetation, both from the simplest, such as using the existing structures for climbing plants, and more complex ones to hold soil for the plants. This solution requires a significant initial investment, particularly if the green façades are not integrated from the earliest design phases of the building. Besides, maintenance costs are associated to the upholding of plant species in a healthy state, replacement of plants, cleaning or repairing possible unforeseen damage to the structure of the building. The implementation of the solution may be hampered due to the owners of the buildings, the availability of blind façades and the possible restrictions due to the building being listed under local byelaws.

6.5.3 NATURING COMMUNITY-USE SPACES

Description: Naturing community-use spaces are urban green spaces located within an urban setting (community courtyards of buildings or community private use space between buildings) that foster the enjoyment and social use of them, avoiding possible acts of vandalism and improving the quality of life of the users. These spaces offer a considerable surface area where to install different blue elements, such as fountains and water features that freshen the atmosphere, mitigating the heat island effect, and green elements, such as vegetable gardens or fruit trees appropriate to the climate and local species, that improve the air quality, mitigate the heat island effect, act as a noise barrier and foster ecological connectivity. This NBS contributes to reducing pluvial flooding thanks to pervious pavements, which help to improve the surface runoff and therefore to reduce flooding from rain and to reducing the temperature increase, thus possible fires and droughts are prevented.

Area of application: This NBS is a building-scale intervention as it is mainly concentrated in urban areas.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Carbons storage
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education
- o Enhances space for social gathering

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: Even though there are no specific technical requirements that limit its implementation, each intervention must be in line with the uses allowed above ground (community courtyards with restricted access, limited available surface area, existence of underground courtyards, etc.). This NBS requires significant initial investment and cooperation between different resident communities. Maintenance costs are associated principally to cleaning and looking after the plant species and control of pests. The implementation of the solution may be hampered due to the owners of the buildings and the possible restrictions due to the building being listed under local byelaws.

6.5.4 GREEN STREET FURNITURE

Description: Green street furniture are relatively simple solutions (benches, canopies, textile structures, plant pots, etc), along with pervious pavements, aimed at contributing to improving the surface runoff, reducing pluvial flooding, and the urban aesthetics. They improve the energy efficiency potential of buildings and neighbourhood and offset the effect of extreme temperatures in summer, meaning that the general public can use more comfortable and safer spaces in the heat of the day. Apart from the environmental advantages, this solution raises awareness among the general public regarding nature-based climate change adaptation and urban planning (plant pots, power beds, etc).

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Increases the value of land and property
- o Regenerates degraded areas

- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: Even though there are no specific technical requirements, apart from using long-lasting and quality materials, there must be a careful selection of plants appropriate to the climate and local species, and an identification of the optimum places to locate the items, for example the installation of seasonal shade textile structures in the sunny areas of the buildings. The implementation of the solution will totally depend on the municipal deployment, as it will be completely necessary to guarantee the effectiveness of the measure.

6.5.5 PERVIOUS PAVEMENTS

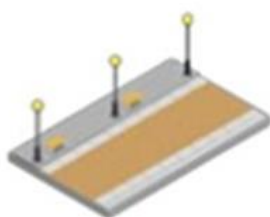
Description: Pervious pavement is designed to allow percolation or infiltration of stormwater through the surface into the soil below where the water is naturally filtered and pollutants are removed. In contrast, normal pavement is an impervious surface that sheds rainfall and associated surface pollutants forcing the water to run off paved surfaces directly into nearby storm drains and then into streams and lakes. This nature-based solution contributes to reducing pluvial flooding and fluvial flooding, thanks to pervious pavements, which help to improve the surface runoff and therefore to reduce flooding from rain and to reducing the temperature increase, thus possible droughts are prevented and sea level rise is slowed down.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves water and noise quality and comfort
- o Reduces energy consumption
- o Increases the value of land and property

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: It is a relatively straightforward technology, which becomes more effective if its implementation is widespread throughout the city. Pervious pavements are particularly viable for surface car parks, pedestrian streets, spaces between buildings, squares and children's playgrounds. Furthermore, the implementation of porous and pervious surfaces (even though it is based on relatively simple technology) is only viable if not located on underground amenities, such as car parks.

6.5.6 COMFORTABLE URBAN PLACES

Description: Naturing of public-living areas, such as hard squares, by introducing NBS, replacing sealed surfaces by pervious pavements, and introducing vegetation, wooded areas and water features improves the surface runoff, which reduces pluvial and fluvial flooding, and mitigates the heat island effect, reducing temperature increase and thus possible droughts. This NBS also raises awareness among the general public regarding nature-based climate change adaptation and urban planning and turns these spaces into healthy and safe gathering areas.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves water, air and noise quality and comfort
- o Protects biodiversity
- o Increases the value of land and property
- o Ensures health and quality of life
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: In this case, the permeability and drainage possibilities (e.g. existence of underground car parks) and the selection of adapted species condition the intervention. The initial investment is not remarkable but there will be maintenance costs, as its conservation is essential to preserve its environmental positive impact. The implementation of the solution may be hampered due to the existence of restrictions associated to protecting the urban heritage. Moreover, to ensure the social acceptance of this type of measures, it is important to conduct an awareness raising campaign so that the public understands their benefits both against the effects of climate change and for the health, comfort and quality of life in general.

6.5.7 URBAN MICRO-CLIMATES

Description: This NBS raises awareness among the general public regarding nature-based climate change adaptation and urban planning. The installation of blue elements, such as fountains or other water features, turns

these into healthy and safe gathering places and offsets the effect of extreme temperatures in summer, freshening the atmosphere and thus mitigating the heat island effect. Besides, the general public can use more comfortable and safer spaces in the heat of the day.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves noise quality and comfort
- o Increases the value of land and property
- o Ensures health and quality of life
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS requires the selection of places where water supply is possible, as well as previous consultation of best practices guide for the correct and responsible use of water. One of the most interesting points of this solution is that it will be used recycled or rainwater, so that the maintenance of the structures to ensure the quality of the water and avoid diseases will be primordial. Furthermore, to guarantee sustainable and responsible consumption of the resource, these spaces need to be designed as far as possible with closed cycles using rainwater and/or recycled water. The expenses will come principally from maintenance costs, in order to ensure water out of diseases. There may also be costs associated to an increase of energy consumption and loss of the water resource.

6.5.8 ALLOTMENT GARDENS

Description: An allotment garden is a plot of land made available for individual or collective non-commercial gardening for growing food plants. This NBS takes this concept into the urban environment as urban agriculture can occur anywhere (rooftops, façades, community courtyards, spaces between buildings, public spaces, etc). This NBS contributes to regulate the water cycle, reducing the surface runoff and the risk of pluvial and fluvial flooding, and mitigates the heat island effect, reducing temperature increase and thus possible droughts. It also fosters the ecological connectivity between the urban and the natural environment and carries out a more efficient harnessing of the public land for recreational and public-living activities and food production in response to the growing concern about the depletion of natural resources.

Area of application: This NBS is a public space intervention, as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves soil quality, stability and erosion
- o Protects biodiversity
- o Carbons storage
- o Improvement of local employment
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education
- o Enhances the space for social gathering
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: Urban agriculture can be implemented practically anywhere in the city from the rooftops and flat roofs or community courtyards and free spaces between the buildings to more outlying urban sites. Nevertheless, there must be take into account some geographical factors for growing such as the slope of the land, the preparation needs, orientation of the site (hours of sun), wind systems, run-off, etc. One of the principal actions will be preparing the site by levelling the land and subsequent provision of earth. It has to be guaranteed too that the sites are not in ‘potentially polluted’ locations which would not be suitable for agricultural activities. The initial and principal investment will be around these two actions and to provisioning the site of electricity and water supplies and auxiliary services (tool hut, toilets, etc). The implementation of the solution may be hampered due to municipal plans: ownership of the land, compatibility with planning, land use (land classified as non-developable), proximity to population centres and accessibility to the sites (existing infrastructures, public transport).

6.5.9 URBAN PARKS AND URBAN FORESTS

Description: Naturalized public spaces that form part of the urban fabric, are home to habitats for flora and fauna and are recreational, public-living and socialization areas for the general public. They are a key urban hallmark as they improve health, absorbing gas pollutants, particulates and mitigating noise pollution, and which indirectly help cut municipal costs associated to environmental management and health. Besides, they also contribute notably to reducing the heat island impact, reducing temperature increase and providing humidity to the atmosphere, thus possible fires and droughts are prevented and sea level rise is slowed down.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle

- o Improves water, air and noise quality and comfort
- o Protects biodiversity
- o Carbon storage
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education
- o Enhances the space for social gathering
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS requires a careful selection of species well adapted to the land and local climate and requires guaranteeing of public accessibility to these parks and connectivity with other green areas of the municipality. It also offers a possible synergy with sustainable drainage systems. The initial investment will be in accordance with this NBS's life cycle. Moreover, the synergy with sustainable drainage systems could reduce the maintenance costs associated with the use of water for irrigation. In relation with the execution, there may be possible incompatibilities of the uses of the land in line with urban planning.

6.5.10 RENATURING ABANDONED AREAS AND OPPORTUNITY PLOTS

Description: This NBS is based in the regeneration and social activation of neglected public space, amenities becoming run down, wasteland or plots in disuse using nature-based criteria, improving the surface runoff, what reduces the risk of pluvial and fluvial flooding, and contributing to the mitigation of the heat island effect reducing the temperature increase, thus possible fires and droughts are prevented and sea level rise is slowed down. Beyond the direct benefits regarding climate change adaptation, the interventions in abandoned areas can contribute to their security and therefore to reducing the risk of criminality by increasing the feeling of belonging in the neighbourhoods.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves water quality, soil quality, stability and erosion, air and noise quality and comfort
- o Protects biodiversity
- o Improvement of local employment
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education

- o Enhances space for social gathering
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS requires selecting the most favourable natural-based solution, whether it is an urban allotment, replanting, landscaping, etc. Moreover, these are low-maintenance solutions, so that the economic requirements will not be high. This solution will need processes to consult and involve local communities in the implementation to guarantee the success of the measure. Besides, temporary uses may be incompatible with the allocated used in the PGOU or municipal byelaw.

6.5.11 SUSTAINABLE URBAN DRAINAGE SYSTEMS

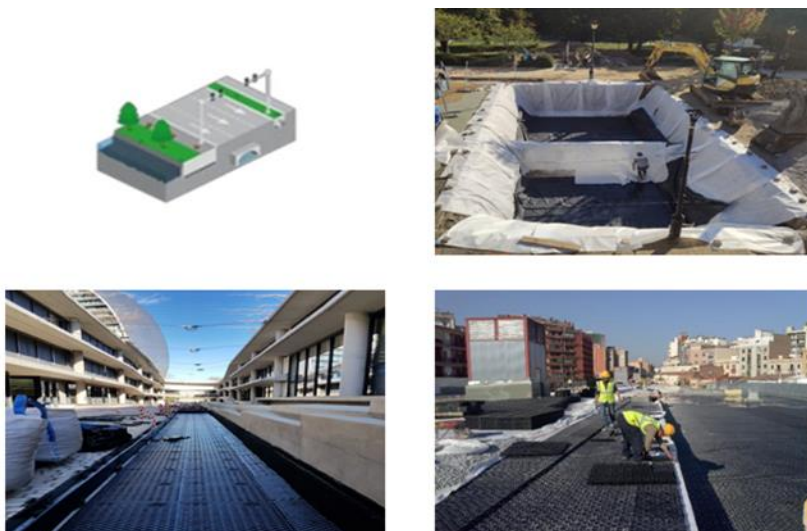
Description: Sustainable urban drainage systems are urban adaptation measures to address intense precipitation phenomena. The replacement of hard surfaces by previous ones that facilitate the absorption of rainwater is considered a very efficient solution in the management of the water cycle particularly in dense urban areas, as well as a great solution for reducing the surface runoff and the risk of pluvial and fluvial flooding, and keeping the land humid and fostering healthy vegetation in the city. Naturally filtered water can be used as a public-living or recreational element and to water adjacent parks and gardens, in order to lower the temperature on hot days. It also offers social benefits as the design of the public space that is part of those drainage systems, turns it into attractive recreational and meeting areas.

Area of application: This NBS is an intervention implemented in water bodies and drainage systems as develops a measure around blue solutions.

Features:

- o Regulates the water cycle
- o Improves water quality and soil quality, stability and erosion
- o Reduces energy consumption
- o Ensures health and quality of life
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: Carrying out this solution involves different actions that imply different levels of technical and management implementation and complexity as the effectiveness of the sustainable drainage systems increases if their implementation is widespread throughout the urban infrastructure and as the possibility of discharge into the sanitation network exists. Besides, they are long-term implementation and deployment measures. These measures are more efficient in medium-to-long economic terms than the traditional wastewater infrastructures, so the initial investment, although may be elevated, seems necessary. In relation with the execution, there may be constraints due to the existence of underground amenities.

6.5.12 GREENING STREETS

Description: Introduction of vegetation in streets with the paving being replaced by pervious surfaces and with the introduction of wooded areas, flowerbeds and a good selection of plants species that are well adapted to the climate and the local characteristics enhances the quality of life, contributing to reducing pluvial and fluvial flooding, and also reducing temperature increase, thus possible droughts are prevented. This NBS offers many other advantages, as it filters pollution from traffic, acts as a barrier against noise (especially perennial species), improving local acoustic quality, and provides shade and the transpiration of plants to mitigate the heat island effect. Greening the streets also fosters more comfortable and healthier environments and makes walking through the city and using alternative means of transport, such as bikes, more attractive and pleasant.

Area of application: This NBS is an intervention implemented in linear transport infrastructures.

Features:

- o Regulate the water cycle
- o Improves water quality, air and noise quality and comfort
- o Protects biodiversity
- o Carbon storage
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education
- o Enhances the space for social gathering
- o Regenerates degraded areas
- o Improves the connectivity of urban spaces

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This solution requires an appropriate sizing and a careful selection of species well adapted to the land and local climate. Ad hoc studies on the orientation and morphology of the streets are also necessary to establish whether the introduction of vegetation may obstruct the ventilation corridors that help the air flow and thus disperse the concentration of pollution. This solution will require maintenance, for if the planting is careless it can be a risk to road traffic safety. In relation to the execution, there may be a possible conflict of uses, particularly in road traffic areas.

6.5.13 GREEN LINEAR INFRASTRUCTURES

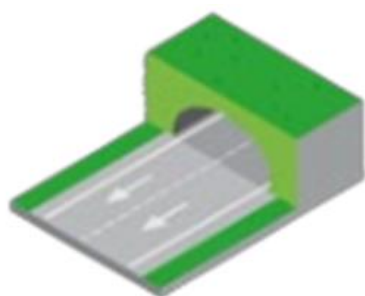
Description: Around high-capacity infrastructures (roads, railways lines and associated features such as bridges) there are usually vacant spaces in disuse, whose naturing would not only considerably improve the quality of the urban landscape in those usually degraded places, but which can mean their coming into use in the form of walks and safer and more attractive sports and recreational zones. This NBS contributes to reducing pluvial and fluvial flooding. This solution also contributes notably to reducing the temperature increase, thus possible droughts are prevented.

Area of application: This NBS is an intervention implemented in linear transport infrastructures.

Features:

- o Regulates the water cycle
- o Improves of water quality, soil quality, stability and erosion, air and noise quality and comfort
- o Protects biodiversity
- o Increases the value of land and property

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This solution requires an appropriate sizing and a careful selection of species well adapted to the land and local climate. There may be technical constraints to ensure that the vegetation does not damage structures and be a risk to road traffic safety. The initial cost is principally associated to the renaturing of the spaces adjacent to the infrastructures. There are other costs associated to the maintenance of the plant features to avoid their damaging and to ensure traffic safety. Inter-institutional coordination with the provincial councils in charge of roads in the Basque Country, along with Euskotren and ADIF, in the case of railways, is essential; likewise crucial is compliance with road traffic and safety legislation relating to all jurisdictions (local, regional, national). Besides, this solution must be in alignment with the Road Sector Provincial Plans in Bizkaia, Araba and Gipuzkoa.

6.5.14 VEGETABLE MORTAR FAÇADE

Description: Vegetable mortar façades are vertical surfaces made of an ecological concrete with the capacity for pigmented organisms to grow naturally and accelerated. This is a multilayer element formed by a waterproofing layer, located on top of another that serves as protection against the passage of water, and a biological layer, where the colonization of species and the accumulation of water is allowed. Apart from the environmental advantages, this solution raises awareness among the general public regarding nature-based climate change adaptation and urban planning. This NBS contributes to reducing pluvial flooding and temperature increase, as well as possible droughts. It also contributes to reducing the temperature increase and consequential droughts.

Area of application: This NBS is a building-scale intervention as it is mainly concentrated in urban type areas.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Reduces energy consumption
- o Improves local employment
- o Increases the value of land and property
- o Promotes recreation and environmental education
- o Enhances space for social gathering

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is still under development, whereby its implementation has recently been subject to a pilot test. The technical challenges that confront this solution are associated to the durability and maintenance of the material, as some of this material's properties (permeability, degradation, fissures and cracks, etc) are still unknown.

6.5.15 VEGETABLE CONCRETE TILE

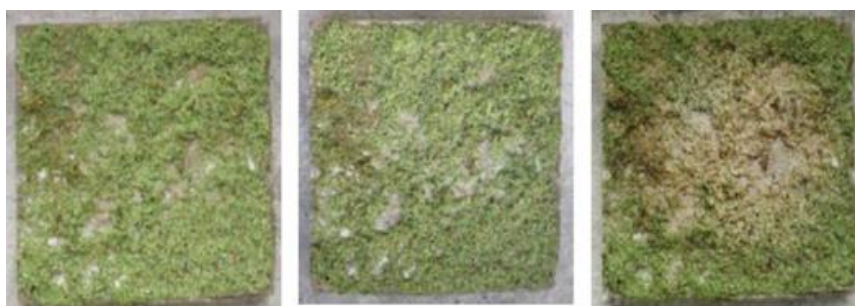
Description: Vegetable concrete tiles are vertical surfaces made of an ecological concrete with the capacity for pigmented organisms to grow naturally and accelerated. This is a multilayer element formed by a waterproofing layer, located on top of another that serves as protection against the passage of water, and a biological layer, where the colonization of species and the accumulation of water is allowed. Organic concrete, as well as being an insulating material and thermal regulator, is also an ornamental alternative, so that it can be used to decorate the façade of buildings or the surface of constructions with different species of plants. This NBS contributes to reducing pluvial flooding and temperature increase, as well as possible droughts.

Area of application: This NBS is a building-scale intervention, as it is mainly concentrated in urban areas.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Reduces energy consumption
- o Increases the value of land and property

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is still under development, whereby its implementation has recently been subject to a pilot test. The technical challenges that confront this solution are associated to the durability and maintenance of the material, as some of this material's properties (permeability, degradation, fissures and cracks, etc) are still unknown.

6.5.16 GREENHOUSE FAÇADE

Description: Greenhouse façades are vertical greenhouses located in the building's façades. They optimize thermal and acoustic insulation, improving air and noise quality and providing greater thermal stability to the buildings, by mitigating the heat island effect and reducing energy consumption. Thus, this NBS also contributes to reducing temperature increase, as well as possible droughts and fires. These also offer a considerable growing area that, as it occurs in standard greenhouses, does not depend on environmental conditions, allows the reuse of water, the quality of production is higher, etc, and fosters ecological connectivity. Moreover, these façades create an aesthetic space, respecting ecological values, and contribute to the environmental awareness of the general public.

Area of application: This NBS is a building-scale intervention as it is mainly concentrated in urban-type areas.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Carbon storage
- o Reduces energy consumption
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education
- o Enhances space for social gathering

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is already commercially available and there are several companies able to provide them. The technical challenges that confront this solution are associated to the maintenance.

6.5.17 GREENHOUSE FAÇADE

Description: Greenhouse façades are vertical greenhouses located in the building's façades. They optimize thermal and acoustic insulation, improving air and noise quality and providing greater thermal stability to the buildings, by mitigating the heat island effect and reducing energy consumption. Thus, this NBS also contributes to reducing temperature increase, as well as possible droughts and fires. These also offer a considerable growing area that, as it occurs in standard greenhouses, does not depend on environmental conditions, allows the reuse of water, the quality of production is higher, etc, and fosters ecological connectivity. Moreover, these façades create an aesthetic space, respecting ecological values, and contribute to the environmental awareness of the general public.

Area of application: This NBS is a building-scale intervention as it is mainly concentrated in urban-type areas.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Carbon storage
- o Reduces energy consumption
- o Increases the value of land and property
- o Ensures health and quality of life
- o Promotes recreation and environmental education
- o Enhances space for social gathering

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is already commercially available and there are several companies able to provide it. The technical challenges that confront this solution are associated to the maintenance.

6.5.18 PRINTED OR BUSH-HAMMERED PERMEABLE CONCRETE PAVEMENT

Description: The continuing growth of urbanisation, combined with increasingly extreme weather events, means that flooding and water damage are now of great concern for many households. This pervious concrete pavement in conjunction with drainage systems gradually disperse water in a controlled process, which contributes to reducing pluvial and fluvial flooding and temperature increase, as well as possible droughts.

Area of application: This NBS is a public-space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves water and noise quality and comfort
- o Reduces energy consumption
- o Increases the value of land and property

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is still under development, whereby its implementation has recently been subject to a pilot test. The technical challenges that confront this solution are associated to the maintenance and to the execution, as it must be precise and careful.

6.5.19 PERFORATED CONCRETE PAVEMENT WITH BIODEGRADABLE FORMWORK

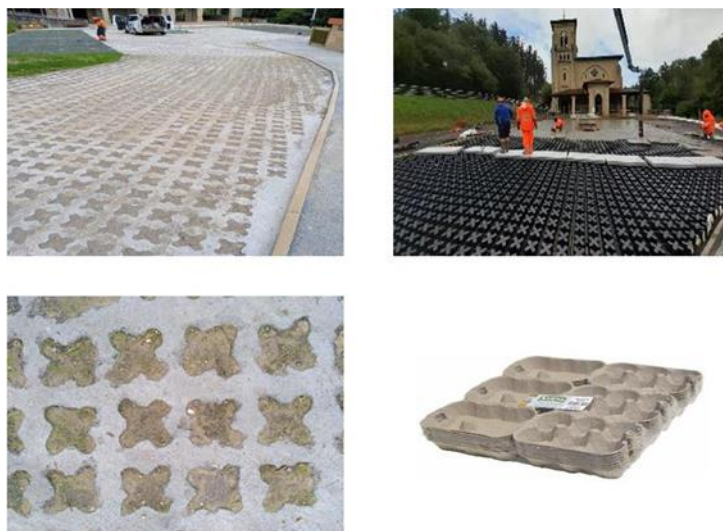
Description: The traditional building is likely to produce an abundance of waste materials that are non-biodegradable and will end up in landfill (even if they are first reused or recycled). This solution allows using less concrete and the formwork used will be decomposed naturally. This NBS contributes to reducing pluvial fluvial flooding and temperature increase, as well as possible droughts.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves water and noise quality and comfort
- o Reduces energy consumption
- o Increases the value of land and property

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is still under development, whereby its implementation has recently been subject to a pilot test. The technical challenge of this solution is finding a producer.

6.5.20 PERFORATED CONCRETE PAVEMENT WITH BIODEGRADABLE FORMWORK

Description: Very often, trees are planted in very limited spaces and with poor soil, which will result in unwanted growth, with roots trying to colonize other areas under the pavement, with consequent damage to infrastructure. The structural cells are designed to provide the appropriate conditions for the integration of the tree into an urban environment, promoting healthy growth, without damaging the adjacent structure. These cells, instead of being of plastic, are bio-based. It has been observed that bio-based materials are the real alternative not only due to the reduction of the carbon and energy emissions but also because they provide thermal comfort with less energy consumption. This NBS contributes to reducing pluvial and fluvial flooding and temperature increase, as well as possible droughts.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Protects biodiversity
- o Carbons storage
- o Improves air and noise quality and comfort
- o Reduces energy consumption
- o Increases the value of land and property

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is still under development, whereby its implementation has recently been subject to a pilot test. The technical challenge that confronts this solution is finding a producer.

6.5.21 STRUCTURAL SOIL

Description: Structural soil is a mixture of coarse-grained gravel and small particles that guarantee the supply of water and nutrients to urban land which due to the modifications suffered over the years is no longer fertile, deep, spongy or well drained. This solution, along with the cells, provides appropriate conditions so that the tree can grow healthily and exponentially increase its impact. This NBS will hence contribute to reducing pluvial and fluvial flooding and temperature increase, as well as possible droughts and fires.

Area of application: This NBS is a public space intervention as it is executed in public-living areas, urban parks and other urban features of the public space.

Features:

- o Regulates the water cycle
- o Improves air and noise quality and comfort
- o Protects biodiversity
- o Carbon storage
- o Reduces energy consumption
- o Increases the value of land and property
- o Ensures health and quality of life

Diagram/image:



Sector representative bodies: Hirinatur-Aclima

Multifactor analysis of the solution: This NBS is still under development, whereby its implementation has recently been subject to a pilot test. The technical challenge is finding a producer.

6.5.22 INCLUSION OF NBSs IN THE OPENGELA MODEL.

Opengela is a model that seeks to extend urban renewal in the Basque Country and to do so uses the creation of a network of neighbourhood offices that act as a one-stop shop to serve the neighbourhood. NBSs meet the necessities of this model, as these solutions are tailored to local biophysical, socio-economic, political and cultural conditions that address social challenges (climate change, disaster risks, food and water security, human health, etc) by protecting, sustainably managing or restoring natural ecosystems.

Nevertheless, and although scientific evidence of the multiple benefits of NBS is rapidly expanding, the approach is still new and their adaptation still depends on some limiting factors that vary depending on context and geographic location and that hamper their implementation in the Opengela model. Some of the limiting factors are:

- Lack of political support
- Poor stakeholder engagement and attitudes
- Social and cultural constraints due to e.g., cultural preferences for certain aesthetics (what a landscape should look like), risk perceptions relating to different management practices and sense of ownership and place
- Physical and biological constraints, e.g. degraded ecosystems as a starting point for NBS intervention
- Lack of land or space constraints for implementation
- Lack of cooperation and consent from landowners and agencies
- Incomplete demonstration of own or comparative benefits (e.g. knowledge gaps on limits and thresholds under which NBS approaches might not deliver adaptation benefits) and unclear cost effectiveness
- Demonstration of effectiveness not tailored to purposes or not at an appropriate scale (e.g. water runoff reduction only demonstrated at plot level but not at catchment scale) and imbalance of knowledge sources underpinning assessments
- Gap of knowledge between private benefits to individual entities and broader social costs and benefits for communities; time lags in achieving and observing benefits
- Evidence is context-specific and often not transferable and is not shared
- Lack of finance for implementation of NBSs (e.g. for land acquisition/compensation) and maintenance
- Difficulties in the NBS tendering process (e.g. lack of knowledge on how to present a convincing business case for NBS, lack of track record, lack of (experienced) suppliers, path dependency favouring engineered solutions)

To offset these limiting factors, it would be essential to promote the following initiatives:

- Promote the use of nature-based solutions to solve society's problems, facilitating their integration with other technological or engineering solutions
- Adapt regulations and legal frameworks to promote the application of nature-based solutions, in a transversal way compared to other types of strategies
- Contribute to evaluating the impact of nature-based solutions at an economic, social and environmental level, to create common indicators, as well as to monitor and analyse the data obtained from the implementation of nature-based solutions, in particular the direct and indirect cost savings
- Provide resources for R&D&I, as research and innovation are key elements of NBS and promote progress towards even more sustainable, long-lasting solutions with immediate and economical application
- Implement an ecosystemic urban model that promotes decarbonization, closing cycles, takes into account ecosystem services and connects in a natural way with the territory
- Renaturalize the city, seeking to increase biodiversity and the conservation and improvement of natural heritage through NBS, including them as an instrument for this change of model in urban/strategic plans and tenders
- Actively include citizens in the design of NBS and its implementation and care, providing information about the health benefits and contributing to converting the city's natural heritage into an element of local pride
- Facilitate the financing of NBS in budgets, plans and public programmes, through green taxation and with the promotion of entrepreneurship and new business models
- Contribute to generating training and training programmes to consolidate a professional sector capable of implementing NBS while promoting the creation of green jobs
- Support the development of consortia and networks between public entities, private companies, research centres, universities and third sector entities in the application of NBS

Besides, there are already regulations and legal frameworks integrated within the Basque strategies that consider and regulate NBSs:

- **Climate change strategy KLIMA 2050**
 - *Goal 3: Incorporate NBSs and green infrastructures for a resilient urban structure*
- **Urban agenda Bultzatu 2050**
 - *5.3. New sustainable urban planning model*
 - ❖ 5.3.2. Resilience of the territory and natural heritage (green roofs on buildings, with special incidence of NBSs)
 - *5.6. Sustainable and resilient cities*
 - ❖ 5.6.4. Biodiversity and ecosystems. Promote the development of green infrastructure and NBS plans as adaptation to CC and protection of biodiversity
- **Territorial planning guidelines**
 - *Article 10. Guidelines regarding urban regeneration*
 - ❖ j.- Promote green infrastructure through the use of NBSs
 - *Article 31. Guidelines on mitigation and adaptation to climate change*
 - ❖ 3.- Promote green infrastructure and NBSs as a measure of adaptation to climate change
 - ❖ 7.- Incorporate the climate perspective into territorial and urban planning
 - c) Permeabilization and planting of public spaces, promoting green and blue infrastructure and NBSs

7. SOLUTIONS GROUPED FOR THE OPENGELA MODEL

To identify innovative solutions grouped for the model, a multi-sector multi-agent workshop was developed, which worked on various differentiating ideas that are set out below.

A **first solution** has been proposed which considers the integration of prefabricated elements in the façade in the form of panels incorporating solar panels and monitoring systems to evaluate their performance over time. This proposal also includes the possibility of expanding the inhabitable area of residences as necessary, thereby improving living conditions. Also considered is the installation of lifts both inside and outside the building, adapting to meet the specific needs of each situation. The complementary creation of a two-floor underground garage is put forward, which can house geothermal and rainwater collection systems. The upper part of that underground garage could be used for implementation of nature-based solutions. Finally, the installation of automated heat recovery systems is suggested, to ensure optimal comfort inside homes.

The **second solution** is grounded on the specific limitations of the Torre Urizar case, focusing on development of the surrounding urban spaces. The implementation of communal urban gardens associated to the community is proposed, as well as the planting of trees exclusively in the area in front of the building's south façade. The centralization of parking is considered in two of the three zones generated by the building's specific distribution, configuring a living area with an integrated open space that connects with the area in front of the church.

The **third solution** is also inspired by the Torre Urizar case and its current limitations. It initially considers the installation of a central geothermal or aerothermal heating system. However, this option is discarded to the limitations of a community of vulnerable neighbours and the complex management associated to the respective maintenance. Regarding interventions in the building, which has heritage protection, the implementation of an exterior insulation finishing system (EIFS) is proposed, which respects the building's architectural appearance and is reversible due to its protection category. Also suggested is the installation of framing with thermal bridge interruption and solar protections on the southwest faces. Finally, the possibility of recovering the underroof space is considered so it can be used for green solutions or storage space, although it is concluded that this is not economically viable due to the roof's current structure and eventual problems it may cause for residents.

The **fourth solution** proposed again addresses the challenge of existing surface parking, which cannot be eliminated to be used in another way. The possibility of installing permeable pavements is considered, accompanied by filter systems that enable usage of the greywater network already present in the building complex. A key approach is the management of construction and demolition waste (CDW) generated during the rehabilitation intervention, promoting solutions that make it possible to work over existing structures to improve them instead of removing them and generating additional waste. Also considered is the viability of establishing a domestic neighbourhood-level domestic waste management system, possibly by implementing an automatic composter that can later be used by residents.

One of the questions put forward on several occasions during the workshop centres on the responsibility for cost overruns stemming from the inclusion of solutions not required by regulations in the interventions. This is considered a crucial aspect to analyse, linked to the possible cost overrun associated to implementation of a different or innovative solution in the Opengela model interventions.

The first conclusions suggest that nature-based solutions seem more beneficial when applied in urban environments, while information and communication technologies (ICTs) can also be effectively integrated along with these natural solutions. It is crucial to apply solutions at building scale to monitor the performance of parameters and ensure optimal functioning of residences, thereby improving quality of life, comfort and health.

The choice between passive and active solutions will depend on the specific characteristics of each building, while the viability of industrial solutions will be determined by the extent of the required intervention.

“ECONOMIC AND FINANCIAL REPORT”

8. EXECUTIVE SUMMARY

This annex presents the public synthesis of the economic and financial assessment carried out for the proximity offices. The first part of this assessment (Part I) was developed in Deliverable D3.2, which contains detailed office-level financial, operational and social information. Because that document includes sensitive data, it is not reproduced in this public deliverable. Instead, the present annex provides a consolidated, anonymised version of those findings. For this reason, the structure begins with a continuation of the previous analysis rather than a repetition of Part I.

This Executive Summary therefore introduces the main aggregated insights derived from D3.2 and frames the approach adopted in this annex: presenting network-level indicators, cross-office patterns and reference values that can be disclosed publicly, while omitting elements that would identify individual offices or their performance.

The analysis combines economic variables (accompaniment costs, financing–investment dynamics, relative weight of service costs), operational indicators (success rates, activation levels), social factors (distribution of vulnerability and subsidy intensity) and organisational dimensions (team structures and resource requirements). Together, these elements offer an integrated view of how the Opengela proximity office model behaves under different conditions and what reference values can guide future planning.

Part II: Continuation of the Economic and Financial Assessment (synthesis of D3.2)

The updated analysis builds upon the methodological foundations of the earlier work, expanding the database and refining the comparative framework. It consolidates information from multiple offices into a harmonised structure that allows meaningful aggregation without disclosing office-level details. As in the previous phase, caution is required when interpreting averages, given the diversity of neighbourhoods, building types and socio-economic contexts. The objective is to describe the overall cost of the accompaniment service, the magnitude of renovation activity mobilised, and the financial relationship between office expenditure and the investments triggered.

Aggregated Data Analysis

At network level, the proximity offices collectively reach a success rate of around 84%, measured as the proportion of dwellings that entered the rehabilitation phase relative to those initially targeted. This high value reflects the effect of professional accompaniment on decision-making and mobilisation within homeowners’ associations.

The distribution of grants shows that approximately three-quarters of households receive general support, while around one-quarter benefit from additional aid linked to energy renovation, indicating a significant presence of vulnerable populations and revealing the social complexity managed by the offices.

The cost of the service, when aggregated, results in two reference values:

- €3,122 per renovated dwelling, and
- €2,386 per targeted dwelling.

These figures summarise the public expenditure associated with direct support, depending on whether calculations consider the total goal or only the dwellings that ultimately undertake renovation works.

At district level, the cost of the accompaniment service represents around 3.8% of the total investment mobilised, while at dwelling level—considering only building-related rehabilitation costs—the relative weight is close to 5%. Despite local disparities, these ratios consistently demonstrate a strong leverage effect: a relatively modest public operating cost supports renovation investments of orders of magnitude greater.

Comparative Analysis Across Offices (Anonymised)

When comparing offices in aggregated form, clear differences appear in cost per dwelling, renovation coverage and investment intensity. Some offices operate in environments where the number of dwellings is limited, works are

less extensive or social complexity is high, leading to higher operating costs per dwelling. Others, particularly those dealing with larger buildings, more cohesive communities or more substantial renovation packages, show lower relative costs and higher coverage rates.

The relationship between the financing received by each office and the investment ultimately committed in buildings highlights a wide range of leverage effects. In some contexts, the service cost represents a relatively small proportion of the renovation budget; in others, where interventions are limited in scale or scope, the relative weight is higher. This diversity confirms that the performance of each office is shaped by local conditions, not only by its internal management.

Expanded Analysis Through Cross-Referencing of Key Data

Cross-analysis of aggregated economic, social and operational variables reveals several consistent patterns.

Areas with higher vulnerability tend to require more intensive accompaniment, affecting staff workloads and, therefore, operating costs, but successful outcomes remain achievable when adequate resources are deployed.

Renovation budgets vary significantly depending on the type of intervention (energy, accessibility or combined), influencing both the level of investment per dwelling and the relative share represented by the office's operating cost.

Other factors—such as the urban morphology, the density of buildings, and the local governance structure supporting each office—also correlate with differences in cost and impact. Offices working in compact environments with concentrated building stock generally reach economies of scale more easily, while dispersed areas or those with fragmented ownership require additional effort per dwelling.

Reference Values and Observed Ranges

The aggregate values obtained allow setting reference parameters that can guide future planning. The cost of the accompaniment service typically ranges around €3,000 per renovated dwelling when extreme cases are excluded.

The relative weight of the service cost tends to stabilise near 5% of the construction budget associated with deep renovation.

A large proportion of offices cluster around these averages, even though specific contexts may push individual offices toward either end of the range.

Reflections on the “Standard Office” Concept

Although the idea of a single “standard office” is not supported by the data—given the heterogeneity of starting conditions— it is possible to identify recurrent features in the offices that perform consistently close to the aggregated reference values: balanced team structures, stable workloads, predictable renovation pipelines and sustained interactions with local administrations.

These characteristics can inform the development of office typologies and staffing guidelines, acknowledging that variations in scale, governance and social context will continue to shape operational realities. In this sense, the analysis points toward a model that is standardised in methodology, but adaptable in its configuration depending on neighbourhood needs.

9. INTRODUCTION AND SCOPE

This annex provides a detailed synthesis of the economic and financial assessment of the proximity offices, drawing on the consolidated dataset of operational, technical, and financial indicators. The information is presented exclusively in aggregated form, and references to specific offices are deliberately anonymised. When comparisons are made between stronger and weaker performers, these distinctions reflect patterns observed in the underlying data rather than the naming of any office.

The purpose is not to evaluate individual offices, but to explain how the proximity office model behaves under different conditions, what levels of investment and staff effort are typically required, and which factors help account for the significant variety of results found across the network.

10. METHODOLOGY

The analysis combines expenditure data, staff structure and workload information, renovation uptake, investment amounts, and subsidy distribution for the full set of offices with complete records. To allow comparison, the dataset was harmonised: figures were standardised per dwelling, per target and per renovated unit, and investment values were aligned using the same categories of building works.

The aggregated indicators must be interpreted in light of substantial diversity across districts. Some offices serve thousands of dwellings across a compact urban fabric; others work with scattered buildings, complex ownership situations, or high proportions of vulnerable households. The aim of this annex is to capture the richness of that diversity without compromising confidentiality.

11. COST STRUCTURE OF THE PROXIMITY OFFICES

The cost profile of the accompaniment service is largely consistent across the network: personnel make up the vast majority of expenditures. This includes technical specialists, social mediators, administrative staff, and legal–financial support. These roles are indispensable because the model centres on guiding homeowners’ associations through a lengthy, multi-stage renovation process. Operational expenses such as rent, utilities, equipment and communication materials form a comparatively stable and predictable component.

Although the structure is similar across offices, the absolute cost differs widely. Offices working in districts with large, continuous building stock distribute fixed costs across many units, leading to significantly lower costs per dwelling. In contrast, offices in fragmented areas—where many buildings house only a handful of dwellings—face a much higher ratio of staff time to renovated dwellings. These conditions, rather than internal management differences, account for much of the variation observed.

Some of the offices with the lowest costs per dwelling operate in environments where building typologies are repetitive and decision-making is straightforward, reducing the need for mediation. On the other end of the spectrum, the most expensive offices operate in districts marked by social vulnerability, scattered buildings, or strained community dynamics. In these cases, the service often requires significantly more staff hours per dwelling, including repeated meetings, extended negotiation processes, or tailored support for individual households.

12. RENOVATION ACTIVITY AND PERFORMANCE

Across the full dataset, the proximity offices achieve an aggregated success rate of roughly 84%, meaning that a large majority of targeted dwellings ultimately move forward with rehabilitation works. This outcome is unusually strong compared with typical renovation programmes in multi-family contexts, where agreement rates tend to be much lower. The proximity offices act as catalysts: they reduce administrative burden, stabilise communication among residents, and provide technical and financial reassurance.

Performance, however, varies. A group of offices achieve near-full conversion of targeted dwellings, sometimes surpassing the number initially planned. These high-performing offices generally operate in districts with coherent building stock; well-functioning homeowners’ associations; residents familiar with prior renovation or community processes; and stable, long-serving office teams.

At the opposite end, a small number of offices record conversion levels close to or below half of the dwellings initially targeted. The reasons are structural rather than managerial: scattered buildings, legal complications, communities unable to reach consensus, or delays in external approvals. In these settings, renovation may require multi-year accompaniment and, even with strong effort, outcomes can lag behind expectations.

What emerges clearly is that the model performs best when it can operate at scale and when the social and governance environment enables collective decision-making. Even so, offices with lower conversion levels often serve populations and building conditions that would be nearly impossible to mobilise without a dedicated structure.

13. INVESTMENT MOBILISED

The renovation projects facilitated by the proximity offices amount to approximately €145.6 million across the analysed districts. This includes both building-level works and, in some districts, complementary urban improvements. The average district-level investment, though strongly influenced by contextual factors, is around €8.57 million.

Investment per dwelling varies widely. Deep energy renovations combined with accessibility upgrades reach the upper end of the investment range, whereas interventions limited to energy improvements alone represent significantly smaller outlays. In several high-performing districts, investment per dwelling is high because communities opt for comprehensive renovation packages. This amplifies the construction value mobilised by the office.

Offices working in multi-building complexes often mobilise investment levels far above the network average, with some reaching several times the typical district investment. Conversely, in offices serving small or widely dispersed buildings, total investment can remain modest even when the office performs well, simply because the opportunities for economies of scale are limited.

The dataset also reveals that the offices with the highest total investment are not always those with the lowest cost per dwelling—although these categories often overlap. In some instances, an office may mobilise a higher-than-average investment per dwelling even if its total number of dwellings is modest, especially when accessibility works or substantial envelope repairs are required.

14. COST OF THE ACCOMPANIMENT SERVICE

The consolidated figures reveal two reference indicators:

- €3,122 per renovated dwelling, and
- €2,387 per targeted dwelling.

These values express the average public expenditure required to support households from initial mobilisation to the start of works. However, the actual values vary significantly between offices.

A group of the most efficient offices record costs per renovated dwelling substantially below €2,000. These offices typically work with large buildings containing many homes; straightforward governance processes; and communities that reach agreements quickly. Their work often requires fewer cycles of mediation, and technical solutions are already well understood by residents.

At the upper end of the spectrum are offices where the cost per renovated dwelling exceeds several times the network average. These cases are characterised by repeated homeowners' assemblies, protracted deliberation, or situations where technical feasibility studies must be revisited multiple times. Scattered buildings or those with complex ownership patterns also drive costs upward. Even in these cases, the office often performs functions that

go beyond renovation—such as supporting vulnerable households or stabilising neighbourhood dynamics—which are not fully reflected in cost-efficiency indicators.

15. WEIGHT OF OPERATING COSTS IN TOTAL INVESTMENT

When set against the volume of investment mobilised, the cost of operating the offices represents approximately 3.8% of total district investment and about 5% of the investment in building-level works.

These averages conceal important differences:

- In districts where renovation is carried out at scale—large buildings, simultaneous interventions, or comprehensive packages—the relative weight of operating costs drops well below the network average.
- In districts with small or fragmented building stock, or where renovation packages are limited to basic energy improvements, the relative weight rises substantially, sometimes exceeding 10%.

This variation is an inherent feature of the model: the operating cost of a proximity office is relatively fixed, while the investment it mobilises fluctuates widely depending on district characteristics and renovation depth.

Even in the least favourable cases, the cost-to-investment ratio remains within a reasonable range for a service that works with populations who often lack the means or expertise to organise complex renovation processes on their own.

16. SUBSIDY DISTRIBUTION AND VULNERABILITY

The distribution of subsidies across households is relatively stable, with roughly three-quarters of households rely on standard renovation support, and around one-quarter also receive additional subsidies linked to energy renovation and vulnerability.

The proportion of vulnerable households varies widely across districts. In some of the districts with the highest vulnerability, offices nevertheless achieve strong renovation outcomes, provided they deploy sufficient social mediation and maintain stable communication channels with residents. In several high-performing cases, the office's social support work appears to be decisive in overcoming initial resistance and helping vulnerable owners navigate administrative requirements.

In contrast, some of the weakest-performing offices work in districts where vulnerability is actually moderate. Their challenges are instead technical (e.g., structural pathologies requiring costly solutions), legal (e.g., complex tenure), or related to governance (e.g., association disputes). These offices often face the paradox of high staff effort yielding limited renovation uptake because external conditions are unfavourable.

Cases with extreme values of vulnerability—either very low or very high—are typically explained by atypical circumstances, such as high proportions of municipally owned dwellings, buildings with uniform social profiles, or administrative classifications that do not fully align with actual socio-economic conditions.

17. INTERACTIONS BETWEEN ECONOMIC, SOCIAL AND OPERATIONAL FACTORS

Three dimensions largely determine office performance: urban morphology, governance context, and social composition.

In districts with compact urban form and buildings of similar typology, offices tend to operate efficiently regardless of moderate social vulnerability. Governance also plays a defining role: when municipal departments, technical services and subsidy schemes align, renovation pipelines move more quickly. Conversely, delays in permitting, insolvency among owners, or contradictory technical requirements can slow progress dramatically.

Social dynamics are equally influential. Offices that perform best often work in communities where residents interact regularly, have prior experience with collective decisions, or share similar expectations. Offices facing the toughest conditions frequently encounter communities with long-standing disputes or widespread distrust of institutions, making each phase of the renovation process more demanding.

The dataset also shows that offices with stable staffing achieve more consistent results. Where staff turnover has been high, or where offices have undergone reorganisations, renovation pipelines tend to stall, even in favourable technical contexts.

18. REFERENCE RANGES FOR PLANNING

Despite variability, the analysis allows the identification of realistic ranges:

- Cost per renovated dwelling: generally €2,000–€4,000, with a central reference around €3,000.
- Relative operating cost: typically 3–7% of investment in building renovations.
- Investment per dwelling: normally €30,000–€70,000, depending on renovation depth.
- District-level investment: highly variable, but with a central tendency near €8.5 million.
- Success rate: usually between 70% and 100%, averaging 84% across the network.

These references are not thresholds but planning tools. They help anticipate the likely behaviour of offices operating under different conditions.

19. REFLECTIONS ON OFFICE CONFIGURATIONS

No single configuration delivers universally optimal results. However, several characteristics recur among the offices operating closest to the reference values: balanced and multidisciplinary teams, predictable workflows, continuous on-site engagement, and clear coordination mechanisms with municipal bodies. Offices that struggle the most do so for reasons beyond their control: buildings in severe disrepair, highly fragmented ownership, low financial capacity among residents, or prolonged administrative procedures.

The overall evidence suggests that the model is methodologically standardised but operationally adaptable. An effective proximity office is one that adjusts staffing, procedures and intervention strategies to the specific social, technical and governance environment of its district.

“LEGAL ASPECTS AND PROTOCOLS FOR OSS”

20. EXECUTIVE SUMMARY

This document seeks to identify and analyse the regulatory and legal sphere of the BIRTUOSS project, regarding both the Proximity Offices and for the rolling out of urban regeneration and building renovation.

The main goal of neighbourhood office is to guide and drive the renovation process, and the technical regulations impacting on the implementation of that work need to be identified.

Therefore, the contextual legislative framework of the project background and the work performed in the previous HIROSS4all project and in the WP2 tasks were first analysed; the legislation impacting the BIRTUOSS project at regional, state and European level was then analysed in depth as regards the following questions:

- i) Housing and urban legislation.
- ii) Accessibility, habitability, building and structural adequacy, and energy certification of the buildings.
- iii) The Commonhold Property Act, the regulatory framework for co-ownership.
- iv) Terms and conditions to access grants for owners for the extensive renovation of buildings.
- v) Regulation of the building passport.

This analysis pinpointed which legislative adjustments should be made for the BIRTUOSS model to function better and have a greater impact.

21. INTRODUCTION

The OPENGELA programme – along with the HIROSS4all and BIRTUOSS projects as its implementation tool – emerged in response to the growing awareness regarding the urgent need to address the challenges associated with the renewal of the building stock from a district-level scale, ranging from the building itself and extending to the public space. It is noted for adopting a holistic approach that not only focuses on energy efficiency, but also considers environmental, economic and social aspects at local level.

Furthermore, it is also fully aligned with the Euskadi-Bultzatu Urban Agenda 2050 guidelines, which define the challenges to which the urban reality of the Basque Autonomous Community (BAC) will be exposed in the medium and long term.

The Euskadi Bultzatu Urban Agenda 2050 was approved in November 2019 and prepared using the United Nations New Urban Agenda. It is in line with Sustainable Development Goal 11 and its purpose is to make cities inclusive, safe, smart, resilient and sustainable, where nobody and nowhere is left behind.

The general goal of the Euskadi-Bultzatu Urban Agenda 2050 is to guarantee the conditions to exercising the right to the city in a context of technological, environmental, social and economic transition. The right to the city is taken to be the right to decent housing, to a healthy neighbourhood with basic services that is socially valued, to structuring links with the city overall and to mobility within it, to the access to training, employment and entrepreneurial opportunities, and to the social insertion, participation and the legal and political equality of all inhabitants. The exercising of this right to the city supposes the adaptation, redesign and rolling out of new urban policies that meet the challenges generated by the transition.

The 8 strategic priorities of the Euskadi Bultzatu Urban Agenda 2050 include promoting the right to housing and basic amenities, whose areas of action are the renovation of buildings and urban regeneration, in order to foster energy efficiency and the renovation of the urban stock of buildings, by adapting them to new energy challenges, guaranteeing the conditions for health, comfort and elimination of the risk of energy poverty.

Thus, the goals of the Opengela programme and those of the HIROSS4all and BIRTUOSS projects are in line with the roadmap defined by the Euskadi BULTZATU Urban Agenda 2050 for the medium and long term.

22. PREVIOUS LEGISLATIVE FRAMEWORK

22.1 LEGISLATIVE FRAMEWORK OF THE HIROSS4ALL PROJECT

In the sphere of the BAC, the HIROSS4all project – OPENGELA- model – was rolled out pursuant to the Basque Housing Act 3/2015, of 18 June, whose purpose is to regulate the right to enjoy decent and adequate housing within the Basque Autonomous Community. This was all to enforce and comply with the mandate envisaged in Article 47 of the Spanish Constitution, and to exercise the full and exclusive powers recognised in Article 10.31 of the Basque Statute of Autonomy.

The Act prescribes that the competent public administration, and particularly local authorities, by themselves or in association and in conjunction with the Basque Government and the provincial governments, drive the renovation, refurbishment and renewal of the built heritage, in order to enable the fulfilment of the right for citizens to have housing in appropriate conditions of habitability, functionality, energy efficiency, accessibility and safety.

In addition to the aforementioned Act, Decree 317/2022, of 30 December, regarding protected renovation actions of the built and urban heritage seeks to regulate their legal system, which include the actions of the OPENGELA programme.

22.2 REVIEW OF THE LEGISLATIVE FRAMEWORK OF THE HIROSS4ALL PROJECT IN THE WP2 TASKS

Since the end of the HIROSS4all project, important developments have taken place in the legal field that directly affect urban renovation in the Basque Country. Such developments reflect a renewed approach to energy sustainability, decarbonisation of the building sector and adopting measures to address energy poverty and protect vulnerable consumers. The main programme developments recently identified in political and legislative framework are set out below:

1. Basque Energy Sustainability Act (Act 4/2019, of 21 February²): A development has been observed in the enactment and rolling out of the Basque Energy Sustainability Act, which seeks to promote more sustainable energy practices and reduce carbon emissions in the construction sector.
2. Roadmap for the Decarbonisation of the Building Sector³: A participatory roadmap for the decarbonisation of the building sector has been prepared in order to accelerate the transition towards a greener economy and meet the greenhouse gas reduction targets for 2030 and 2050. This roadmap has been driven and drafted by Green Building Council España (GBCe) and is a landmark document in Spain. The document lays out a set of milestones and key actions to achieve zero emissions by 2050.
3. New Energy Performance of Buildings Directive (EPBD)⁴: On 12 March 2024, the European Parliament passed the EPBD with new goals and action priorities. The directive includes measures to address energy poverty, protect tenants and drive the retrofitting of the most inefficient buildings by means of one-stop-shops (OSS). The transposition period for each of the Member States is currently underway and will run for the coming 2 years.
4. National Integrated Energy and Climate Plan (PNIEC) 2021-2030⁵: The PNIEC was revised in 2023 and an ambitious target set for 1,377,000 houses to be retrofitted by 2030, which reflects a greater commitment to energy efficiency and cutting emissions.
5. Spanish National Retrofitting Plan: Work is underway on the Spanish National Retrofitting Plan in order to enact the EPBD and which will replace the Long-Term Retrofitting Strategy (ERESEE)⁶; the draft is expected to be ready by December 2025. The plan will identify the most inefficient buildings and the resources needed for their retrofitting.

Those legal developments are fundamental to drive sustainable urban renovation in the Basque Country, as they provide a clear regulatory framework and establish ambitious goals to improve energy efficiency, reduce carbon emissions and protect vulnerable citizens.

² <https://www.legegunea.euskadi.eus/eli/es-pv/l/2019/02/21/4/dof/spa/html/webleg00-contfich/es/>

³ <https://gbce.es/proyectos/building-life/>

⁴ https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en?prefLang=es

⁵ <https://www.miteco.gob.es/es/prensa/pniec.html>

⁶ <https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana>

23. ANALYSIS OF THE CURRENT REGULATORY FRAMEWORK

23.1 HOUSING AND URBAN PLANNING LEGISLATION

Urban Planning and Land Act 2/2006, of 30 June.⁷

The Basque Autonomous Community has sole jurisdiction regarding spatial planning of the territory and the coast, town planning and housing pursuant to the Basque Statute of Autonomy.

As regards urban planning, the Basque Autonomous Community is governed by the Urban Planning and Land Act 2/2006, of 30 June, whose Recitals establish that – as regards urban regeneration – the Act is going to incorporate a series of urban planning instruments to enable public administrations to act efficiently.

Article 50 of the Act establishes the urban planning powers, which include, *'singling out areas for regeneration and renovation and the rules to protect the built and urban heritage of the municipality'* and envisages, in its Article 55 – in the context of the rules for the structural planning – the identification of *'degraded areas for the purpose of their regeneration or renovation'*.

Furthermore, Article 71 defines the Special Urban Renovation Plan, a planning instrument whose purpose will be to roll out specific actions aimed at urban regeneration and renovation, while conserving the fundamental structure of the previous planning and without altering the urban development potential.

Basque Housing Act 3/2015, of 18 June⁸

As regards housing, the Basque Housing Act 3/2015, of 18 June, was enacted; it regulates the right to have adequate and decent housing, along with intervention in the existing city by means of improving the building stock, to ensure its functional and energy adequacy, in the same line that society demands of new builds.

The Act establishes driving and fostering the upkeep, refurbishment, retrofitting and renovation of the existing housing stock and focusing all interventions on improving its habitability, functionality and safety as guiding principles of housing policy in the Basque Country (Article 2), with special emphasis on accessibility, the efficient use of natural resources and environmental, financial and social sustainability, taking the principles of universal design into account.

Chapter VII of the Act is fully devoted to intervention in building (Articles 40 to 53); it lays down that public activity in this area must adopt – as regulatory principles – the optimisation and reduction of energy consumption, by means of using passive systems, encouraging the use of centralised systems of energy production and use of renewable energy, at building level or the urban complex (Article 40.d)), and fostering the sustainable use of the built heritage, with incentives for renovation over new builds.

Pursuant to the aforementioned regulatory principles, the Act prescribes that the competent public administration, and particularly local authorities – by themselves or in association and in conjunction with the Basque Government and the provincial governments – drive the renovation, refurbishment and renewal of the built heritage, in order to enable the fulfilment of the right for citizens to have housing in appropriate conditions of habitability, functionality, energy efficiency, accessibility and safety (Article 41.3).

Thus, the support and encouragement provided by the competent public administrations coexist with the obligation of the owners to refurbish and keep their houses in the appropriate conditions of safety, sanitation, energy efficiency, being aesthetically pleasing and in a good state of repair, carrying out the jobs and work necessary to conserve and improve the houses in order to ensure the conditions required for their habitability, accessibility or effective use in line with resource and energy consumption with the legally agreed limits (Article 41).

⁷ chrome-extension://efaidnbmninnibpcjpcglclefindmkaj/https://www.euskadi.eus/web01-bopv/es/bopv2/datos/textosconsolidados/200603776_vigentea.pdf

⁸ https://www.legegunea.euskadi.eus/eli/es-pv/l/2015/06/18/3/dof/spa/html/webleg00-contfich/es/

Furthermore, the Act (Article 48) envisages that interventions to refurbish, retrofit or improve the buildings and housing are eligible for the subsidies established for that purpose by the public administrations.

Decree 317/2002, of 30 December, regarding protected refurbishment actions of the built and urban heritage.⁹

The regulatory framework of the refurbishment actions of the built heritage and urban regeneration also includes Decree 317/2002, of 30 December, regarding protected refurbishment actions of the built and urban heritage (Basque Official Gazette (BOPV) 31/12/2002 and BOPV erratum 07/04/2003) that seeks to regulate their legal system in order to promote and boost the housing sector.

The Decree regulates the impulse of the refurbishment of occupied housing and buildings; fostering the refurbishment of empty houses to be leased; and the urban renewal overall, with the addition of a major boost to redevelopment and providing public spaces and amenities under the parameter of improving the habitat.

This legislative framework has been the basis for urban regeneration and building renovation that has been driven in the BAC. However, it has been noted that a new decree regulating and driving the actions to be implemented through proximity offices will be necessary, given the need to retrofit the building stock established in the 'Long-term Strategy for Retrofitting the Building Sector in Spain' (ERESEE 2020), along with the targets set in the Energy Performance of Building Directive (EPBD) currently being transposed, which establishes a considerable leap in the volume of urban regeneration and building renovation actions.

23.2 TECHNICAL LEGISLATION

The technical legislation affecting the work to be carried out by the proximity offices for urban regeneration and building renovation is extensive and includes regional, state and European legislation. The actions that must be implemented to undertake the extensive renovation of the buildings have been defined in order to be able to establish and analyse the legislation with greatest impact; those actions can be broken down into:

- Actions for the building and structural adequacy, so that they will necessarily include the interventions required and recommended in the Report of the Technical Inspection of the Building, and they will have to take into account the basic requirements determined by the Building Ordinance Act and their characterisation in the Technical Code.
- Actions for adequate habitability conditions as per Decree 80/2022, of 28 June and Article 3 of the Building Ordinance Act.
- Actions to guarantee accessibility to housing pursuant to Decree 68/2000 of 11 April, enacting the Technical Standards regarding Accessibility Conditions of urban settings, public spaces, buildings, and information and communication systems.
- The actions aimed at achieving a reduction in the global annual energy demand for heating and cooling, along with non-renewable primary energy consumption, whose measurement base will be the energy efficiency certificates of the buildings.

The technical legislation in question for each of these types of action are analysed below.

23.2.1 BUILDING ORDINANCE ACT 38/1999, OF 5 NOVEMBER, AND TECHNICAL CODE.

At state level, the Building Technical Code is the regulatory framework that establish the basic quality requirements that buildings must meet as regards the basic habitability and safety requirements establish in the Building Ordinance Act 38/1999, of 5 November.

⁹ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.euskadi.eus/bopv2/datos/textosconsolidados/200207429_vigentea.pdf

Those requirements – regarding structural safety, fire safety, safety in use, hygiene, health and protecting the environment, anti-noise protection, and energy saving and thermal insulation – are defined in the first part of the Technical Code, but the way of complying with those requirements is left open.

The second part of the Technical Code consists of the basic documents that contain the characterisation and quantification of the defined requirements, along with a list of procedures to accredit their compliance.

23.2.2 DECREE 117/2018, OF 24 JULY, REGARDING THE BUILDING TECHNICAL INSPECTION IN THE BASQUE AUTONOMOUS COMMUNITY.

The Building Technical Inspection (ITE) is an obligation for the owners of mainly residential buildings that are over 50 years old from the date of completing the new build works or the comprehensive renovation of the building.

Furthermore, and pursuant to the First Additional Provision, regarding the mandatory nature of the Building Technical Inspection in the case of benefiting from public funding, *'the buildings whose owners plan to benefit from funding from the Public Administration of the Basque Autonomous Community in order to undertake upkeep, universal accessibility or energy efficiency work, will need the building technical inspection to be performed prior to formalising the application for the funding in question, regardless of the age of the building.'*

In accordance with this Decree, the Building Technical Inspection consists of a visual inspection of the building to assess:

- Its state of repair, which will involve inspecting the structure, façade, roof and facilities, their state and the pathologies or problems detected that may affect the building. They are then classified in order of severity; the causes (pre-diagnosis) of the detected pathologies will be determined and the measures to be carried out will be established.
- Its accessibility conditions, determining whether the building complies with the basic conditions of universal accessibility and non-discrimination of people with disability for their access and use.
- Its conditions regarding energy efficiency, where the data of the building envelope and of its facilities will be gathered, and the energy efficiency of the building certified.

Should the ITE Report find that building repairs are needed, the Home Owners' Association are required to rectify the shortcomings reflected in the ITE report. The report can indicate up to five types of intervention to be carried out in the building: immediate interventions, to be carried out in under 24 hours; the very urgent ones, as they are short-term risks, to be carried out in under three months; the urgent ones, considered to be serious risks to be carried out in under 12 months; the medium-term ones, which can be delayed by over a year; and maintenance work.

23.2.3 DECREE 80/2022, OF 28 JUNE, REGULATING THE MINIMUM LIVING CONDITIONS AND DESIGN STANDARDS OF THE HOUSING AND FIXED-TERM SOCIAL ACCOMMODATION IN THE BASQUE AUTONOMOUS COMMUNITY.

Housing Act 3/2015, of 18 June, establishes that it is the jurisdiction of the Basque Autonomous Community to establish the minimum habitability conditions that will be mandatory for the planning instruments that other public administrations approve and the cited Decree is enacted in the framework of this obligation.

This Decree regulates the minimum habitability conditions for housing and social accommodation for the territory overall, as well as for mainly residential buildings that accommodate them, to guarantee they are decent, adequate and accessible.

Habitability is a condition of a space that allows the people that occupy it to embark on a life plan. Thus, habitability is linked to basic requirements of surface area and height, thermal comfort, amenities, sanitation, natural lighting, use and maintenance, without forgetting the flexibility or versatility to adapt the housing to the different stages of life, as well as to the new needs and forms of modern life.

Furthermore, Article 5 establishes the duty of the owners to keep their housing unit in the appropriate conditions of safety, sanitation, energy efficiency, and being aesthetically pleasing, carrying out the jobs and work necessary to conserve and improve the houses in order to ensure the conditions required for their habitability.

Therefore, the owners must carry out the jobs and work needed for upkeep or improvement of the property, either by means of the provisions envisaged in the Building Book regulated in Decree 250/2003, of 21 October, regarding the Book of the Building to be used for housing, or failing that, by means of the actions indicated in the Maintenance and Use Plan regulated in Decree 117/2018, of 24 July, regarding the Building Technical Inspection (ITE) in the Basque Autonomous Community.

23.2.4 ACT 20/1997, OF 4 DECEMBER, TO PROMOTE ACCESSIBILITY AND DECREE 68/2000 OF 11 APRIL, ENACTING THE TECHNICAL STANDARDS REGARDING ACCESSIBILITY CONDITIONS OF URBAN SETTINGS, PUBLIC SPACES, BUILDINGS, AND INFORMATION AND COMMUNICATION SYSTEMS.

As regards universal accessibility in the sphere of the Basque Autonomous Community, Act 20/1997, of 4 December, to Promote Accessibility is in force; its purpose is to guarantee the accessibility of the urban environment, public spaces, building, means of transport and communication systems for their autonomous use and enjoyment by everyone and, in particular, by those people with reduced mobility, communication difficulties or any other temporary or permanent sensory or mental limitation.

The legislation envisages the accessibility conditions that must be respected in the case of buildings to be used for housing.

23.2.5 ENERGY EFFICIENCY: BASIC ENERGY SAVING DOCUMENT, ENERGY EFFICIENCY CERTIFICATE AND THE ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE (EU) 2024/1275 (EPBD).

As regards the energy efficiency of buildings, the document in force is the Basis Energy Savings Document (DB-HE)¹⁰, whose purpose is to establish the rules and procedures to comply with the basic energy saving requirement approved by Royal Decree 450/2022, of 14 June, which amended the Technical Code for the transposition of different energy efficiency directives.

With respect to energy certification, its technical procedure is set out in Royal Decree 235/2013, of 5 April¹¹, approving the basic procedure to certify the energy efficiency of the buildings. While the reception, registration, updating, cancellation, extension, inspection and control of the building Energy Efficiency Certificates are set out in Decree 25/2019, of 26 February, regarding certification of the energy efficiency of the buildings in the Autonomous Community of the Basque Country¹².

On 12 March 2024, the European Parliament passed the Energy Performance of Buildings Directive (EPBD) with new goals and action priorities. The directive includes measures to address energy poverty, protect tenants and

¹⁰ chrome-extension://efaidnbmnnnibpcajpcgclefindmkaj/https://www.codigotecnico.org/pdf/Documentos/HE/DBHE.pdf

¹¹ https://www.boe.es/buscar/act.php?id=BOE-A-2013-3904

¹² Decree 25/2019, of 26 February, regarding certification of the energy efficiency of the buildings in the Autonomous Community of the Basque Country.

drive the retrofitting of the most inefficient buildings by means of one-stop-shops (OSS). The transposition period for each of the Member States is currently underway and will run for the coming 2 years.

23.3 LEGISLATION AS REGARDS CO-OWNERSHIP: COMMONHOLD PROPERTY ACT 49/1960, OF 21 JULY, AND HOME OWNERS' ASSOCIATIONS

The main scope of the project is urban regeneration at neighbourhood level; we therefore find that the building renovation actions are mainly being carried out in urban buildings with the majority of housing being commonhold property.

Accordingly, the Home Owners' Association is governed by the Commonhold Property Act 49/1960, of 21 July. The Act defines commonhold property, which is characterised by the coexistence of two different property rights:

- a. The sole and exclusive property right on a sufficiently defined space and subject to independent use, with any type of architectural features and facilities, whether or not apparent, that come within its boundaries and are used exclusively by the owner, along with adjacent ones that have been expressly indicated in the deed, even if they are located outside the defined space; and
- b. Co-ownership, shared with the other flats or commercial premises, of the remaining communal elements, belongings and services. In other words, commonhold property means the housing as such, the flat where one lives, with its facilities and built elements, and the commonhold right of the communal elements and spaces of the building.

Therefore, the owners, formed as an Association, share the duty to upkeep the buildings, due to their status as owners and/or users of the building, and the right to adopt the agreements that affect them.

Those shared rights and duties that require the Home Owners' Association to reach consensual agreements regarding their buildings hinder renovation actions going ahead to a great extent.

Pursuant to the legislation, the jobs and works needed for the proper upkeep and maintenance of the property, which meet the basic needs of safety, habitability and universal accessibility, are mandatory.

23.4 TERMS AND CONDITIONS TO ACCESS GRANTS FOR OWNERS FOR THE EXTENSIVE RENOVATION OF BUILDINGS. THE VULNERABILITY INVENTORY.

In 2011, the Basque Government undertook the 'Assessment of the need to intervene in the renovation of the building stock of the BAC', which involved identifying, assessing the seriousness and they classified the Vulnerable Urban Areas of the Basque Autonomous Community.

In 2019 and 2021, that work was updated and included the classification data of the residential stock.

This Urban Vulnerability Inventory¹³ has become the tool that allows the different level of vulnerability or need for urban regeneration and renovation of the census sections of the territory to be identified and assessed. Therefore, the Inventory identifies those census sections have a Very High, High and Medium High GVI (Global Vulnerability Index), using variables and indicators previously created and defined in different areas of study and analysis: demographic, sociological, socio-economic, building, urban and energy.

In the context of the OPENGELA programme, the Urban Vulnerability Inventory has been used to select those areas of priority urban regeneration, even though the local councils have defined the terms and conditions to be met by the beneficiaries in the specifications published for building renovation.

¹³ <https://www.euskadi.eus/gobierno-vasco/-/inventario-de-vulnerabilidad-urbana/>

This regulatory framework has been the basis for the urban regeneration and building renovation that has been driven in the BAC; however, the need has been detected for a new decree to regulate and drive the actions to be carried out through proximity offices, so that, based on the Urban Vulnerability Inventory and the areas detected as having Very High and High Vulnerability Indexes, the terms and conditions to access subsidies for urban regeneration and building renovation can be regulated.

23.5 REGULATION OF THE BUILDING PASSPORT

As regards building retrofitting, Directive (EU) 2024/1275 EPBD – currently being transposed – proposes two new tools, at building scale, with the specific goal of increasing the rate and the depth of the renovations to a level that allows climate neutrality to be reached by 2050:

- **The Building Renovation Passport**, established as voluntary for owners, which is aimed at encouraging the retrofitting by phases of the buildings, on the path of transforming them into zero-emission buildings, passing previously through the phase of nearly zero-energy consumption buildings, as a process overtime that facilitates the progressive compliance of the minimum energy efficiency standards. Renovation by phases is a key tool that allows the retrofitting of the building to be a process that adapts both to the possibilities of the owners and to the transitional and final goals to be reached by the building stock as a whole.
- **The Digital Record of the Building**, the digital repository of all the data belonging to the building, including those related to energy, which must be interconnected with the Energy Efficiency Database, and which will allow the building data to be accessed by the agents of the sector (safeguarding data protection).

Furthermore, the EPBD envisages preparing another two tools that will complement and structure the previous ones nationally, the National Building Renovation Plan, which will provide an overview and long-term roadmap to guarantee a national decarbonised and highly efficient building stock, along with the National Building Database, which is a public data repository for the national building stock open to all agents and connected to EU Observatory.

“SOCIAL ASPECTS FOR THE OSS”

24. EXECUTIVE SUMMARY

The purpose of this document is to outline and systematise the various social indicators that are to be adopted, quantified and developed in the Opengelas or neighbourhood offices for housing/building renovation and urban regeneration processes in communities with vulnerable populations.

Based on the findings of the field study conducted as part of the previous HIROSS4all project: Home Integrated Renovation One-Stop-Shop for Vulnerable Districts, involving the piloting of one-stop-shop offices, we drew up a list of social indicators to be implemented and developed by the teams in those offices.

Given that the purpose of these local/neighbourhood offices is to support and promote the dual renovation and regeneration process, it inherently entails a social dimension, i.e. it concerns the beneficiary community, which is integral to the whole of the process. However, this social component needs to be defined, measured and developed.

Consequently, we have identified two categories of social indicators or criteria to be measured and assessed, which are outlined below in two table formats:

- 1) general and quantitative indicators based on the points where the Opengela’s services overlap with the phases of the housing renovation process;
- 2) the indicators for the different vulnerable groups identified in the Torreurizar Group in relation to the services provided by the office.

The purpose of the two indicator tables presented here is to serve as a social checklist to measure and assess the fulfilment of social aspects throughout the life of the project, thereby helping to ensure its success, and to serve as a framework or model that can be replicated in future operations at local or community levels.

25. BACKGROUND

During any urban regeneration process and, more specifically, during housing renovation works, the social element is unavoidable. It is worth remembering that the ultimate aim of any housing or urban planning operation, over and above the energy efficiency of dwellings, is the comfort and quality of life of the people who live in them, and all technical innovations are designed to achieve this. Thus, this document focuses on the social dimension, which not only concerns the residents who will experience or feel the effects of the renovation itself, but also all the stakeholders involved in the project. Additionally, the social dimension is even more critical in situations where vulnerable cases are identified.

It is no coincidence that many of the urban regeneration processes in which the neighbourhood offices are located are in areas where the housing stock - much of which is social housing - has become obsolete because it does not meet the energy efficiency requirements, it has accessibility issues or it is beset by numerous problems. Moreover, they generally have ageing populations, making it all the more necessary to adapt these dwellings to meet their needs. And finally, as we will see below, there is also a sector of the population with economic, educational or communication needs that require institutional support and assistance.

In this regard, over the last five years we have accumulated experience in setting up coordinating committees between the various social inclusion systems, such as employment, education, health, housing, basic social services and the third social sector. Initially, these committees were held in four places in the Basque Autonomous Community where urban regeneration processes were being implemented, namely: Otxarkoaga (Bilbao), Durango, Eibar and Lasarte. The initial idea was to create a kind of powerhouse for regeneration processes, so that when building work was undertaken, given the high costs per dwelling (between 40,000 and 50,000 euros), families - especially those in the most vulnerable situations - would have a pre-existing inter-system network of organisations to protect their interests, so that at a given moment of need, services, assistance or support could be arranged.

At present, these “Inclusion Committees”, which fall under the responsibility of the Basque Government's Department of Employment and Inclusion, are addressing the need to put in place social and employment inclusion programmes in those municipalities where they are held. And while they have not directly addressed the economic pressures generated by regeneration processes, they have facilitated these processes in two ways:

- 1) By enabling social and employment programmes linked to urban regeneration, such as vocational training on advising communities on energy and digital issues.
- 2) They served as a model for the Opengela when drawing up social indicator tables and identifying the different roles required by the office to provide a comprehensive service, which could also function as an “inclusion committee”.

Accordingly, based on the field study conducted on the earlier HIROSS4all project, we concluded that the Opengela serves as an “advocate”, in the sense that it represents the concerns and interests of the local community and also acts as a technical authority in dealings with the professional bodies involved in completing the works. After a round of in-depth interviews with stakeholders in different sectors and different locations, we found that neighbourhood offices were not only fully aware of the current technical and legal context, they also provided a middle ground between the needs of users and the product being offered by professional bodies. And, to some extent, this

relationship, which is usually top-down and unequal, becomes balanced and is placed on a level playing field by the Opengela.

At the same time, this one-stop-shop service also has a positive impact on professional bodies, which are obliged by scripts to adopt an “opposing” stance, since it performs a “filtering” function that lightens the workload of companies. Ultimately, these projects entail all manner of problems that affect the personal, everyday aspects of people's lives, and the Opengela eliminates the need for them to have this “hotline”. The office also helps professional bodies to incorporate the “human factor” into their services, as it makes them aware of the fact that they often prioritise corporate interests over the needs of customers.

Another of the great strengths identified in the Opengela, as we observed when previously systematising the knowledge gained from HIROSS4all, is the fact that its team combines technical, legal, administrative and social roles, something that is further detailed in the following deliverable: 3.5 Training and definition of the roles for OSS. It is true that the social role is played by social workers, who serve as “neural connectors” between the requirements of renovation programmes and the circumstances of the people affected by them. In any event, especially in socially vulnerable areas, all office staff must be able to listen, empathise and build trust, since - it must be stressed - the aim is not simply to renovate for the sake of it, it is about addressing housing needs that vary with each individual, depending on their situation, through renovations that are carried out in the most appropriate manner.

In the final analysis, we are dealing with homeowners and tenants, a combination of different groups and, even if all possible mechanisms are put in place, there will always be at least one dwelling with a problem that may hinder or impede the complex renovation process. This risk is even greater in populations where socio-economic deprivation and disadvantaged individuals are confined to specific “zones”, as these areas have had a decades-long history of social exclusion. It is therefore necessary to understand what is happening in these areas, not only to resolve housing issues but also, as stipulated in the United Nations' second principle and universal value, to help “leave no one behind”, in this case, on the other side of the energy, digital and social divides.

In view of the above, our first idea was to use the points identified in the field study as indicators in order to create a social checklist. By this we mean quantifiable elements such as the number of project presentation and/or dissemination activities or the number of people attending meetings or receiving information; but also qualitative factors such as the physical accessibility of the office, digital accessibility, information adapted to each phase of the process, advice and support services or the impacts of the works (time/duration, noise, occupation of the public highway, etc.). Moreover, our aim was to assess these elements, as we did in the previous work package, with three sample groups: the Opengela's team, the homeowners and/or members of the works committees, and the professional bodies involved.

However, after holding a meeting with the Local Autonomous Body for Municipal Housing in Bilbao (VVMM), we became aware that during the months when we would be carrying out this project, there would be no work performed on the buildings, so we made the residents - both homeowners and tenants - the focus of the indicators. However, we decided to identify and deploy each successive phase of the renovation process, as these were aligned with the different social integration services that are provided, which can be measured by the Opengela.

Therefore, we created two types of tables, one general and the other specific and, although Torreurizar is used as an example, they can be used in any other context, which we will discuss and explain in more detail below. The two types of tables are complementary, although they allow the social indicators to be classified and measured from different perspectives. The first table contains general and quantitative indicators based on the points where the One-Stop-Shop services overlap with the different phases of the housing renovation process. Meanwhile, the second table shows indicators relating to different vulnerable groups - in this case identified in the Torreurizar Group - in respect of the services provided by the office.

26. TABLE TYPE: 1 QUANTITATIVE SOCIAL INDICATORS

The first social checklist table shown here includes a set of general and quantitative social indicators to be completed by the Opengela over the course of the project. These indicators were defined according to six characteristics of the service provided by the neighbourhood office, which were observed during the previous field study, namely:

- 1) communication or provision of information;
- 2) accessibility of the office for users;
- 3) support or assistance tailored to the individual needs of homeowners and tenants;
- 4) participation or attendance of residents at meetings that are called;
- 5) individual appointments requested with the office's team (technical architects and social workers);
- 6) community participation, i.e. the involvement of third social sector organisations operating in the neighbourhood or close to the Torreurizar Group.

	PHASES	PRELIMINARY (Setting up the Opengela)	PRE-PROJECT (Decision making)	BASIC DESIGN (of the Project)	PREPARATION & IMPLEMENTATION (of the renovation process)	WORKS (Monitoring the renovation process)	POST-WORKS (Perceived improvement)
COMMUNICATION (Provision of Information)	Leafletting						
	General meetings for all residents [no.]						
	Neighbourhood meetings per portal [no.]						
	Meetings with representatives of portals [no.]						
	Owners' meetings [no.]						
ACCESSIBILITY (For Users)	Digital resources [specify]						
SUPPORT/ ASSISTANCE (Tailored to the individual needs):	Energy Efficiency Advisory [no. of actions]						
	Digital Interaction Advisory [no. of actions]						
	Support for vulnerable situations [no. of interventions and case study statement]						
PARTICIPATION (Attendance at meetings)	Group residents (owners and tenants) [no.]						
	Homeowner's Meetings [no.]						
	Portal representatives [no.]						
Individual APPOINTMENTS	Appointments requested [no.]						
COMMUNITY PARTICIPATION	Agents involved in social protection systems [no.; system or entity]						

FIGURE 1. TABLE OF QUANTITATIVE SOCIAL INDICATORS

There is a crossover between these six characteristics, which are broken down below, and the timeline of the housing renovation process, which consists of six phases:

- 1) the preliminary phase of setting up the neighbourhood office, liaising with residents and providing information;
- 2) the pre-project phase involving the signing of community agreements;
- 3) the basic design of the project;
- 4) preparation and implementation of the renovation process, involving Works Committee meetings, and administrative procedures;
- 5) monitoring the progress of the works, which includes paying for certificates, administering grants, etc.;
- 6) the post-works service.

More specifically, the six characteristics of the Opengela's service are broken down into different quantifiable elements.

Firstly, we identified the following elements relating to communication:

- 1) The number of door drops, which in the specific case of Torreurizar, covers a total of 265 dwellings and/or housing units and, within these, 101 homeowners.
- 2) The number of general meetings held for all Torreurizar Group residents.
- 3) The number of meetings held for users of each building entrance which relate to those respective residents.
- 4) The number of meetings between residents who use different entrances with representatives of each group.
- 5) The number of Homeowners' Meetings held.

Secondly, with regard to accessibility, assuming that the physical location of the office is suitable, we quantified the number of digital resources made available to residents and the use of these resources.

Thirdly, we evaluated support, i.e. the assistance provided to each dwelling or housing unit, according to their specific circumstances. On this latter point, we measured:

- 1) The number of actions related to energy efficiency advice.
- 2) The number of actions in which advice is provided on digital interactions or electronic processing performed for the office in particular and for the government in general.
- 3) The number of actions related to supporting vulnerable people (identified and listed in the following table, by category).

Fourthly, we evaluated participation, in the sense of attendance at meetings held by the office, with three specific types identified:

- 1) The number of residents, both homeowners and tenants, who attend general meetings.
- 2) The number of homeowners who attend Homeowners' Meetings.
- 3) The number of representatives of users of each entrance attending meetings for each specific entrance and between users of different building entrances.

Fifthly, we quantified the number of appointments requested by any of the Group's residents.

Finally, we have included a section where we identify and quantify any actions taken by actors in social protection systems - employment, education, health, basic social services, third social sector organisations - who may be involved in the process.

27. TABLE TYPE 2: VULNERABILITY INDICATORS

The second type of social checklist table classifies different vulnerability indicators. These are general indicators and they cover different disadvantaged groups or groups that are socially excluded/at risk of social exclusion.

The process of creating this second type of table differed greatly from that of the first table. While the first type was based on “internal data”, i.e. the list of indicators was based around the characteristics of the Opengela, for the second table we used “external data”. Therefore, we created the checklist according to the characteristics of the area in which the office was located and the work it does locally.

Moreover, we could say that the working methodology used for to prepare the second type of table is similar to the way in which coordinating committees are set up between different social inclusion systems. It consists of five steps:

- 1) liaising with and interviewing local representatives of the different social protection systems;
- 2) meeting and presentation of the respective service portfolios;
- 3) analysis of pre-existing processes and new opportunities for coordination between systems;
- 4) identifying common cases;
- 5) piloting methods and tools to optimise coordination.

Specifically, we contacted the key players in the Torreurizar sector, located between the districts of Irala and the San Adrián and Miribilla area. We are referring to the Lanbide (Basque employment service) office in Mazarredo, to which the Torreurizar Group is assigned, and the Irala Social Services Unit. Through these entities we also tried to identify other key actors in education, health and the third social sector, although the results of this initial analysis revealed a map with blurred lines, where local actors focus on the neighbourhoods adjacent to that of the Group, outside their boundaries.

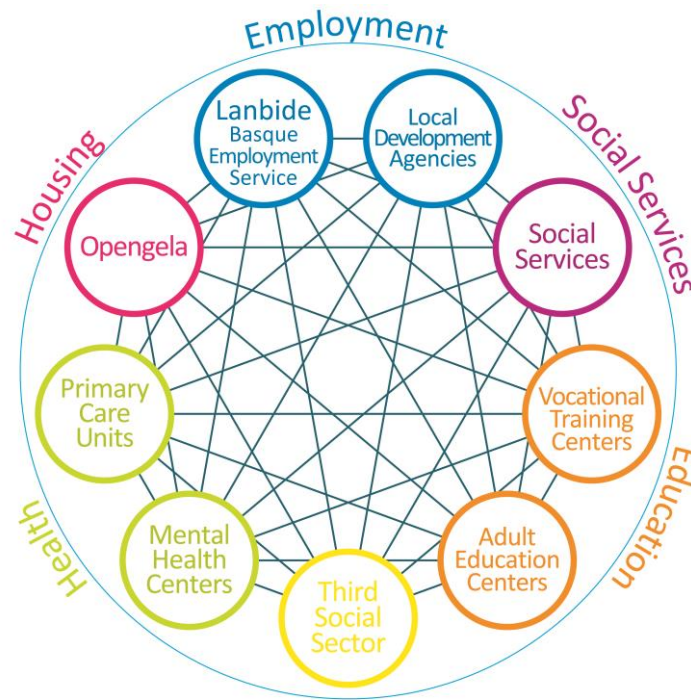


FIGURE 2. GENERIC EXAMPLE OF THE CREATION OF A SOCIAL INCLUSION INTER-SYSTEM NETWORK

In any event, what should really interest us, with a view to defining the functions and tasks of the team in the offices, and more specifically those of the social facilitators, is the process of identifying the key players involved in social and/or employment inclusion processes, based on the example of the committees, since they enable us to obtain:

- 1) Specific data, as outlined in the second table, which forms the basis of the social analysis of the socio-economic conditions, the different aspects of vulnerability, social and personal circumstances and relational contexts.
- 2) Support in finding social assistance to mitigate the economic impact on homeowners.

Returning to the table, given that the indicators relate to specific residents, we have included the figures for each specific category of resident in the Torreurizar Group; the total figures for each category and the figures broken down by gender. In any event, although the indicators do not change, the figures will have to be adjusted according to the location of the neighbourhood office.

It should also be noted that the above figures were obtained based on two sources:

- 1) The current records on recipients of income support (named with the acronym “RGI”).
- 2) Active cases monitored by the basic units of Social Services (SS).

The intersection of both sources implies access to personal data and, therefore, only figures are indicated according to realities of vulnerability by dividing them into two parallel rows. In any event, the sum of vulnerable cases that have been identified represent, in themselves, a significant number of residents and show that the

Opengela in Torreurizar is located in a vulnerable area, thereby further illustrating the importance of the social role played by the office.

		Service Features→ Number of People [*]↓			COMMUNICATION (Provision of Information)	ACCESSIBILITY	SUPPORT (Assistance tailored to the individual needs)	PARTICIPATION (Attendance at meetings)	Individual APPOINTMENTS
Typologies of vulnerability		TOTALS	Gender (*)						
TOTAL			Female	Male					
	RGI	82	60	22					
	SS	237	156	81					
YOUNG PEOPLE [18-35 years]	RGI	11	7	4					
	SS	37	17	20					
FOREIGN-BORN PEOPLE	RGI	25	12	13					
	SS	62	37	25					
SINGLE-PARENT FAMILIES	RGI	19	19	0					
	SS	31	31						
DISABLED PERSONS	RGI	5	2	3					
	SS	X							
LOW WORK INTENSITY/ NO WORK [≤65 years]	RGI	33	25	8					
	SS	X							
PENSIONERS [≥65 years]	RGI	20	17	3					
	SS	53	41	12					
ELDERLY PEOPLE [≥80 years]	RGI	5	5						
	SS	24	20	4					
REGISTERED VICTIMS OF GENDER-BASED VIOLENCE	RGI	3	3	0					
	SS	X							
REFUGEES	RGI	1	0	1					
	SS	X							
CHILDREN	RGI	31	X	X					
	SS	41	24	17					

[*] The totals and breakdowns shown correspond to the Torreurizar Group's actual situation. Although the indicators do not vary, the numbers must be adjusted to each reality.

FIGURE 3. TABLE OF VULNERABILITY INDICATORS INCLUDING FIGURES FOR TORREURIZAR

The vulnerable groups identified, which, we should recall, are generic and applicable to any setting, include:

- 1) The young population, i.e. people aged ≤35 years.
- 2) The foreign-born population.
- 3) Single-parent families.
- 4) Disabled persons.
- 5) Households with low work intensity or no work (in ≤65 age group).
- 6) Pensioners and/or people aged ≥65 years, who are broken down in the following point.
- 7) Elderly people, aged ≥80 years (among these, Social Services have identified 8 people aged between 90 and 95).
- 8) Registered Victims of Gender-Based Violence, who are mainly women (as shown in the table).
- 9) Refugees.
- 10) Children in the care of families who receive income support (RGI). This figure has not been reported but it has been calculated based on the above data.

Furthermore, as remarked above, the total figures and figures broken down by gender are included for each of the cases, according to the criteria of the Basque employment service (Lanbide), which is currently limited to males and females and does not include non-binary identities.

Having identified and quantified the vulnerable groups, providing us with a broad picture of the underlying situation, we have a point of contrast to measure the impact of the Opengela on these vulnerable groups. The neighbourhood office's services serve as this point of contrast, as outlined in the first general and quantitative table.

However, in order to perform a quantitative and/or evolutionary measurement of the positive impact of each service on the circumstances of each vulnerable group, it would be necessary for the office to have access to specific data on the people behind the figures. We therefore conclude that it is necessary to share these tables

with the Lanbide (Basque employment service) to make them aware of the situation and to promote a closer relationship between the Opengela social workers and the employment office assigned to Torreurizar.

Therefore, to conclude this working paper, as stated above, we believe it is necessary to coordinate the neighbourhood office with the key local players in social and/or employment inclusion processes, especially the Social Services Unit and the relevant Municipal Social Action Department, the corresponding Lanbide office and, to the extent possible, the local third social sector organisations.

“TRAINING AND DEFINITION OF THE ROLES FOR THE OSS”

28. EXECUTIVE SUMMARY

The purpose of this document is to define the profiles and specific functions of the staff required for the proper functioning of the One Stop Shop (OSS) and to design a training and coaching program proposal that will enable the professional team to manage and develop the tasks within the OSS.

The main objective of the OSS's is to accompany and stimulate the rehabilitation process and it is precisely these activities that will determine the definition of the professional profiles that will form part of the structure and organisation of the Offices' team. Both the specialized literature and previous experience show the need to identify these profiles and roles of the office team and to provide the system with specific training processes.

To this end, first of all, an analysis of the background of the project has been carried out. First, the work developed in the previous HIROSS4all project as well as in the tasks of the previous WP2 of this project have been studied. Second, a field analysis of the Opengela Programme's proximity offices has been made; the technical specifications of the offices' tenders have been reviewed and several interviews have been held with the active Opengelas in order to contrast the theoretical work with reality.

After this analysis, a first hypothesis has been done on the definition of the profiles and roles of the staff of the BIRTUOSS model office as well as the tasks to be performed by each of the identified profiles.

Taking the identified roles as a starting point, we have worked on the definition and development of the training proposal for the OSS professional team.

To this end, the first step was to analyse the existing training offer that could be of interest for the design of the structure and organisation of the future training proposal. Firstly, we analysed the courses specifically linked to the Opengela model and, secondly, professionalisation and postgraduate courses whose structure could be extrapolated to the proposal. Once the training structures had been studied, the focus was placed on the contents and teaching methodologies of the existing training offer in order to contrast the existing approaches to complement the design of the training proposal.

With all this, a training proposal has been developed based on a complementary modular structure and two levels of competences that can respond to the professional needs of the different profiles identified for the proposed new BIRTUOSS office model.

The conclusions obtained and the proposals designed will be revised and completed on the basis of the criteria to be established later in this project in WP3 T.3.6 and WP5.

29. DEFINITION OF SKILLS ACCORDING TO PROFESSIONAL PROFILES AND ROLES

The main goal of the OSS's is to accompany and stimulate the rehabilitation process and it is precisely these activities that will determine the definition of the professional profiles that will form part of the structure and organisation of the Offices' team.

Urban regeneration processes are approached from a perspective that goes beyond the mere execution of works, as they must take into account the social and economic aspects of each area of action and bring together criteria and processes that, standardised as far as possible, are operational and simplify management.

Office staff must be multidisciplinary as office management is also multidisciplinary. Therefore, it requires technically trained and experienced professionals, staff with a social profile with mediation and conflict resolution skills, as well as personnel with an administrative and economic profile and staff with specific training in the legal field, among others.

Both, the specialised literature and previous experience point the need to identify these profiles and roles of the office team and to provide specific training processes for the system.

To this end, in this section, firstly, the background analysis of the project is presented, based on the work developed in the previous HIROSS4all project as well as in the tasks of the previous WP2 of this project, and secondly, is described the field analysis made on the proximity offices of the Opengela Programme. In the last point, the identified profiles and roles of the BIRTUOSS model office staff are presented in conclusion.

29.1 BACKGROUND

2.1.1 HIROSS4ALL PROJECT DOCUMENTATION REVIEW

The foundations for the operation of these proximity offices were defined in the framework of the European Horizon 2020 project *HIROSS4Aall: Home Integrated Renovation One-Stop-Shop for Vulnerable Districts*, which preceded the project in question.

Thus, the different project documents have been analysed to identify the different role groups and the tasks associated with the OSS team.

In the first place, it is necessary to note that the proximity offices, depending on the size and characteristics of each area of intervention, will give rise to different 'types' of office, which in turn must have the appropriate staff to respond to the specific needs of each case. The following figure shows the classification of the different types of offices defined in the HIROSS4ALL project and the composition of the related team.

TYPE OF CLASSIFICATION	Depending on the intensity, variety and complexity of the works		According to its relation to the integrated network and the management responsibility it assumes		According to the type of personnel available	
	BASIC OFFICE	COMPLEX OFFICE	HEADQUARTERS OFFICE	SECONDARY OFFICE	HEAD OFFICE	SUB-OFFICE
SCALE TYPE OF AREA	Rehabilitation Area	Rehabilitation + Urban Regeneration Area	Large cities/ County areas	Local level/areas or city neighbourhoods	Local level/areas or city neighbourhoods	Smaller scale areas or neighbourhoods /rural area
TEAM COMPOSITION	Basic Team	Complex Team	Basic or Complex Team	Basic Team	Basic or Complex Team	Partial HO Team (only facilitator and 1 technical person)

Figure 1. Types of proximity office defined in the HIROSS4all project. Source: Own elaboration.

As can be seen in the figure above, the BASIC OFFICE-TEAM is the basic model defined in the project as a standard OSS, from which all other variants of offices are based, which will have more complex team or will have reduced team depending on the characteristics of the area in which they operate, i.e. this initial team may be adapted to the circumstances of the development of each area, for example in those areas with a larger scale or advanced degree of development of the actions.

Thus, in the project, the BASIC OFFICE MODEL is developed, which is detailed in document *D3.1-D3.6 SUPPORTING DOCUMENT - PROPOSED BASIC OFFICE MODEL* analysed.

The roles and functions of the BASIC TEAM of the BASIC OFFICES have been extracted from the document.

It is proposed to provide a standard OSS with personnel with the following skills, background and capabilities:

- **Senior Architect with a Master's degree or specialisation in Refurbishment**, with extensive professional experience in Projects, Works and Management of Refurbishment.
- **Technical Architect or Building Engineer**, a specialist with a long professional career and extensive experience in the Execution Management of Refurbishment Works.
- **Social Dynamiser**, personnel with a degree in Social Work or Social Education, or equivalent, with adequate with appropriate expertise and practical experience in issues related to family therapy, youth, community mediation, developmental education and social dynamisation.
- **Administrative accountant**, person with administrative training, appropriate experience, qualification and training in basic computer and accounting skills.

The following figure in table format shows the tasks and functions assigned to each profile:

FUNCTIONS AND TASKS OF THE PROFESSIONAL PROFILES OF A BASIC OFFICE

ARCHITECT	Head of Office
	Coordinate the OSS with the <i>Local or Area Management Body (LMB/AMB)</i> to which it belongs or the City Council .
	Carry out previous inspections and review the Technical Building Reports (ITE).
	Check that the specifications indicated in the ITE are included in the renovation project submitted.
	Inform the <i>Local or Area Management Body</i> to which their area belongs of the relocation needs.
	To direct technically the Informative Owners' Meetings and to advise the Communities in the Decision-Making Meetings with voice, but without vote.
	Once the rehabilitation work has begun, and in collaboration with the technical architect, monitor the work process.
	Coordinate the preparation of Final Rehabilitation Reports (IFR) for rehabilitated buildings.
TECHNICAL ARCHITECT	In the absence of the architect, to carry out the duties of Head of the Office and coordination with the <i>Local or Area Management Body</i> to which his or her area belongs.
	In collaboration with the social dynamiser, inform and promote rehabilitation at home.
	Collaborate in the previous inspections of buildings and in the revision of the ITEs.
	Inform affected residents about the contents of the ITEs.
	In the absence of the architect, to direct technically the Informative Owners' Meetings and to advise the communities in the Decision-Making Meetings with voice, but without vote.
	Alternate with the architect in attending to the public at the head office and the corresponding sub-offices, as well as attending the aforementioned meetings.
	Providing support for the processing of the corresponding municipal building permit, as well as the granting of aid and financing.
	Together with the architect, monitor the construction process.
ADMINISTRATIVE ACCOUNTANT	Collaborate with the team in the preparation of the Final Report for each of the rehabilitated buildings.
	Provide the necessary administrative support to the management of the processes.
	Support the social dynamiser and the technical architect in establishing contacts and making appointments with the different residents.
	Schedule the visits of individuals to the sites, the visits of technicians and facilitators to the buildings and the dates and times of the Owners' Meetings.
	Support in the constitution of new Communities of Owners, if necessary.
	Support in the preparation of the documentation to be submitted by the beneficiaries.
	Organise the various files, requesting the necessary documentation from the beneficiaries until they are complete.
	Receiving and archiving this documentation.
SOCIAL DYNAMISER	Check the compliance of individuals and communities with the requirements for eligibility and financing.
	Support in the processing of financial aid and financing applications with the different organisations.
	Collaborate with the team in the preparation of the Final Report of each of the rehabilitation interventions.
	To carry out their work at the head office or sub-offices, so that all of them are continuously manned within the established timetable.
	Support the constitution of Communities of Owners, if appropriate.
	Active information tasks at door-to-door level, informing and promoting rehabilitation.
	Drawing up Social and Economic Reports (ISE) for each of the buildings to be rehabilitated.
	Detect situations of social precariousness, their amount and characteristics.
	Support the communities in the preparation and presentation of the documentation required in the different files.
	With the support of the administrative staff, processing applications for aid and funding with the various bodies.
	Report on the assessment of relocation needs, seeking and negotiating alternatives.
	Monitoring relocation processes.
	Accompany the architect or technical architect in the Informative and Decision Meetings of Owners, detecting the most conflictive people or those who oppose the process, as well as the points where disagreements occur and their causes.
	Carry out advocacy work, mobilising communities and explaining to families who are undecided or opposed to rehabilitation the advantages of rehabilitation, its costs, financing, etc.
	Carry out mediation actions in the resolution of conflicts in the communities and in the reaching of agreements.
	Once the rehabilitation work has started, monitor the contributions of the residents and the granting and payment of grants and funding.
	Collaborate with the team in the preparation of the Final Report of each of the rehabilitation actions.

Figure 2. Roles and tasks of the Core Office team defined in the HIROSS4all project. Source: Own elaboration

Another of the issues to be taken into account when identifying the OSS team, is the scalability of the offices for their territorial implementation. Thus, within the organisation chart of the future Management Entity, which will be responsible for coordinating and managing the Opengela OSS network in an integrated manner, is foreseen the existence of an **EXPERT TECHNICAL TEAM (ETT)** made up of professionals with extensive experience in the development of this type of actions, which will provide technical coverage for the Opengela OSS network. In this sense, in the HIROS4Aall project, a first approach was made to the structure of the Management Entity. In this way, the document *D2.4 White Book on replicable OSS model* has been analysed, identifying the profiles that could be suitable for the composition of the ETT.

As mentioned above, in addition to assisting the Management Entity, the Expert Technical Team will have among its purposes to transmit to the members of the OSSs the guidelines established for their work, or derived from the strategies designed at the Regional Level, to standardise and homogenise the documents, formats and procedures of the Opengela OSS network, as well as to monitor and evaluate the results obtained in the different milestones of the process in order to draw the necessary conclusions to make feasible and improve the gradual implementation of OSS in the Basque Region.

This team will be made up of multidisciplinary specialists in the different lines of work addressed by an OSS and its composition may vary over time, adapting to the growing complexity of the Opengela OSS network, although initially it is proposed that it should have, as a minimum, the following professionals and capacities:

- **Specialist architect**, with a long professional career and extensive experience in Projects, Works and Management in Rehabilitation Areas.
- **Social dynamiser**, with a long-standing degree, and experience in issues related to family therapy, minors, community mediation and education for development.
- **Graduate in Business Administration and Management**, with extensive knowledge of accounting, taxation, IT and with training in legislative aspects, administrative procedure and teaching.
- **Law graduate**, with extensive experience in drafting contracts, agreements and any document of an administrative nature.

The functions and tasks assigned to the **EXPERT TECHNICAL TEAM** are summarised below; Figure 3 shows the general activities of the ETT in relation to the different aspects covered by its functions and Figure 4 shows the specific tasks of the above-mentioned professional profiles of the ETT.

GENERAL FUNCTIONS AND TASKS OF THE **EXPERT TECHNICAL TEAM (ETT)**

IN RELATION TO **PROCEDURES**

Development of internal rules of procedure.

Design, unification and formalisation of as many Formats and Models of forms, applications, technical and social reports, etc. as necessary.

Coordination of the above Formats with the analogous and/or equivalent ones, relating to grants from the different organism.

Preparation of Information Sheets aimed at a better understanding of the process by the agents involved.

Drafting of the contents of the grant and financing processing.

Assistance for the coordination and development of a specific IT Application, etc.

CONCERNING THE **CONSTITUTION OF OSSs**

Drawing up the technical and administrative specifications for the contracting of personnel or technical assistance for the offices.

Establishment of the profiles and functions of staff and the criteria and scales for their recruitment.

Drawing up model contracts for OSSs professionals, community technical teams, construction companies, etc.

IN RELATION TO **DISSEMINATION**

Coordination, unification and supervision of the design and contents of the Dissemination Documents to be elaborated in the OSSs.

Computer presentations, small explanatory brochures, small exhibitions consisting of general and specific panels, website content, Facebook, Twitter, Instagram, etc.

IN RELATION TO **MONITORING AND EVALUATION**

Those responsible for the ETT will hold regular Monitoring and Coordination meetings with those of the OSSs. The latter will provide the ETT with reports on the degree of compliance with the Action Plans, the diagnosis of the problems that may arise and their possible solutions. These meetings will coordinate and unify the intervention criteria, the scope of the actions, the working methods, the dissemination and information procedures, and any other aspects required for the adequate and homogeneous implementation of the established forecasts.

The ETT will submit to the Management Entity a *Synthesis Report* of the previous contents, the conclusions obtained, the proposals for recommended guidelines and quarterly and cumulative statistics at the origin of the actions carried out, initiated and planned. The ETT will also prepare an *Annual Report* reflecting the Monitoring Statistics of the period, as well as the possible proposals for readjustment of the functional structure of the LMBs, AMBs and OSSs and their potential budgetary variations, depending on the development of the Programme and the experiences obtained.

Figure 3. General roles and tasks of the **EXPERT TECHNICAL TEAM (ETT)** defined in the **HIROSS4all** project. Source: Own elaboration

SPECIFIC FUNCTIONS AND TASKS OF THE **EXPERT TECHNICAL TEAM'S PROFESSIONAL PROFILES**

ARCHITECT	Determine the technical criteria for rehabilitation
	Coordinator and responsible for the training of the staff of the OSSs and their sub-offices and for the relations with the Management Entity (ME).
	Coordinate the managers of the different offices and sub-offices.
	<i>Could count on the support of other architects, technical architects or engineers with significant experience in rehabilitation.</i>
BUSINESS ADMINISTRATION AND MANAGEMENT	Coordination of the administrative and management services of the OSSs.
	Elaboration of methods and advice to the OSSs for the constitution of new Communities of Owners in the buildings that require it.
	Unification of the procedures and method of support to be provided to stakeholders in the preparation of documentation
	Coordination of the procedures for processing financial aid with the different organism.
	Support and dialogue in the procedures for obtaining financing for residents who require it.
	Administrative monitoring of the process, and preparation of accounting and management statistics.
	Provide teaching support in the subjects of their competence to be taught in the training course for personnel of the OSSs.
SOCIAL DYNAMISER	Active information tasks at door-to-door level, informing and promoting rehabilitation.
	Visits to the dwellings in buildings that are eligible for renovation work
	Meetings with Communities of Owners
	Drawing up model reports that take into account the social and economic needs to be detected in each building.
	Establish criteria for assessing possible relocation needs, seeking and negotiating alternatives.
	Establish criteria for mediation actions aimed at resolving conflicts in communities and reaching agreements.
	Monitoring the social aspects of the process. Social impact of the actions.
	Provide teaching support in the subjects of their competence to be taught in the training course for personnel of the OSSs.
LAW GRADUATE	Drafting of contracts, agreements and any administrative document.
	Legal advice to the ME and coordination of the advisors of the Local and/or Area Management Entities, monitoring compliance with the relevant legislation.

Figure 4. Specific roles and tasks of the ETT professional profiles defined in the HIROSS4all project. Source: Own elaboration

2.1.2 SOCIAL DIMENSION REPORT. BIRTUOSS D.2.2

This report offers a review of the experience gained through the HIROSS4all project from a social approach in the neighbourhoods of Otxarkoaga (Bilbao) and Txonta (Eibar), where part of the project was implemented.

The document presents the results of the fieldwork focused on interviews and focus groups with the various stakeholders involved in the process, i.e. it presents the conclusions and impressions of community agents, users, neighbours, professionals and One-Stop-Shop staff.

The document identifies a number of aspects and issues related to the professional profiles, skills and functions to be undertaken by the staff of OSSs, as follows;

Section 4 contains the experience of the Otxarkoaga office staff, of which the following is highlighted:

*"At Opengela, there is a strong relationship with users facilitated by the trust that homeowners place in the office professionals. Consequently, **technical matters often take a secondary role, while proficiency in interpersonal skills becomes a fundamental requirement for Opengela staff to successfully do their work.**"*

In this line, the staff of the Txonta office (section 5) stresses the following:

*"strongly recommends **having technical, social and legal professionals** in neighbourhood offices. More specifically, they underscore the **indispensable role of a legal expert for interpreting legal matters, especially those concerning the Commonhold Property Act**, and for effectively managing financial aid and certifications. Additionally, they emphasise the **necessity of a social worker to address the needs of vulnerable residents**, noting that while this role may not be permanent, it should be readily available when required. Overall, they **stress that all professionals - technical, social and legal - must have the competencies, skills and resources necessary to instill confidence and effectively guide a process like this.**"*

Section 6 collects the opinions of owners who highlight *"several key attributes that, although embodied in the attitude of specific professionals, are decisive when it comes to making the office a trusted resource: **proximity and readiness to address questions, clear communication devoid of technical jargon, efficiency in handling formalities, and a sense of professionalism and reliability.** These qualities contribute to building trust among homeowners"*.

On the other hand, professionals involved in urban regeneration processes *"especially highlight the valuable **combination of technical knowledge and social skills of Opengela's staff.**"*

Finally, by concluding, it is worth citing the recommendation included in the last section, which reinforces the defined professional profiles – **technical | social | administrative-financial | legal**- and underlines the social aspect that all the roles of the team should have.

*"Ensuring a diverse mix of professionals (**technical, social, administrative-accounting, legal, or juridical**) in the office is imperative to achieving its objectives. To this end, it is vital that these offices have three different types of professionals, or more specifically, a minimum of three (technical, legal/financial and social) and that **not only must they possess professional skills but also personal capabilities such as relationship-building and emotional***

intelligence. This ensures a “social vocation” among team members, grounded in a deep understanding of the neighbourhood, district, and specific circumstances of each home.”

29.2 FIELD ANALYSIS

Having analysed the work carried out so far, we proceeded to study the actual experiences linked to the Opengela programme.

On an initial level, work was focused on the technical specifications of the tenders for the Opengelas neighbourhood offices, identifying the profiles hired and the tasks required of each one of them, and on a second level, a characterisation of the neighbourhood offices was made based on a series of interviews to gain in-depth knowledge of how they operate and to be able to contrast the theoretical work with the real situation.

2.1.3 TECHNICAL SPECIFICATIONS FOR TENDERS

In order to undertake this study, have been selected the technical specifications of the tenders of four Opengelas, representing a real sample of the existing range of offices in the Opengela network at present.

The specifications published by the city councils of Donostia, Bilbao, Gasteiz and Trapagarán were reviewed, cases that present different financing programmes, scale, among others. Even so, it was noted that the profiles requested and the tasks required of each of them are similar, which allows us to extract the profiles to be recruited for the staff of a standard OSS, as will be seen later on. The following figure shows the comparative analysis of the specifications studied, based on the data collected in four sections:

- 1. Subject of contract:** grant or programme
- 2. Territorial scope:** Number of dwellings
- 3. Human resources:** data for each office, required qualifications and annual hours, other specifications or specific requirements (language, experience in the UK, etc.).
- 4. Face-to-face service:** opening of offices (estimated minimum), data for each office

BILBAO		DONOSTIA		GASTEIZ		TRAPAGARAN		
OBJECT OF CONTRACT	- NEXT Generation EU Programme		Interagency Strategic Investment Plan (ISIP 22-24)	Interagency Strategic Investment Plan (ISIP 22-24)		- BERPIZTU Programme to revitalise Action Areas		
	- Interagency Strategic Investment Plan (ISIP 22-24)			Interagency Strategic Investment Plan (ISIP 22-24)		Preferential, (included in the Strategic Grants Plan of the Department of Territorial Planning, Housing and Transport 2021-2024)		
TERRITORIAL SCOPE	Otxarkoaga	240	Neighbourhood of Alza	Zaramaga Degraded Area	525	St Andrew's Group, from No. 1 to 65		
	Torreurizar	264				- Avenida Primero de Mayo, nº 32 y 34		
	Párroco Unceta Neighbourhood	135				- Estrada San Andrés, nº 25,26 y 27		
	TOTAL	639				- Estrada la Rozada nº1,3,5,7,from 9 to 21, 23,25,27,29,31,33,35,37,37,39,41, 43, 45 and 47		
HUMAN RESOURCES	Higher Technical Degree, preferably Architecture		Higher Technical Degree in Architecture		Higher Technical Degree in Architecture		Architect	
	320 h/year		1234,80 h/year				You have been part of an urban regeneration or rehabilitation office team for at least 1 year.	
			You must have a level of knowledge of Basque C1 or equivalent.					
	Accountant-administrative		Accounting, taxation, grants and subsidies, management and administration of the processes and associated documentation and paperwork, support to Communities of Owners in the application of the Commonhold Property Act.		Legal-Accounting		Accountant-Administrative	
	840 h/year * 17.5 h/week		1323 h/year		Accounting, taxation, grants and subsidies, management and administration of the processes and associated documentation and paperwork, support to Communities of Owners in the application of the Commonhold Property Act.		Minimum qualification: FPII or higher in business administration or equivalent.	
			You must have a level of knowledge of Basque B2 or equivalent.					
	Mediation		Facilitating support at specific times, providing guidance on the social aid available, accompaniment and mediation work with the Communities of Owners, Administrations involved and people affected by the actions.		Skills for the orientation of available social aid, the development of accompaniment and mediation tasks with the Communities of Owners, Administrations involved and people affected by the actions.		Social intervention technician	
	280 h/year * 6 h/week		352.80 h/year				Qualification: Social Worker, Psychologist or Social Educator.	
			You must have a level of knowledge of Basque B2 or equivalent.					
	External legal assistance							
50 h/year *4h/month								
IN-PERSON ATTENTION								
	4 hours in the morning for 2 days/week.		2 hours in the morning for 4 days/week				4 hours a day, 5 days a week	
	4 hours in the afternoon for 2 days/week.		4 hours in the afternoon for 2 days/week				Minimum 2 days in the afternoon	
	16 h/week		16 h/week				20 h/week	
	* External legal assistance is estimated at 15 hours per month.							

Figure 5. Comparative table of technical specifications for the implementation of an Opengela. Source: Own elaboration

From the results of the analysis of these tenders for the launching of an Opengela, we have extracted the profiles requested for the office team and their respective tasks. Profiles are as follows;

- **Technician: Architect; Technical Architect.**
- **Accountant-Administrative**
- **Mediation; Social intervention technician**
- **Legal**

The table below specifies the concrete functions and tasks for each profile:

SPECIFIC FUNCTIONS AND TASKS OF THE PROFESSIONAL PROFILES Technical Specifications for Tenders	
TECHNICIAN	Information (active +passive) and dissemination to the neighbourhood and administrators of the conditions established for the Urban Regeneration and the Rehabilitation of Buildings included in the areas.
	Implementation of information and participation processes
	Elaboration of criteria and scales for the evaluation of proposals
	Drawing up a report proposing the adjudication of the work concerned, which will be validated by the Management Commission.
	Guidance for the definition of the projects to be contracted and works to be executed and technical information related to the content of the eligible actions.
	Analysis and advice on projects during the development phase of projects contracted by the community. Preparation of relevant reports for the processing of grants.
	Attending construction sites and monitoring the works (without having the status of site management).
	Attend coordination meetings with the different administrations and entities.
	Technical Inspection of the building (ITE)
	Identification of the buildings and plots affected. Preparation of files identifying the properties and determining the characteristics of the building.
	Rehabilitation projects: Information will be provided on the technical contents to be developed.
	Monitoring of the works: verifying the fulfilment of the objectives and actions planned and foreseen in the corresponding project.
ADMINISTRATIVE ACCOUNTANT	Support for the search for funding
	Calculation of neighbourhood financial contributions
	Preparation of a cash flow analysis of the operation with estimated costs and revenues.
	Information and dissemination of grants and subsidies
	Support in the processing of applications for municipal licences and sectoral authorisations.
SOCIAL MEDIATION	Implementation of information and participation processes
	Guidance on available social assistance. Accompaniment and mediation between communities, administrations and affected people.
	Social report.
	Social monitoring: granting and payment of financial aid and rehousing processes. Professional support for conflict resolution during the process.
LEGAL	Information and dissemination of aid and regulations (Municipal, Orders...)
	Advice on setting up Communities of Owners
	Application of requirements and formalities demanded by current legislation on Data Protection.
	Support in the processing of applications for municipal licences and sectoral authorisations.

Figure 6. Specific functions and tasks of the professional profiles identified in the Technical Specifications. Source: Own elaboration

2.1.4 CHARACTERISATION AND ANALYSIS OF OFFICES IN THE OPENGELA NETWORK

In parallel to the BIRTUOSS project, under the impulse and with funding from the Directorate of Territorial Planning and Urban Agenda of the Basque Government, CAVIAR UPV/EHU has been working on the *CISO2* project " *Studies on the Revitalisation and Implementation of PCTI Euskadi 2020-2030 in Sustainable Cities*". Within this *CISO2* project, the objective of one of the lines of work is the identification and characterisation of the different systems of operation, management and composition of the Opengela Programme's proximity offices (OSSs).

Therefore, in 2023 we began to analyse the real experiences of those offices in operation with more time and experience.

In this process we have been able to detect a wide variety of realities and differences between OSSs and we have collected many interesting facts and figures that have helped us to understand the offices' internal operation method. In this phase, we have been able to obtain a point of view of the reality and the daily work of the offices to contrast with the previous theoretical analysis of HIROSS4all, the previous *D.2.2.Social Dimension* and the tenders.

OFFICE TEAM: PROFILES AND FUNCTIONS

One of the key aspects in characterising the offices has been to identify and analyse the operation of the offices, i.e. the work that is carried out from the office, including information on the roles and profiles of the staff, as well as the main tasks of the personal of each office.

In this regard, the following data was collected for each office:

- In relation to PERSONNEL AND STAFF
 - *Date of joining the office*
 - *Function*
 - *Profile/Discipline*
 - *Dedication: full, part-time, occasional (indicating %, H/week, H/month)*
- In relation to the FUNCTIONS and SERVICES OFFERED by the office throughout the whole process for the integral urban regeneration and rehabilitation of the neighbourhoods in which it operates, indicating the following functions it undertakes:
 - *Advice / Communication / Coordination with neighbourhood bodies and the neighbourhood community*
 - *Technical and economic monitoring of projects /Management of neighbourhood data/ Submission of documentation to the administration.*
 - *Grant management/support in the search for funding*
 - *Training Workshops / Intervention and Social Participation / Employment Plan*

Once the information was collected , a comparative analysis was made between the offices, extracting the profiles and tasks associated with each of them. The following profiles were identified:

- **Senior Technician/Architecture**
- **Administrative-Accountant**
- **Administrative-Fiscal**
- **Mediation-Social**
- **Legal**

The following figure summarises the intersection of these profiles and their related functions.

OFFICE Services Functions	OFFICE TEAM : Profiles	SENIOR TECHNICIAN ARCHITECTURE	ADMINISTRATION FISCAL	ADMINISTRATION ACCOUNTING	MEDIATION SOCIAL	LEGAL
COORDINATION OFFICE HEAD						
ADVICE and GUIDANCE						
COMMUNICATION						
COORDINATION OF NEIGHBOURHOOD BODIES						
PROJECT MONITORING						
AID MANAGEMENT and ADMINISTRATION DOCUMENTATION						
NEIGHBOURHOOD DATA MANAGEMENT						
SEARCH FOR FUNDING						
TRAINING WORKSHOPS						
INTERVENTION and SOCIAL PARTICIPATION						
EMPLOYMENT PLAN						

Figure 7. Profiles and functions of a OSS staff defined in the Opengela Network characterisation process. Source: Own elaboration

29.3 CONCLUSIONS / DEFINITION OF PROFILES AND ROLES

Once the background information has been analysed, the information has been merged into a single document identifying the roles and main tasks of each of them. These results have been shared with the WP3 task managers (T3.1 BUILD INN, T3.2 GNE FINANCE, T3.3 GV, T3.4 EDE). Inputs received from GNE FINANCE and EDE have been incorporated into the conclusions presented.

In the previous work completed, the rehabilitation of buildings has played a particularly important role. In the definition of the new model that is sought in this project, the offices will have to respond to other strategies linked to urban regeneration, such as interventions in public space.

Therefore, the phases proposed in the previous HIROSS4all project have been redefined to accommodate the tasks associated with other types of interventions beyond building refurbishment.

However, at this preliminary stage of the project and in the absence of defining this new model (under development in other tasks of this WP3), the results show mainly the tasks defined so far.

From the analysis of these tasks, 5 main roles have been identified. Based on the analysis of the roles established in HIROS4all and assumed in the aforementioned D.2.2, it has been decided to divide the administrative-accounting role into separate profiles, because different tasks are understood for each of them. The following figure shows the proposed team profiles. As in the previous project, two types of work teams are distinguished. On one side, the team of the offices that are implemented in each of the neighbourhoods- OSS TEAM- and on the other hand, the EXPERT TECHNICAL TEAM that will assist the Management Entity that will coordinate the Opengela OSS Network.

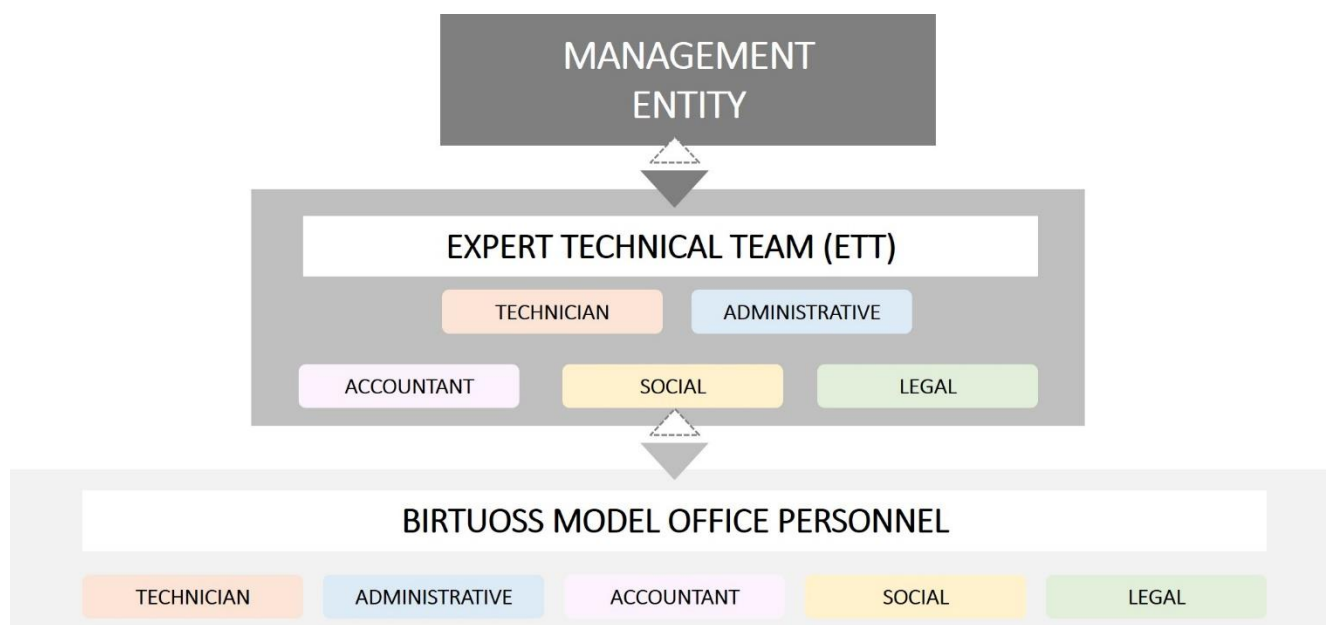


Figure 8. Profiles identified for the workforce of the new BIRTUOSS office model and the ETT. Source: Own elaboration

Below are the summary tables showing the tasks and functions corresponding to each work team, structured by phases and associated with the roles determined.

Firstly, the roles and tasks of the OSS team are presented in two tables. Figure 10 shows the tasks corresponding to the 5 phases of the defined regeneration process - PHASE 01: PREVIOUS / PHASE 02: PRELIMINARY DRAFT - BASIC PROJECT / PHASE 03: EXECUTION PROJECT - TENDERING / PHASE 04: WORK / PHASE 5: POST-WORK - and in the following Figure 11, the tasks of a transversal nature are shown.

TECHNICIAN	ADMINIS.	ACCOUNT.	SOCIAL	LEGAL	ROLES AND TASKS OF THE OSS TEAM				
					Report on the conditions established for the Urban Regeneration and Rehabilitation of Buildings included in the area.	PHASE 01 PREVIOUS Implementation of Opengela			
					Identification of affected buildings and plots. Preparation of characterisation sheets for the buildings identified.				
					Establishment of prioritisation criteria for the rehabilitation of buildings in each neighbourhood.				
					Advice on integral rehabilitation and possible rehabilitation solutions.				
					Setting targets for each office				
					Advice on setting up Communities of Owners				
					Advice on Commonhold Property Act.				
					Support in the search for funding .				
					Calculation of contributions and analysis of flows with estimated expenditure and income for the neighbourhood.				
					Support in the search for social assistance				
					Social diagnosis that includes the socio-economic situation, the elements of vulnerability, the socio-personal situation, relational context...				
					Elaboration of criteria and scales for the evaluation of proposals	PHASE 02 PRELIMINARY DRAFT-BASIC PROJECT			
					Evaluation of the proposals submitted by the tenderers and report on the proposal for the award of contracts				
					Guidance for the definition of the projects to be contracted				
					Analysis and advice on projects during the community-contracted project phase.				
					Provide information on technical aspects to be developed.				
					Support in the processing and application for municipal licences and sectorial authorisations.				
					Calculation of inputs and flow analysis with estimated expenditure and income for the neighbourhood .				
					Preparation of relevant reports for the processing of grants.				
					Social diagnosis of the residents in the neighbourhood.				
					Elaboration of criteria and scales for the evaluation of bids (contracts)	PHASE 03 EXECUTION PROJECT TENDERING			
					Evaluation of the proposals submitted by the tenderers and report on the proposal for the award of contracts				
					Guidance for the definition of the projects to be contracted.				
					Analysis and advice on projects during the community-contracted project phase.				
					Provide information on technical aspects to be developed.				
					Analysis of the ITE ; monitoring of compliance with the requirements demanded in these reports in the projects executed.				
					Support in the processing of bank loans.				
					Analysis of the ITE; monitoring of compliance with the requirements demanded in these reports in the projects executed.				
					Work site visits.				
					Monitoring of the granting and payment of financial aid.				
					Advice on law of succession, inheritance, usufruct, etc.	PHASE 04 WORK			
					Monitoring and updating of expenditure and income of the owners.				
					Assessment of the results obtained in each office.				
					Monitoring of the granting and payment of financial aid.				
					Monitoring and updating of expenditure and income of the owners.				
					Final reporting				
						PHASE 05 POST-WORK			

Figure 9. Roles and tasks of an OSS team by phase. Source: Own elaboration

TECHNICIAN	ADMINIS.	ACCOUNT.	SOCIAL	LEGAL	CROSS-CUTTING PROCESS TASKS
					Attending coordination meetings with the different administrations.
					Ongoing coordination with the Management Entity
					Preparation of reports provided for in specifications or required by the different administrations.
					Control and monitoring of the targets set for the office.
					Schedule the visits of individuals (from the different stakeholders either in the office or in the buildings to be rehabilitated).
					Management of documentation; organisation of the different files, preparation of the documentation to be submitted by the interested parties...
					Accompaniment and mediation between different actors; conflict resolution.
					Permanent dialogue with protection systems: Lanbide (according to active RGI files); Social Services; TSS entities.
					Development of model reports/Table for monitoring social and economic needs and their evolution throughout the process.
					Information and participation processes.
					Inform and provide in-home rehabilitation (active information).
					Support to the Boards of Owners.

Figure 10. Cross-cutting tasks of an OSS team. Source: Own elaboration

Below is the table showing the tasks that would fall to the ETT, which in general terms will have the mission of assisting and technically advising the Management Entity for the best implementation of the programme.

It will also have the purpose to transmit to the members of the OSSs the guidelines established for their work, or derived from the strategies designed at the Regional Level, to standardise and homogenise the documents, formats and procedures of the Opengela OSS network, as well as to monitor and evaluate the results obtained in the different milestones of the process in order to draw the necessary conclusions to make feasible and improve the gradual implementation of OSS in the Basque Region.

As was found in the synthesis of the tasks corresponding to the offices, this table will have to be updated and completed with the territorial model to be defined in WP5 of this project.

In this case, the phases correspond to the implementation phases of an office. - **PHASE 01: PRELIMINARY** / **PHASE 02: IMPLEMENTATION** / **PHASE 03: OPERATION**.

TECHNICIAN	ADMINIS.	ACCOUNTANT	SOCIAL	LEGAL	FUNCTIONS AND TASKS OF THE EXPERT TECHNICAL TEAM (ETT)				
					Coordinator responsible for the teaching to be given for the training of the staff of the OSSs.	PHASE 01 PRELIMINARY			
					Coordination and monitoring of OSSs. Regular meetings with OSS managers.				
					Coordination and communication with the Mangement Entity (ME)				
					Active information work of the OSSs, to disseminate and promote home-based rehabilitation.				
					Development of internal rules of procedure.				
					Design, unification and formalisation of formats and models for forms, applications, technical and social reports, contracts, subsidies, etc. That are necessary throughout the whole process.				
					Drawing up the technical and administrative specifications for the contracting of personnel of staff for the offices.				
					Provide teaching support on the topics of each competency to be taught in the training course for OSSs staff.				
					Visits to the homes in buildings that are eligible for renovation work	PHASE 02 IMPLEMENTATION			
					Coordination, unification and supervision of the design and contents of the Dissemination Documents (presentations, brochures, RRSS...) that are drawn in the OSSs.				
					Determine the technical criteria for rehabilitation.	PHASE 3 OPERATION			
					Elaboration of methods and advice to the OSSs for the constitution of new Communities of Owners in the buildings that require it.				
					Unification of the procedures and method of support to be provided to stakeholders in the preparation of documentation.				
					Coordination of the procedures for processing financial aid with the different organism.				
					Administrative monitoring of the process, and preparation of management statistics.				
					Support and dialogue in the procedures for obtaining financing for individuals who require it.				
					Financial monitoring of the process, and preparation of accounting statistics.				
					Meetings with neighbourhood associations				
					Preparation of report models where the social and economic needs to be detected in each building are contemplated.				
					Establish criteria for mediation actions aimed at resolving conflicts in communities and reaching agreements.				
					Monitoring of the social aspects of the process. Social impact of the actions and associated reports.				
					Drafting of contracts, agreements and any document of an administrative-legal nature.				
					Provide legal advice to the ME and coordinate the legal advisors of the OSSs by monitoring compliance with the relevant legislation.				
					Provide the ME with Monitoring and Evaluation Reports of the OSSs with the diagnosis of the problems detected, proposals for recommended guidelines and statistics on the actions carried out, initiated and planned.				

Figure 11. Roles and tasks of the ETT by phase. Source: Own elaboration

In summary, the new BIRTUOSS office model should have a **multidisciplinary team** of professionals - **technical, social, administrative, accounting, legal** - and to achieve its objectives, it is considered essential that these **roles must be flexible and transversal**, i.e. staff should not only have professional competences in their field, they should also have a basic knowledge of the other specialisations.

In this sense, it is important to pay special attention to the relational capacity that the work of OSS as a proximity office requires. Therefore, the people who provide their services in the offices must also be 'people close to people' and have personal skills for dealing with people. Consequently, all staff, regardless of their area of expertise, must have **basic qualifications and skills in the field of social mediation**.

Additionally, as previously indicated, in the tasks described above, a more general vision of urban regeneration will need to be incorporated, therefore, **specific tasks of other types of interventions will need to be defined** to complete this preliminary list.

Finally, it is noteworthy that the work developed is the basis for defining and developing the training proposal presented in the next section 5 of this document.

3. ANALYSIS OF POSSIBLE TRAINING STRUCTURES

The aim of this section is to study the existing training offer that may be of interest for the design of the structure and organisation of the future training proposal. Firstly, we have analysed the courses specifically linked to the Opengela model and, secondly, the professional training and postgraduate courses whose structure can be extrapolated to the proposal.

29.4 PREVIOUS COURSES LINKED TO THE OPENGELA PROJECT

Since 2018, the Directorate of Territorial Planning and Urban Agenda of the Basque Government has been working on specific training for urban regeneration and rehabilitation managers, promoting courses for both public administration workers and unemployed people, as well as professionals in the sector. The following chronogram shows a summary of the courses promoted.

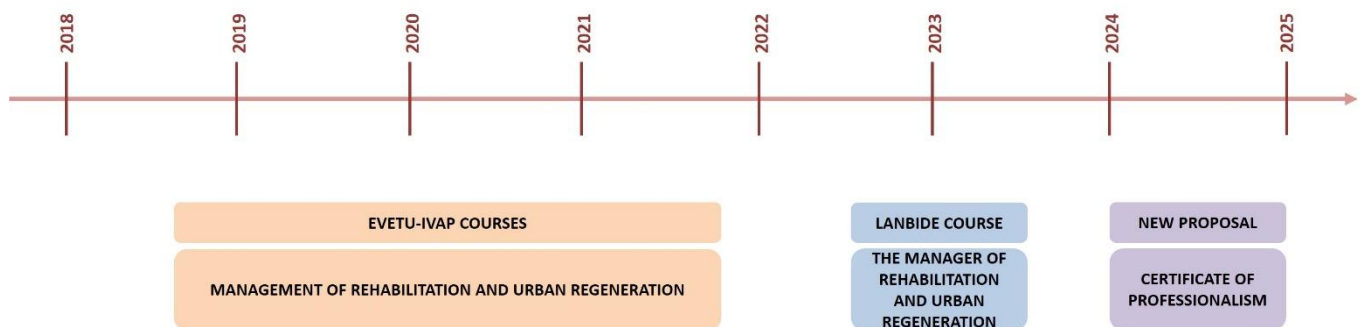


Figure 12. Background of training courses oriented to the management of urban regeneration and rehabilitation in the Basque Country linked to the Opengela Project. Source: Own elaboration.

3.1.1 MANAGEMENT OF REHABILITATION AND URBAN REGENERATION. EVETU-IVAP COURSES

The Directorate of Territorial Planning and Urban Agenda of the Basque Government through the Basque School of Territorial and Urban Studies (Escuela Vasca de Estudios Territoriales y Urbanos - **EVETU**), integrated in the Basque Institute of Public Administration (Instituto Vasco de Administración Pública- **IVAP**) of the Basque Government, under the name "MANAGEMENT OF REHABILITATION AND URBAN REGENERATION" developed training actions directly related to urban regeneration and its proximity management throughout the period 2018-2021.

This course had three editions under the direction of Ignacio de la Puerta, Director of Territorial Planning and Urban Agenda of the Basque Government; and Gerardo Ruiz Palomeque, professor at the Escuela Técnica Superior de Arquitectura of the Universidad Politécnica de Madrid and expert in urban rehabilitation and regeneration.

The course was linked to the Opengela programme, since its main objective was to provide transversal and holistic training for the professionals of the One Stop Shops that will eventually serve all the vulnerable neighbourhoods in the Basque Country.

Thus, the objective was to train professionals in technical and organisational aspects to deal with urban regeneration and rehabilitation projects at all scales.

The course was addressed to public administration professionals (categories A and B) and professionals, graduates with a university degree or higher, and had a duration of between 63 and 75 hours taught over 10-12 days in a presential format and to a group of 20-40 participants.

The methodology included modules based on theoretical classes that were completed with a range of practices. The course was accredited through the *certificate of achievement* issued by the IVAP.

3.1.2 THE MANAGER OF REHABILITATION AND URBAN REGENERATION. LANBIDE COURSE

In the 2022/2023 academic year, in collaboration with **Lanbide** - Basque Employment Service - and the CAVIAR Research Group of the UPV/EHU, the Directorate of Territorial Planning and Urban Agenda launched the course "THE MANAGER OF REHABILITATION AND URBAN REGENERATION", giving continuity to the "Management of Rehabilitation and Urban Regeneration" course started in 2018 at the EVETU and described in the previous section.

The main objective of the course was the training of new professionals in the field of integrated urban regeneration. As a secondary objective, the course was also oriented towards the training of trainers, i.e. coaching in educational skills focused on the teaching of such course in subsequent calls in order to create a network of qualified professionals.

In this case, the course was aimed at professionals with technical, social and business administration profiles and a percentage of the places (< 30%) was reserved for unemployed people.

It was composed of 6 theoretical modules with 185 hours in total, in presential format, taught over three months and 40 hours of practical work in OSSs or research groups in urban regeneration. The certificate obtained was a *specialisation course at qualification level 4* issued by Lanbide.

29.5 OTHER TRAINING PROPOSALS OF REFERENCE

It has seemed of interest to analyse other training structures in order to assess the possibility of optimising and extending the existing courses for *rehabilitation and urban regeneration managers*. In one way, EVETU-IVAP offers the possibility of structuring the courses on the modular system, in this way, each module can be taken independently.. The Urban Planning and Territorial Studies course was considered because of the applicability of its organisational structure to a future proposal. At the same time, Lanbide, in its range of certificates of professionalism, also presents a modular structure based on training units. Finally, it is thought that postgraduate training in the academic field could be another alternative framework for this training. The analysis is set out below.

3.1.3 EVETU-IVAP COURSES - URBANISM AND TERRITORIAL STUDIES COURSE

The Basque School of Territorial and Urban Studies (Escuela Vasca de Estudios Territoriales y Urbanos -**EVETU**), part of the Basque Institute of Public Administration (Instituto Vasco de Administración Pública - **IVAP**) of the Basque Government, has been organising this course since 1992 with the aim of training and recycling personnel working in the areas of urban and territorial planning.

This course has changed its contents, duration and name throughout its existence, and from 2017-2018 has adopted the current name *Course on Urban Planning and Territorial Studies*. The forthcoming academic year 2024-2025 will be its 50th edition.

Thus the IVAP, through EVETU, provides this training programme in urban planning issues, which aims to cover the training needs of Basque public administration staff and also those of professionals working in the urban planning field.

The objectives of this course include analysing the processes of urban and territorial transformation, the methodologies, the modification of regulations and techniques and the incorporation of new paradigms in urban planning, enabling the implementation of urban planning projects and appropriate regulations for the new situation, as well as assessing urban and territorial planning projects and learning about their legal, technical, social and economic impact and implications.

The course, as mentioned above, is mainly aimed at public officers, staff of the Basque public administrations in group A and, exceptionally, in group B, and professionals with a university degree and linked to the urban and territorial planning sector and the environment.

Academically, the course is made up of six compulsory theoretical-practical modules (700 hours) and optional internships (420 hours). The course can be completed in a single call (over a 9-month academic year-September/June) or by taking the various modules independently, completing all the course requirements in each of the different calls in which you register, as long as these are within the last 10 calls made. This modular structure allows students to adapt the timing of the course to their professional and/or personal practice, offering the possibility of taking the course continuously or in modules. The course is taught in blended mode, with 60% on-site and 40% off-site.

For each module taken, the IVAP will issue the corresponding certificate of achievement. Once the six modules have been passed within the last 10 course dates, the IVAP will issue the "Diploma in Urban Planning" which accredits the completed course.

3.1.4 LANBIDE PROFESSIONAL CERTIFICATES

A certificate of professionalism is a professional profile understood as a set of professional competences identified in the productive system, and recognised and valued in the labour market.

The *certificate of professionalism* is the official accreditation instrument of the professional qualifications of the National Catalogue of Professional Qualifications (Catálogo Nacional de Cualificaciones Profesionales - CNCP) in the field of the Labour Administration, which accredits the training for the development of a work activity with significance for employment and ensures the necessary training for its acquisition. This certificate is issued and promoted by the *State Public Employment Service (Servicio Público de Empleo Estatal-SEPE)* and in the Basque Country by **Lanbide** - Basque Employment Service.

We analysed the regulatory framework that regulates the certificates of professionalism. Mainly the following decrees:

- Royal Decree 1128/2003, of 5 September, which regulates the National Catalogue of Professional Qualifications (CNCP)
- Royal Decree 34/2008, of 18 January, which regulates *Certificates of Professionalism*.

CHARACTERISTICS of the Certificate of Professionalism

The **Certificates of Professionalism** are arranged in 26 **professional families** and three **levels of qualification** in the National Catalogue of Professional Qualifications (CNCP). Below, the characteristics of the professional certificate that would be of interest to the case are specified:

- **Professional family : Training speciality:** A *training speciality* is understood to be the grouping of contents, professional competences and technical specifications that respond to a set of work activities framed within a phase of the production process. **Lanbide's** training specialities fall within the 26 *professional families* established in the CNCP. In this case, the professional family with a possible link would be the *Building and Civil Works*.
- **Levels of qualification:** Certificates of professionalism are divided into different levels (level I, II and III), which correspond to different degrees of complexity and specialisation in a given area of work. This level will also define the minimum qualifications for access to the Certificate of Professionalism. In this case Level III (Level 3) is identified as the appropriate one;

***Level 3:** Competence in a set of professional activities that require mastery of various techniques and can be performed autonomously, involves responsibility for coordination and supervision of technical and specialised work. It requires an understanding of the technical and scientific fundamentals of the activities and the evaluation of process factors and their economic implications.*

*The **minimum entry qualification** required is the Secondary School certificate or a Level II Certificate of Professionalism in the same family/professional area. Or, to have passed the entrance exams to Higher Level Vocational Training or university entrance exams for people over 25 and/or 45 years of age.*

TRAINING STRUCTURE of the Certificates of Professionalism.

In the following, we specify the concepts related to the training structure of Certificates of Professionalism that would be relevant to the case:

- Each certificate corresponds to a professional profile structured in **units of competence**. The unit of competence constitutes the **minimum accreditable unit** for obtaining a certificate of professionalism. The units of competence are the set of abilities, skills and knowledge that a person must possess in order to carry out a specific work activity.

- **Training modules of the certificate of professionalism.** This is the coherent block of training associated with each of the **units of competence** that make up the qualification accredited by the certificate of professionalism. Training modules with a duration of more than 90 hours may be divided into **training units**, which shall never have a duration of less than 30 hours. A training module may not be subdivided into more than 3 training units.

The following figure shows a diagram of the training structure of the certificates of professionalism;

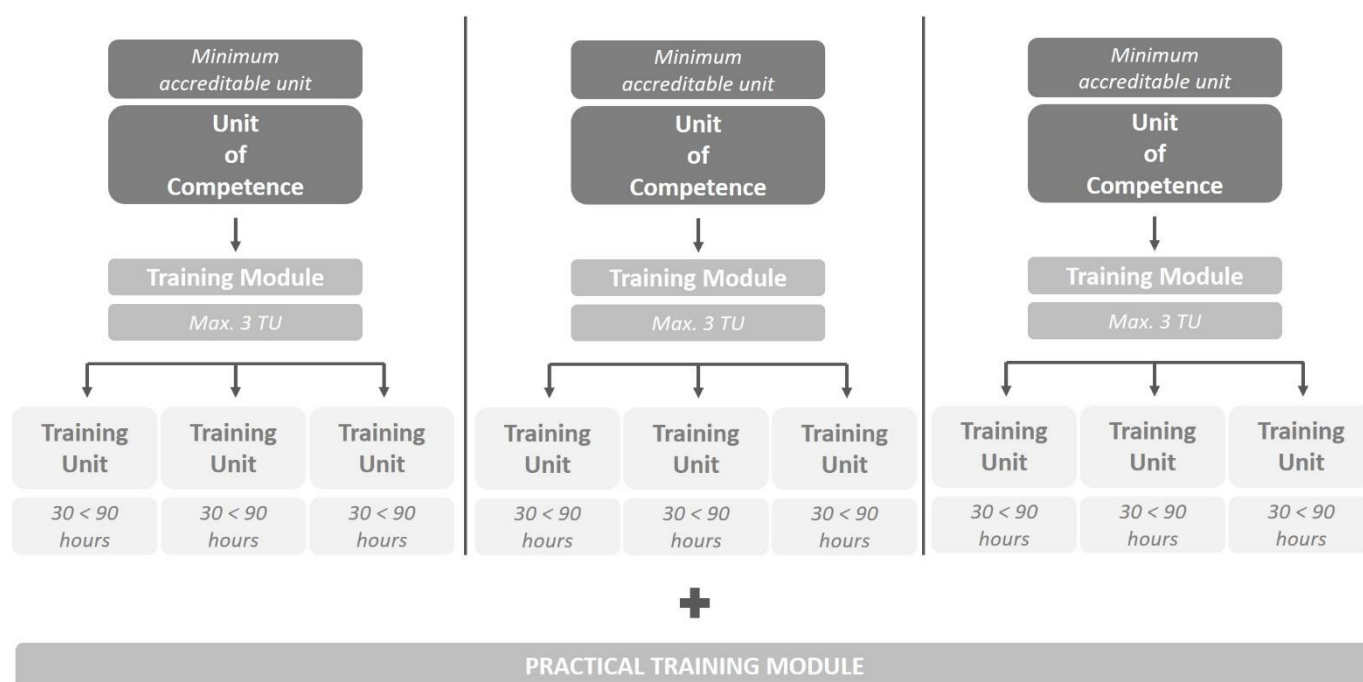


Figure 13. Diagram of the training structure of the Certificates of Professionalism. Source: Own elaboration

PATHWAYS TO OBTAIN the certificates of professionalism.

Below, we specify the various routes envisaged for obtaining the professional certificate that would be of interest in this case:

- It can be obtained by **passing all the modules** corresponding to the Certificate of Professionalism or **through the accumulation of the non-work experience module and the partial accreditations of the training modules** associated with the units of competence included in the certificate of professionalism.
- **Those who do not pass all the modules** associated with the certificate of professionalism and pass the modules associated with **one or several units of competence of the same**, will receive a **certification of the modules passed** that will have the effect of cumulative partial accreditation of the professional competences acquired.
- **The certification shall be valid within the scope of the Labour Administration.** Passing all the training units defined for the module, provided that the participant completes consecutively at least one training unit per year, will entitle the participant to the certification of the training module and the accreditation of the corresponding unit of competence.

3.1.5 UNIVERSITY-ACCREDITED MASTER'S AND POSTGRADUATE DEGREES

As stated on the UPV/EHU website (<https://www.ehu.eus/es/web/masterrak-eta-graduondokoak/titulos-proprios>), University-accredited Master's and Postgraduate degrees are specialist courses designed and run by the University itself, which adapt in a flexible manner to social demands, thus helping students orient or reorient their professional careers. In this way, it offers the possibility of perfecting their professional, scientific, technical and artistic development. At the same time, it aims to open up new possibilities of professional application, establishing collaborative relationships with institutions and companies, allowing the recycling of professionals to adapt to the new needs demanded by society and companies.

Studies can be organised with a **modular structure** that is complementary to each other, so that by adding up training programmes, students can progressively achieve higher level qualifications. The internal, university-accredited courses offered by the University of the Basque Country are organised and structured in accordance with the following levels, depending on their aims, the type of students for which they are designed and the qualifications or certificates to which they provide access:

Postgraduate degrees:

- University-accredited Master's degrees: These courses generally consist of between 60 and 120 ECTS credits and must last for at least one academic year. These postgraduate courses are aimed at those who have already earned their undergraduate degree.
- University Specialisation Qualifications: These courses consist of between 30 and 59 ECTS credits, and last for either one or two semesters. As with the university-accredited Master's degrees, these postgraduate courses are aimed at those who have already earned their undergraduate degree
- University Expert Qualifications: These courses consist of between 15 and 29 ECTS credits, and last for one semester. They are mainly targeted at those in possession of a university degree, although up to 20% of the students accepted onto the course do not necessarily have to have said qualification.

University Extension Diplomas:

These courses will have a minimum duration of 15 ECTS credits. The access requirements for acceptance onto a University Extension Diploma course are those established by current law for university admissions. Under exceptional circumstances, those who are able to provide documentary evidence of extensive experience in the field related to the area of study may also be accepted onto the course.

University Extension Teaching/Training:

Teaching/Training that allows the expansion, specialization, improvement and/or updating of knowledge. These are updating, specialization, recycling and knowledge expansion courses aimed at the complementary and continuous training of students. In general, it will be less than 15 ECTS credits. It will be called "University Extension Course / Certificate".

In order to study these academic structures in more detail, an example of related subject matter has been analysed.

MASTER RERU: BUILDING REHABILITATION AND URBAN REGENERATION - Universitat Politècnica de València

The Departments of Mechanics of Continuous Media and Theory of Structures, together with the Department of Urban Planning of the Universitat Politècnica de València, promoted for 6 editions, from 2017 to 2022, the *Master in Building Rehabilitation and Urban Regeneration*, along with 4 other related degrees. This training was mainly aimed at people linked to architecture and urban planning and other engineering related to the building sector in order to improve and expand the knowledge and skills of professionals in the sector, enabling them to face new job opportunities.

The training offer included a *Master's Degree*, two *Specialisation Diplomas* and two *Expert Diplomas*.

The modular configuration of the master's degree itself is considered of special interest, as can be seen in the following figure, which allows different levels of accredited specialisation in both subjects (in Building Rehabilitation and Urban Regeneration) to be obtained through the expert and specialisation diplomas and, in turn, makes it possible to build a complete training itinerary if the master's degree is taken.

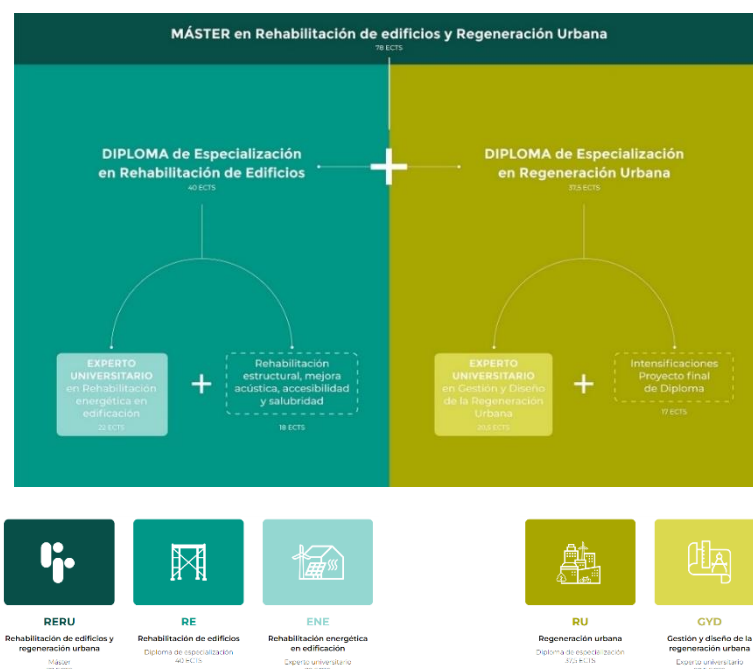


Figure 14. Diagram of the RERU master's training offer. Source: <https://www.reru.es/>

29.6 CONCLUSIONS

As can be seen in the previous sections, there are different alternatives:

Neither Lanbide, nor EVETU-IVAP and the academic field, offer the possibility of modular training structures that allow access to certifications of courses with a lower course load or to postgraduate and higher-ranking certificates through the accumulation of several modules. The following figure shows an outline of the different training structures analysed;

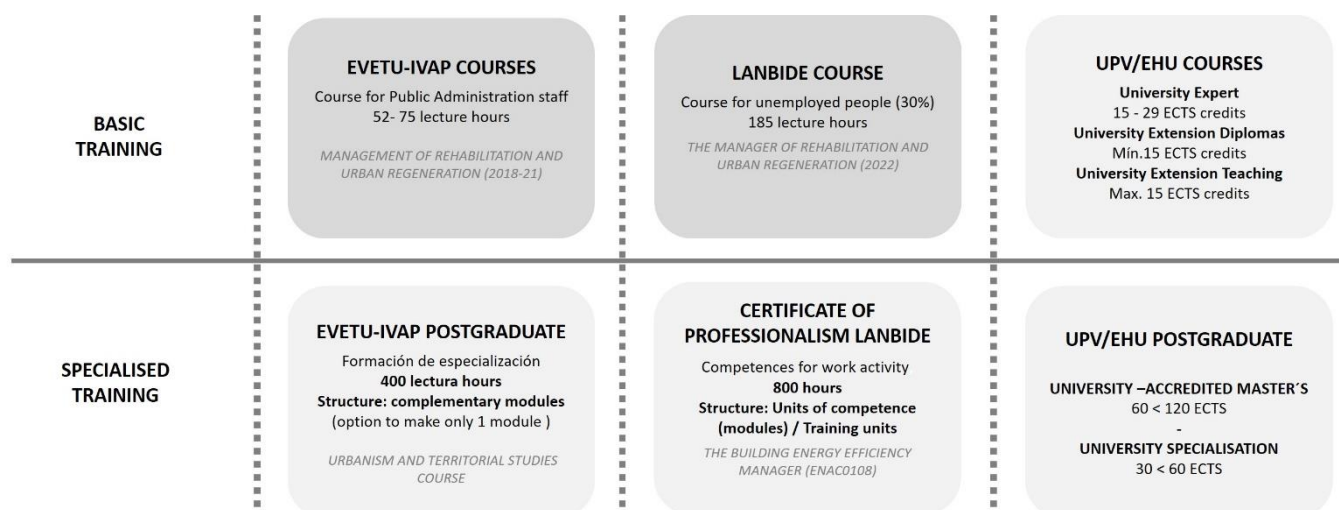


Figure 15. Synthesis of the different training structures analysed. Source: Own elaboration

All certifications have in common their organisation by blocks and/or modules that allow different degrees of certification and specialisations to be achieved. The choice of certification will depend on the criteria to be established later in this project in T. 3.6 of WP3 and WP5. In any case, we propose to design a flexible modular structure that facilitates the adaptation of the training programme to the type of certificate that is considered convenient to use at the time.

30. ANALYSIS OF CONTENTS, COMPETENCES AND TEACHING METHODOLOGIES

The aim of this section is to carry out an analysis of the contents and teaching methodologies of the existing training offer in order to contrast the existing approaches to complement the design of the training proposal. To this end, has been followed the same scheme as in the previous section, studying firstly the courses linked to the Opengela model and then other reference training proposals.

30.1 PREVIOUS COURSES LINKED TO THE OPENGELA PROJECT

3.1.6 MANAGEMENT OF REHABILITATION AND URBAN REGENERATION. EVETU-IVAP COURSES

The three courses that have been developed so far have maintained a similar outline in terms of content and teaching methodology.

These are basic knowledge courses targeted mainly at rehabilitation management and the competencies developed through the training are as follows:

- Ability to work in the areas of Urban Regeneration and Building Rehabilitation.
- Carry out and/or supervise and control the quality of the basic technical and socio-economic studies required to draw up action programmes.
- Carry out and/or supervise and control the quality and compliance of the Technical Inspections of Buildings (ITE).
- Knowledge of the socio-economic characteristics, constraints and aptitudes of the population who live in and benefit from the project.
- Proactively inform and disseminate among this population, both individually and collectively, about the technical conditions and the established aid and subsidies.
- Advising on agreements between co-owners, or between tenants and owners of properties.
- Advise the resident population on the process of applying for grants and obtaining funding for the development of interventions.

For this purpose, the course programme has been structured in four scales:

- Regional Scale : Basque Region and other regions of Spain
- Local Urban Scale
- Building Scale and Housing Groups
- Integral Rehabilitation

In each of the scales, the theoretical and conceptual context, the strategic and normative framework and good practices are worked on. A focus is placed on practices based on real examples. The methodology used combines theoretical and practical lessons and debates, which promote the active participation of students. In addition, the evaluation is carried out through the development of a course work.

3.1.7 THE MANAGER OF REHABILITATION AND URBAN REGENERATION. LANBIDE COURSE

This course is based on the "Management of rehabilitation and urban regeneration" training course initiated in 2018 by IVAP-EVETU and described in the previous section, although it is more extensive, with more hours and teaching load and incorporates practical work experience in OSSs into the training programme.

It maintains the competences of the previous courses, but two innovative issues have been incorporated; It aims, from one side, to promote and manage building renovation and urban regeneration in a multidisciplinary and entrepreneurial environment and, from the other side, to train in teaching skills focused on the implementation of future editions of the training 'The Manager of Rehabilitation and Urban Regeneration'.

For this reason, specific modules on entrepreneurship and leadership and didactic methodology are incorporated in the development of competences and in the content programme. There are 6 modules in total:

- **Module 1.** Conceptual Framework of Building Rehabilitation and Urban Regeneration: Roles of the Manager
- **Module 2.** Building Rehabilitation and Urban Regeneration at the local scale
- **Module 3.** Urban Regeneration and Rehabilitation at the building scale
- **Module 4.** Socio-community Mediation focused on Urban Regeneration
- **Module 5.** Entrepreneurship and leadership focused on Urban Regeneration Project Management
- **Module 6.** Complementary Module: Didactic Methodology focused on the teaching of the speciality "Management of Rehabilitation and Urban Regeneration".

The methodology is similar to previous courses. It is also based on real experiences of building rehabilitation and urban regeneration and is worked on in a collaborative way through the solution of cases set out in accordance with the learning objectives. In this case, the training is complemented with an internship period which is carried out in the OSSs themselves.

30.2 OTHER TRAINING PROPOSALS OF REFERENCE

1. Integrated Rehabilitation Manager (IRM) - CSCAE

The Architects' Associations of Spain, through the Spanish Higher Council of Architects' Associations (**CSCAE** - Consejo Superior de Colegios de Arquitectos de España), offer registered architects a course to **consolidate their role as integral rehabilitation managers**, broadening and reinforcing their knowledge in the field to enable them to accompany and advise the different stakeholders (public administrations, neighbours...) in the process of a thriving residential rehabilitation.

The course lasts 36 hours and, in order to facilitate the training of the members, the course is **asynchronous**, so that it can be taken at any time depending on the needs and availability of the users.

The course provides an overview of residential renovation processes and the framework of support provided by European funds. To this end, the course content is divided into three blocks: 1) the European and professional context, 2) the management of rehabilitation processes and 3) the management of grants. The most innovative part of the course lies in the second block, which provides a step-by-step approach to the management of rehabilitation in ten stages and provides innovations and particularities from four complementary perspectives: technical, legal-administrative, social and financial.

The course syllabus is detailed below:

- **Topic 1.** The current context. Rehabilitation objectives at European and national level.
- **Topic 2.** The architecture team as an IRM and the LEE as a planning tool.
- **Topic 3.** Agents and keys to the rehabilitation process.
- **Topic 4.** Step by step of the rehabilitation process.
- **Topic 5.** Technical approach. The existing Building Record book.
- **Topic 6.** Technical approach. Integral rehabilitation by interventions.
- **Topic 7.** Technical approach. New developments.

- **Topic 8.** Legal-administrative approach.
- **Topic 9.** Rehabilitation management from a social approach.
- **Topic 10.** Financial approach.
- **Topic 11.** Overview of subsidies and other incentives for rehabilitation.
- **Topic 12.** Key concepts in aid.
- **Topic 13.** Actions under the Next Funds.
- **Topic 14.** Documentation throughout the grant process.
- **Topic 15.** Case study.
- **Topic 16.** Examples.
- **Final evaluation.**

2. Course on Management of Rehabilitation Grants Programmes (GPAR) – CSCAE

The Architects' Associations of Spain through the CSCAE, offer registered architects a course to **reinforce their knowledge as professionals of reference in the comprehensive management of subsidies for housing rehabilitation** under the *Next Generation* funds, facilitating the understanding and management of the regulatory bases of these aids.

The course has a duration of 20 hours and to facilitate the training of the members, the course is **asynchronous**, so that it can be done at any time depending on the needs and availability of the users.

The syllabus focuses on the management of the different grants that the Public Administrations have approved within the framework of the *Recovery, Transformation and Resilience Plan*, charged to the European *Next Generation* funds, and the Housing Plan 2022-2025. The course programme is divided into the following sections:

1. The current context. Rehabilitation targets at European and national level.
2. The LEE as a tool and the rehabilitation agent as a key role
3. Overview of grants and other rehabilitation incentives.
4. Requirements and other key parameters of the grants.
5. Project preparation and grant management.
6. Information and advice to the property.
7. Case studies.

3. Training Course for URBAN ACTIVATORS for the Management and Co-production of Integrated and Participatory Urban Regeneration Processes - Polytechnic University of Cartagena.

This is a continuing education and university specialisation course aimed at final year students (undergraduate, graduate or diploma), graduates, diploma holders, masters or professionals who are interested in updating their knowledge or specialising in the field of integrated, inclusive and sustainable urban regeneration.

The aim of the course is to fill the existing skills gap in the urban regeneration sector by training a new professional profile, the "**Urban Activator**", capable of facilitating, co-producing and managing integrated urban regeneration processes by enhancing various urban, cultural and/or social assets through the involvement of local communities and the promotion of social innovation.

The course is blended learning, 75% of which is online, with a total of 350 hours over 3 months.

The course consists of **5 modules** with a total of 14 ECTS which must be taken in a full course to obtain the Certificate. The first 4 modules are theoretical and the 5th, called Future Urban Lab, is a practical module where students will apply the knowledge acquired to solve a real urban challenge. These are the 5 modules that compose the course:

- **Module 1.** Integrated Urban Regeneration. Global context and challenges.
- **Module 2.** Models, Methodologies and Tools to promote the participation and involvement of local communities in Integrated Urban Regeneration processes.
- **Module 3.** Social, solidarity-based and sustainable economic management of Integrated Urban Regeneration processes.
- **Module 4.** Design and elaboration of Integrated Action Plans for inclusive and sustainable Urban Regeneration.
- **Module 5.** Future Urban Lab: Local urban workshop for the design of an integrated action plan for Urban Regeneration in a real context.

4. Energy Efficiency in Buildings (ENAC0108) - Certificate of Professionalism -Lanbide

The certificate of professionalism in Energy Efficiency in Buildings (ENAC0108) is issued and promoted by the *State Public Employment Service (Servicio Público de Empleo Estatal-SEPE)* and in the Basque Region by **Lanbide - Basque Employment Service**.

Regulated in the *Royal Decree D 643/2011, 9th May*, it belongs to the professional family, *Energy and Water* at *level 3 of qualification* in the National Catalogue of Professional Qualifications (CNCP) and the associated training takes 920 hours.

The general competence of the course is to manage the efficient use of energy, assessing the efficiency of energy and water installations in buildings, collaborating in the process of energy certification of buildings, determining the feasibility of implementing solar installations, promoting the efficient use of energy and making proposals for improvement, with the required quality, complying with current regulations and in safe conditions.

For this purpose, the certificate is made up of 6 modules, 5 Training Modules (TM) and one Practical Module (PM). Below is a list of the training modules that make up the certificate:

- **TM1:** Assessment of the energy efficiency of building installations.
- **TM2:** Energy certification of buildings.
- **TM3:** Water efficiency in buildings.
- **TM4:** Feasibility studies of solar installations (Transversal)
- **TM5:** Promotion of energy efficiency in buildings.
- **PM1:** Non-occupational work placement module on energy efficiency in buildings.

5. University Master's Degree in Management, Energy Efficiency and Building Rehabilitation (MUGERE) - Univ. de BURGOS

This is a postgraduate university course aimed at all graduates and/or graduates involved in the building process (architects, technical architects, building engineers industrial engineers...), both in new construction and in the refurbishment and maintenance of existing buildings, who wish to focus their professional career on Management, Energy Efficiency and Refurbishment in Building.

The fundamental objective is to train specialists in this field from a global and integral vision, by means of a carefully studied training programme adapted to the realities of regulations, the environment and the regeneration of urban spaces, always seeking effectiveness and efficiency in the solutions proposed.

This is a hybrid or blended master's degree; there are both face-to-face (at least 40% of hours) and virtual training activities. The teaching methodology consists of theoretical lessons and learning based on projects/problems as well as the resolution of practical cases and debate.

This Master's Degree consists of 60 ECTS divided into a single academic year and 10 compulsory subjects, 1 optional subject and a final master's thesis. The syllabus includes an optional internship in a company.

Below is the syllabus of the master's degree based on the compulsory subjects and the optional subjects offered, of which only one of them will be taken.

Compulsory subjects:

- Fundamentals of rehabilitation
- Legislation on rehabilitation and urban regeneration
- Graphical BIM representation environments
- Assessment of building pathologies
- Pathology of envelopes
- Restoration and rehabilitation of buildings
- Economic management
- Energy Efficiency in the built heritage
- Environmental planning and management
- Thermography and sealing
- Master's Thesis

Optional subjects:

- Materials innovation
- Architectural survey techniques
- Internships in a Company

6. Master's Degree in Building Rehabilitation and Urban Regeneration (RERU) - Univ. Politécnica de València

This master's degree is offered together with 4 other related degrees. The training offer includes *a Master's Degree, two Specialisation Diplomas and two Expert Diplomas*.

It is mainly aimed at people linked to architecture and urban planning and other engineering courses linked to the building sector. Its purpose is to train students to manage and resolve both comprehensive urban regeneration processes and the refurbishment of collective housing buildings constructed mainly in the decades between the 1940s and 1980s.

The final objective is to make theoretical training compatible with calculation and the resolution of practical cases that allow the student to finish the course with the criteria and resources to face real problems.

The Master's degree lasts one academic year and has a teaching load of 78ECTS divided into 27 subjects.

Two groups of subjects can be distinguished, a first block made up of subjects related to urban regeneration and a second block of subjects on the building scale. The subjects include the final projects that give access to the various degrees that are offered and included in the master's degree.

1. Introduction to Building Rehabilitation and Urban Regeneration
2. Regulations and implementation of the Urban Regeneration project
3. Procedures in Urban Regeneration
4. Diagnostic and analytical techniques for Urban Regeneration
5. Long-term planning and forecasting techniques
6. Urban Regeneration Strategies
7. Good Urban Regeneration project practices
8. Designing urban spaces with environmental criteria
9. Regeneration of "mature" tourist areas
10. Thinking the city
11. Regeneration and conservation of historic centers
12. Spatial and material policies for smart urbanisation
13. *Final project for a specialist diploma in urban regeneration*
14. Inspection and diagnosis of buildings
15. Energy analysis of buildings
16. Improving the energy efficiency of collective housing buildings
17. Energy rehabilitation project for buildings
18. Management of building renovation
19. Intervention on building envelopes
20. Improving the accessibility of buildings
21. Improving acoustic conditions in buildings
22. Improving air quality in buildings
23. Obtaining stresses in rehabilitation. Structural model
24. Assessment of loads and residual strength of structural elements
25. Intervention on reinforced concrete structures
26. Rehabilitation project of reinforced concrete structure buildings.
27. *Final Master's Project*

The following diagram summarises the issues addressed in each of the formations analysed, highlighting the issues that are most represented.

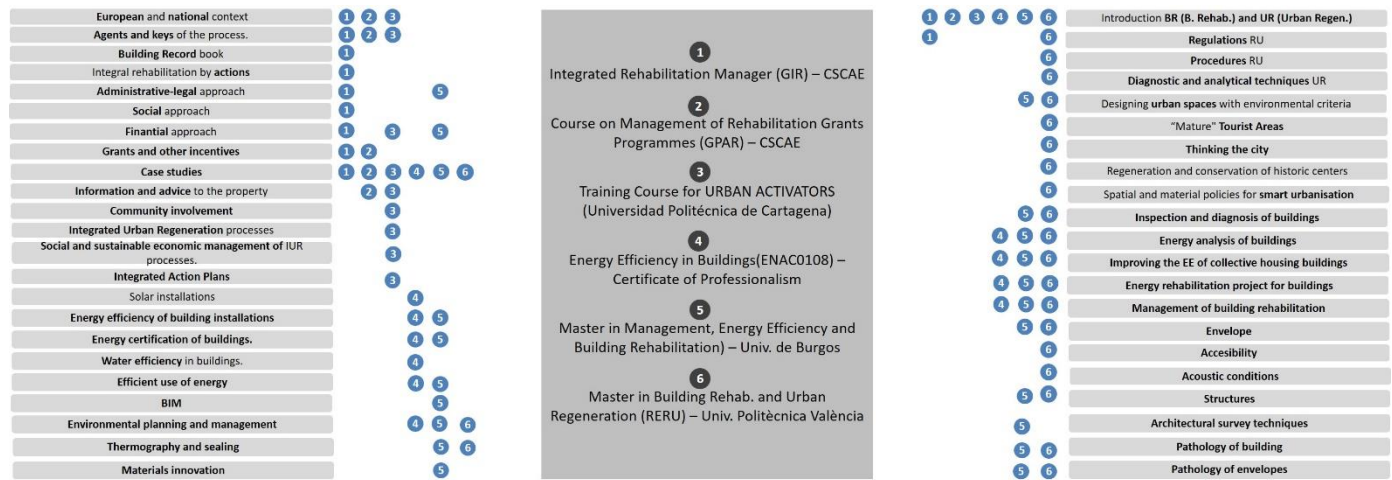


Figure 16. Outline of the contents and themes of the training courses analysed. Source: Own elaboration

31. TRAINING FOR THE OFFICE PERSONNEL

From the analysis presented in the previous sections, the criteria for the design of the training proposal for the staff of the OSSs have been defined. Firstly, the complementary modular structure has been identified as the appropriate one to respond to the diversity of profiles and the flexibility and transversality of the roles identified. On the other hand, two levels of competences have been established: basic knowledge that must be acquired by all the people working in the offices; and other specialised competences that can be studied according to the needs and requirements of each office.

31.1 COMPLEMENTARY MODULAR STRUCTURE

Based on the results obtained from the previous analysis of the training proposals of reference and the definition of profiles and roles of the office staff, an initial proposal has been designed with the objective that the training programme should enable the staff of the OSSs to respond to the demands of the reality of an Opengela.

Complementary modules are designed; the two initial modules (M1 and M2) cover the necessary basic skills and knowledge to be acquired by all persons working in the office and another set of modules (M3, M4....MX) go into more specific topics covering an urban regeneration process.

The structure is designed in order to serve as a small-format training proposal, as continuing education or as specialised training if several modules are combined.

The specifications in terms of credits and teaching hours have not been defined, on the understanding that this will be done once the format in which the training proposal is formalised has been determined.

The following figure shows the training proposal with a modular structure and two levels, basic training and specialised training.

BASIC TRAINING

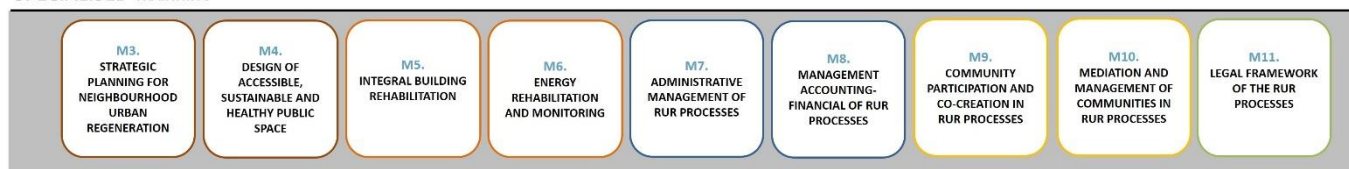
SPECIALISED TRAINING


Figure 17. Training proposal with a modular structure and two levels: basic and specialised training. Source: Own elaboration

31.2 TRAINING AND CONTENT OF BASIC TRAINING

A “Basic Course in Rehabilitation Management” is proposed, consisting of 2 modules; a first module of theoretical-practical character (M1) and a second module of intership to be carried out in the Opengela offices (M2).

The first theoretical and practical module M1 is divided into 8 thematic blocks. These themens respond to the subjects identified as necessary to deal with the daily work of a neighbourhood office.

The first content blocks of M1 focus on general and transversal issues - Conceptual Framework, Opengela Model, Urban Regeneration, Building Rehabilitation) and the successive blocks focus on the areas of specialisation according to each role and/or professional profile of the office team - Administrative Management, Accounting Management, Legal, Social Mediation - The following figure shows in detail the proposed content programme of Module 1 of the basic training:

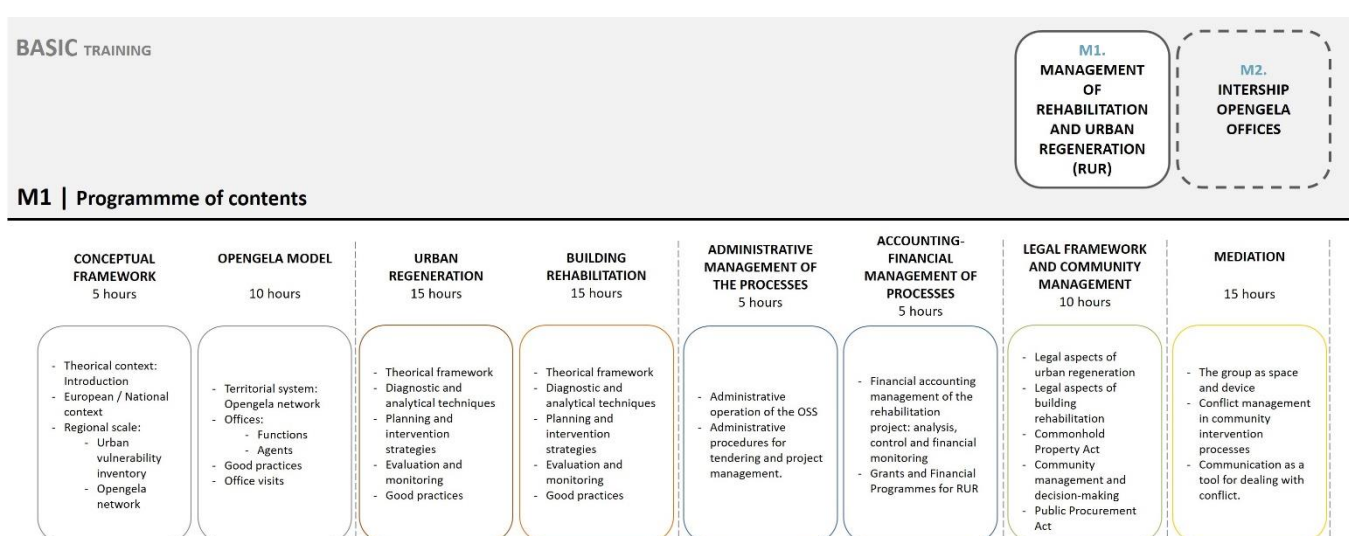


Figure 18. Proposed contents of Module 1 of the Basic Training course Source: Own elaboration

The aim of this training proposal is to ensure that all office professionals, regardless of their technical training and initial area of specialisation, are trained in all subjects related to the functions of the OSS in order to have a comprehensive vision of the process, giving rise to more flexible and transversal professional profiles. In this way, office staff will have a basic knowledge of all the disciplines that integrate the day-to-day work of the OSS, providing all professionals with a transversal vision that is essential and enriching when it comes to effectively OSSs operation.

31.3 TRAINING AND CONTENT OF SPECIALISATION TRAINING

Once the Basic Training "*Basic Course in Rehabilitation Management*" has been completed, it is now proposed to complement the basic course with a Specialised Training made up of a range of thematic modules specialised in the different areas of work of an OSS. In this way, professionals will be able to acquire a deeper and more specific knowledge of the different topics.

It is planned that the initial offer of these specialisation courses may vary and adapt to the needs and topics detected as priorities in terms of carrying out the development of all the processes and procedures involved in building rehabilitation and urban regeneration actions in the areas in which the Opengela Network operates.

The target is that all professional profiles should attend all modules, despite their original area of specialisation, thus creating the flexible and transversal roles needed in the offices.

At this preliminary stage of the proposal, the detailed programme of contents of each specialisation module has not been developed, on the understanding that this will be done once the format in which the training proposal is formalised has been determined.

The following figure shows the proposal for specialised training structured in thematic modules.

SPECIALISATION TRAINING

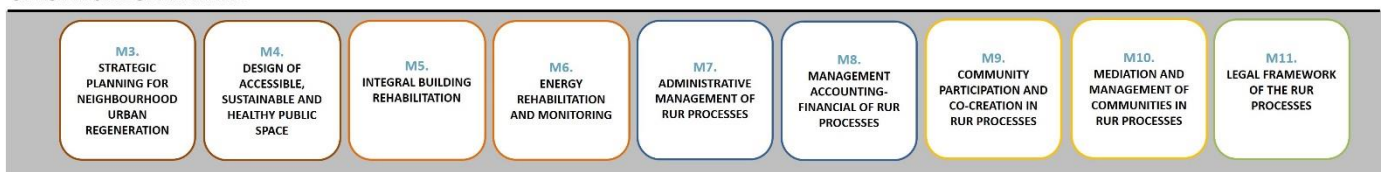


Figure 19. Proposal for the specialised training course based on thematic modules. Source: Own elaboration



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