



Save the Homes

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1 Executive Summary

The overall aim of **Sav€ the Homes** is to contribute to an increase of an annual renovation rate of > 5% by offering attractive One Stop Shops (OSS) services to homeowners, managed and implemented by municipalities as being trustworthy entities for citizens. This is achieved by the implementation of OSS Citizen Hub concept, offering renovation offices, both as physical hubs and web-based virtual hubs at local level based on the concept of medium-sized cities and to maximize replicability, at national and EU level.

Sav€ the Homes will:

1. Offer a full customer journey in 5 stops:
 - Stop 0 Onboarding
 - Stop 1 Design: Social design by co-creation with the homeowners
 - Stop 2 Elaboration: Organizing the financing, purchasing of renovation kits and the preparations for the construction of the renovation works
 - Stop 3 Construction: Realization of proven quality in interaction with homeowners and a peer-to-peer Renovation Community, as part of the Citizen Hub
 - Stop 4 In-use: Monitoring of total performances in practice for ensuring sustainable quality of building and user experience
2. Create strong networks and trustworthy partnerships with local actors in the whole chain
3. Create locally developed and organized financing and investment pipelines

The integrated home renovation services will be established within already established OSS networks at the city (City of Rotterdam) and regional (Comunitat Valenciana) level in two EU countries, building upon existing energy targets and networks so far well established at the city levels where it brings a new method and mechanism on how to improve the existing interactions between the relevant organizations and stakeholders. It holistically connects renovation advisory, products and services, finance opportunities and legal advice with a building owner at a single point. By involving relevant EU umbrella organizations, the concept will be further promoted in other member states to come to a harmonized method applicable at EU level.

The **WP2** objective is mapping of the demand and supply side as a foundation to build successful Citizen Hubs. The demand side aggregation helps understanding who the customers are, their pain points and motivational drivers for the renovation. For the identified personas, the customers journeys will be mapped according to each location context.

Supply side aggregation is fundamental to provide optimal offer, improve trust and awareness of homeowners, reduce renovation costs and time, and mainstream innovative technical solutions adapted to the local context, allowing for regional replicability and business risks reduction. As part of the Citizen Hub services, energy retrofitting products and services will be clustered to reduce fragmentation of the renovation process. To increase trust and ensure sufficient quality, these solutions will be verified to assess their applicability which can ease the decision making as also allows for a fair and reliable comparison between the solutions. The supply side means everyone who can be a single-point of contact in a one-stop-shop solution like manufacturers, service providers, contractors, architects, engineers, energy consultants, government etc.

Mapping of the current situation at different levels is a pre-requisite to understand the demand and supply at the different scales: local, regional, national, and European level.



2 Introduction

This deliverable deals with the mapping of the current situation at different levels, as a pre-requisite to understand the demand and supply at the different scales: local, regional, national and European level.

In this context, the whole ecosystem of key stakeholders has been investigated first for the pilot cities, then a methodology has been defined, and finally the follower cities have evaluated if the methodology can be replicated to other cities.

1. The demand side mapping and segmentation covers both, buildings as the building's owners. Surveys and inquiries will be done to understand the building owners' profiles (household size, age, background, education, literacy, etc.) in order to understand their needs and opportunities for engagement campaigns and several buyer's persona will be created.
2. The buildings segmentation allows to understand better which neighbourhoods should be renovated first (buildings typologies). Buildings aggregation schemes for the cities will be proposed. Aggregation of dwelling or buildings of similar characteristics and/or in a delimited area will be done with strength to get better understanding and conditions for all later renovation process steps.
3. In order to achieve the supply mapping and segmentation, the first step is to define the supply stakeholders that should be negotiated to channel their offer through the office.

Therefore, this report presents the pilot cities ecosystem of stakeholders and data sources, and the segmentation achieved according to a series of steps that will define the mapping methodology, then, it present the fittingness for replication in different contexts, a same country situation, and a different country situation. The methodological framework and step by step process can be found on the Annex 1, to be used by any interested city or region.

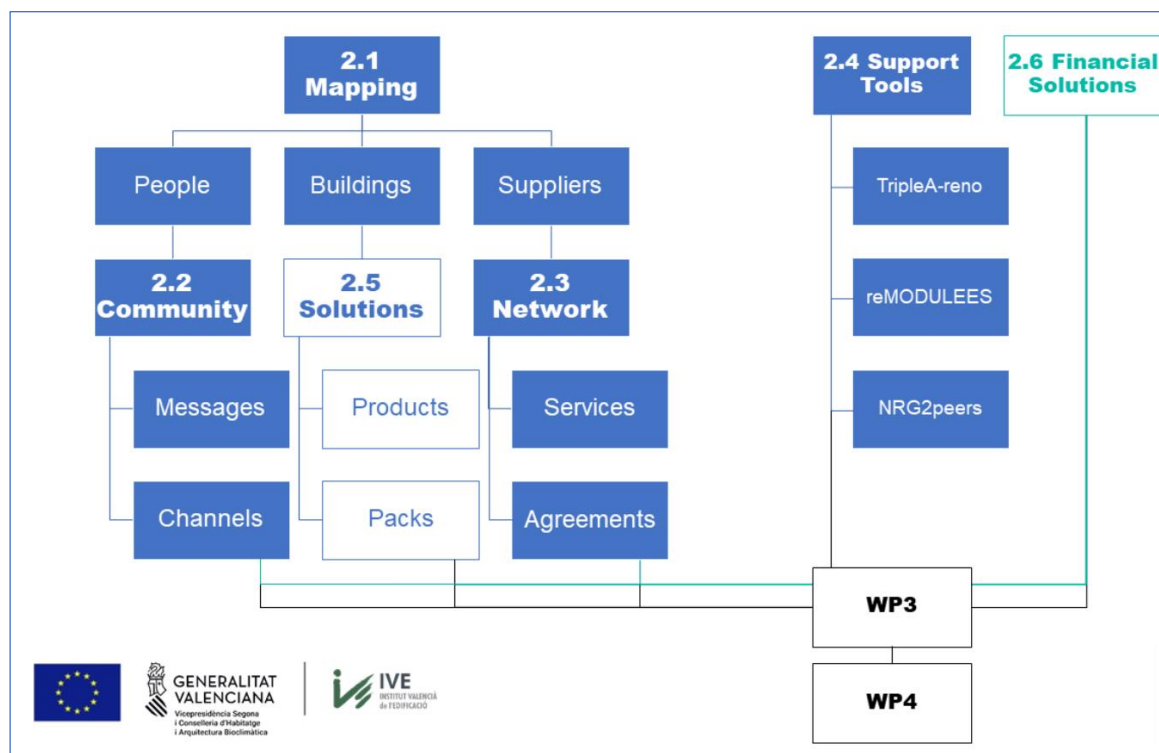


Figure 1.- WP2 strategy

3 The previous experiences

(Analysis and conclusions from collected previous experiences)

The Europe 2020 Strategy¹ sets out the vision of a social market economy for Europe in the 21st century. It aims at transforming the EU into a smart, sustainable and inclusive economy with high levels of employment, productivity and social cohesion and at reinforcing the EU as an actor in global governance.

In this context, the Spanish government launched in 2010 a social platform with the aim of promoting the retrofitting, accessibility and energy efficiency of buildings and housing (*Plataforma RHÈ+*). Its activity was intended to be based on inter-institutional collaboration and with the private sector, supported by the creation, from this sector, of a network of Technical Offices to help citizens.

Since then, numerous tools -beyond guides and traditional supporting documentation- have been developed to help and support citizens in the process of retrofitting their homes, usually associated with one of the following groups:

- A. Physical offices.
- B. Web tools/platforms.
- C. Professionals
- D. In-store assistance from the building materials/supplies sales companies themselves.

Some of these tools (mainly physical offices) are the result of research and innovation projects focused on supporting and boosting the retrofitting process in the residential sector. These are some of the projects with the greatest impact and whose main results will be taken into account within the framework of Save the Homes, but a more extensive and wider analysis is being carried out in **T3.3**:

- **OPENGELA – HIROSS4all.** OPENGELA is a H2020 project to spread urban regeneration in the Basque Country (Spain) through neighbourhood offices acting as OSSs and providing advice and support to individuals and communities of owners who want to renovate their residential buildings. The project kicked-off on May 2019 and is based on five main features:
 1. It is a neighbourhood-based project, whose focus is to build trust among residents whose neighbourhood is being regenerated, providing them with a physical contact point to solve any possible issue arising during the building renovation journey.
 2. A combination of energy efficiency measures with other additional elements -accessibility, health- and having a social focus, focusing on the most vulnerable neighbourhoods.
 3. An innovative financing mechanism, building on the experience of the tax based EuroPACE programme.
 4. A vocation for dissemination in the region, starting from two specific pilot projects but aiming to become a replicable model throughout the Basque Country.
 5. A combination of bottom-up and top-down approaches, framing specific pilot cases within solid regional strategies: Basque Urban Agenda, Basque 2030 Agenda for Sustainable Development Goals.

The project is driven by the Basque Government and there are two pilot projects in the region:

 1. Otxarkoaga (Bilbao), in five apartment buildings encompassing 240 homes.
 2. Txonta (Eibar), in 221 homes.

¹ European Commission: Europe 2020. A strategy for smart, sustainable and inclusive growth. COM (2010) 2020 final, Brussels, 3 March 2010.





The offices are aimed at accompanying individuals and communities of throughout the whole renovation process (by supporting them in the preparation of administrative documentation, contacting energy service contractors, applying for financial support, etc.).

- **EuroPACE.** It is a project to establish financial solutions to address neighbourhood regeneration in scalable ways. The aim is to address barriers to decision-making and the scale of renovation projects. The renovation formula has been set for Spain, based on 3 elements:
 1. Technical assistance to homeowners.
 2. Affordable financing (for low-income houses).
 3. Smart funding (participation from public administration for the creation of guarantee funds to make building renovation available for low-income citizens).

The project is based on the experience (PACE) in the United States, a system covering up to 100% of project costs and reimbursed as a special assessment added to the property tax bill for up to 20 years. The loans use the house as collateral to protect the financing being made. The advantages are the risk profile and offering homeowners a long-term financing solution.

- **HousEInvest.** It is a H2020 project which started on March 2018 to create a new financing model for the energy retrofitting of multifamily housing in Extremadura, counting on a combination of innovative tools for standardization, pooling, bundling and de-risking. It is the result of two years of work between key institutions in Extremadura region from the energy, economic and construction sectors, combined with international resources from EIB and EU cooperation programs. This project is also intended to introduce EU added value through the combination of several proved innovations, which are applied and customized for the multi-family buildings with central heating.
- **INNOVATE.** It is a H2020 project which ended in October 2020 and developed one-stop-shops and integrated energy efficiency service packages for homeowners to motivate them to carry out deep energy retrofits of their residential buildings. The packages included the development of products adapted to customers' concerns, independent advice and technical assistance, tailor-made financial advice, and coordination of a chain of suppliers/contractors, among others. As a pilot of this project in Spain, the region of Extremadura launched OSS in both the region's provincial capitals: Cáceres and Badajoz.
- **TURNKEY RETROFIT.** It is a H2020 project which started on June 2019 to develop and replicate an integrated home renovation service to be initially operated in France, Ireland, and Spain. The service will be accessible through a user-friendly digital platform (**Solutions4renovation**) and is being developed as a home-owner-centric renovation journey. The goal is to transform the current complex and fragmented renovation process into a simple, straightforward, and attractive process for homeowners, by offering them tailor-made solutions through the whole customer journey. This service will be developed until February 2022 and it is expected that:
 1. It will include the initial technical and behavioural diagnosis, technical offer, contract development and agreement, structuring and provision of financial support, on-site coordination of works and quality assurance.
 2. It will address drivers of building renovation going beyond a desire to reduce energy bills and increase asset value, such as home improvement, increased comfort, enhanced health, and quality of life.
- **BETTER HOME.** It is an industry OSS solution developed as a private initiative in Denmark, acting as a facilitator for a better communication between the actors involved in the renovation project. The owner meets one certified installer who becomes the single point of contact for the whole process (and who also follows-up afterwards). The installers receive training, guidance, and



support. Both owners and installers are provided with a digital platform to follow all the energy renovation process in an interactive and visual manner. Regarding funding, the companies recover the investment through a general increase in demand for their products but do not require them to be used in the works.

- **OKTAVE.** It is an integrated home renovation service initiated in France to help homeowners reaching the low energy renovation standard (BCC Renovation). The services offered include personalised support by an advisor, a range of solutions adapted to the specificities of each home, effective aid for both the renovation works and the financing, and selected, trained, and experienced craftsmen and companies.
- **ORFEE.** It is a H2020 project currently in course which aims to create a shared platform for the attention of third-party financing companies in France. The project covers a wide variety of topics including support for energy renovation projects, building ventilation and insulation, financing, legal expertise, and construction insurance.
- **PRORETRO.** It is a H2020 project currently in course within OSSs will be developed and put to test in five German cities and regions. It aims to cover the whole customer journey (audit/advice, planning, contracting, implementation, monitoring) to support owners of residential buildings. They also count on peer-to-peer learning from other EU countries having implemented successful OSS business models.
- **RENOBOOSTER.** It is a H2020 project currently in course in Vienna for the creation of a OSS solution to help the owners of century-old multi-story buildings renovating them. The project will include all necessary services (consulting, banking, technical and legal framework) and will test new technologies, ecological and economical solutions.
- **SUPERHOMES.** It was first launched in 2017 in Ireland as a two-year research programme with the aim of optimising air source heat pump technology in domestic retrofits. Currently, SuperHomes2030 is a H2020 project in course which will develop four regional OSSs to provide quality retrofits all over the country. They will create open-source energy performance data platforms and optimise technical analysis, design systems and solutions, and will support a Deep Retrofit Community of Practice across Europe to share experience, knowledge and competence.

A. Physical offices

Within the Recovery, Transformation and Resilience Plan approved by the Council of Ministers in April 2021 to access the Next Generation European funds, one of the pillars will be the housing rehabilitation program. There will be direct aid or subsidies to boost this process, part of which will go to the one-stop-shops. The creation of regional or supramunicipal refurbishment offices as a support mechanism was proposed in 2019 in the public participation process for the third version of the Long-term Strategy for Energy Rehabilitation in the Building Sector in Spain (ERESEE 2020).

At the end of 2019, in the study “Recent innovations in Spain in urban rehabilitation and regeneration”, also drafted in the framework of the ERESEE 2020, the following one-stop-shop initiatives at the regional level were highlighted:

- Neighbourhood offices (OPENGELA) that act as one-stop-shops in the Basque Country, centralizing the procedures related to the integral building retrofitting (from administrative paperwork to contact with the professionals involved in the work, or the channelling of financial aid). These offices were created within the framework of the European HIROSS4all project mentioned above and are aimed at individuals and homeowners’ associations, which they accompany from the beginning and involve in the renovation process. In an initial phase, two pilot projects were launched in the neighbourhoods of Otxarkoaga (Bilbao) and Txonta (Eibar).





- The Housing and Building Retrofitting Offices in Navarra (*Oficinas de Rehabilitación de Viviendas y Edificios, ORVE*), which offer personalized information for the realization of repair works, improvement and/or adaptation to the regulations in dwellings or residential buildings destined to the habitual and permanent residence. These citizen assistance offices were created in 1986-1987 -many of them have been in existence for almost 30 years- and are located in nine localities of the autonomous community. Navarra region also has an informative web portal on rehabilitation.
- The Office of Integral Services for the energy Retrofitting of housing in Extremadura (*Oficina de Servicios Integrales para la Rehabilitación energética de viviendas, OSIR*), also linked to European projects (HousEInvest and Innovate). The office offers technical, financial, and legal assistance and advice, both to homeowners and homeowners' associations, during the entire renovation process, with the objective of the integral energy refurbishment of multi-family and single-family buildings in the region.
- The Network of Retrofitting Offices and Rexurbe Centres and Forum of Historic Centres for Retrofitting Offices in Galicia (*Red de Oficinas de rehabilitación y Centros Rexurbe, Foro de Centros Históricos para las Oficinas de Rehabilitación*). One of the goals of the Forum is to publish information to citizens on the different actions carried out in the retrofitting tasks. It also aims to exchange information between the Retrofitting Offices.
- The Network of Information Offices for Retrofitting (*Red OIR, Oficinas de Información para la Rehabilitación*) in the Valencian Community, with the aim of raising awareness of retrofitting among citizens, and also aimed at professionals in the construction sector, through training and information. The network's member municipalities provide an information point for their citizens and professionals, centralizing up-to-date information on subsidies, regulations, and renovation best practices.

Since the publication of this study, other autonomous communities/cities have developed one-stop-shop mechanisms based on the effectiveness and acceptance of the aforementioned examples. Some of them are:

- Olot, a municipality in Girona. As a result of the EuroPACE project, they developed the integrated programme HolaDomus to accompany homeowners throughout the whole energy renovation process of their homes, providing them personalized technical, administrative and financial advice.
- Barcelona City Council. Since October 2020, it offers specialized attention to its citizens through a one-stop shop, streamlining procedures and licensing. Another of the functions of the new office is to draw up a catalogue of best practices for retrofitting adapted to Barcelona, considering the materials, the state of the buildings and the climate.
- The Community of Madrid. At the end of last April, the creation of a Retrofitting Office in the region was announced. It will operate as a one-stop-shop offering information and services. The office will also be used to process regional retrofitting subsidies. In addition to streamlining processes and centralizing information, the office aims to reactivate the professional activity of architects by creating a pool of specialists.

B. Web tools/platforms

Almost all web tools/platforms have a directory of professionals or allow users to request quotes online. In general, they could be included in the following three categories:

- Tools for the **search of professionals**, which seem to arise in response to people unable to find the right professional they trust when hiring services. Some examples are:
 - **Houzz** (<https://www.houzz.es/>), an on-line platform with a directory of professionals who use the site to connect with homeowners. Customers can use the platform to search through different types of professionals for hire, view their previous projects, and begin a discussion with them with questions and inquiries.





- **Workuu** (<https://workuu.com/>), which is an APP that helps users to find the closest and best rated services. There is a selection by categories (more than 50, including the “home” category, which applies in this case), where users can find all the information about the service and contact the professional to solve their doubts and queries.
- Tools for **requesting quotes**. An example of this category would be **3presupuestos** (<https://www.3presupuestos.com/>), which is an on-line platform where the user, after having specified the details of the service needed, receives 3 quotes for free with no obligation to perform the service afterwards. It is free of charge for both users and professionals.
- **Multi-service tools**, most of which combine the search for professionals and the request for quotes:
 - **Solutions4renovation** (<https://www.solutions4renovation.eu/>). It is an on-line platform developed within the framework of the EU H2020 Turnkey Retrofit project mentioned above. It allows homeowners not only to perform a free online diagnosis and select professionals and financing options. Beyond that, the platform provides homeowners with information about their homes, recommendations on improvement potential, access to information and management of public-private financing opportunities, monitoring of works and quality control, coordination of all contractors involved in the works, commissioning and subsequent evaluation of the works and building performance, and maintenance. It is the only platform that explicitly addresses housing blocks.
 - **Cubicup** (<https://www.cubicup.com/>). It is an on-line platform which, besides allowing to contact professionals and request quotations, offers additional services during the renovation works such as search for financing, payment management, legal advice, technical monitoring/supervision of the works, processing of grants, etc. depending on the contracted plan. Also depending on the contracted plan, the user will pay a percentage of the work budget. According to the information published on their own website, they have provided services to some 250 homeowners in four autonomous communities.
 - **Habitissimo** (<https://www.habitissimo.es/>). It is an on-line platform that helps households to find professionals and to request quotations from them. Professionals register in the platform’s directory by paying a fee to offer their services. When a particular user requests a quote, professionals performing that requested work in the area view the ad/request and decide to purchase it. All contact between individuals and professionals is direct, and the platform does not act as an intermediary in the process of information, negotiation, contracting, etc. between both parties. Habitissimo was founded in 2009 and is present in 9 countries in Latin America and Southern Europe (in Spain, Italy and Portugal, in the latter case). It has a network of more than 1,800,000 construction professionals and, according to data published on its own website, more than 10 million households have used the platform to find professionals for renovation/repair work.
 - **Pro2meet.es** (<https://www.pro2meet.es/>). It is a free on-line platform, both for users and professionals, allowing two options: direct contact with the professionals or requesting quotes. As direct contact depends on the availability of the professionals, there is also the option to detail the project and request quotes (up to 3 available professionals will contact the user to offer their quotes). According to the data available on the website itself, they have a directory of about 350 professionals throughout the national territory.
 - **Doméstiko** (<https://www.domestiko.com/>). It is an on-line platform for all kinds of home services with a specific section for renovation and maintenance works. It has a directory of more than one million professionals (for all domestic services offered, not only for the specific section mentioned) organized in categories by sector of activity, provinces, and localities. The platform allows to request quotations and also direct contact with professionals. It is free for both users and professionals.





C. Professionals & Companies

With the endorsement that the energy refurbishment of buildings has the capacity to generate up to 80,000 jobs a year, Spanish associations including ANESE (National Association of Energy Services Companies) and A3e (Association of Energy Efficiency Companies) signed the **Retrofitting the future manifesto** in June 2020. The associations signing the manifesto bring together more than half a thousand companies, professional and business associations, research centres, academic institutions, and technology centres, from the entire value chain of the energy efficiency sector in the construction and renovation of buildings. One of the lines of action proposed by the signatories of this manifesto, an appeal to the Administration, is the creation of municipal OSSs for the streamlining, promotion, communication, and management of local energy retrofitting programs.

Besides that, ANERR, the National Association of Renovation and Retrofitting Companies, has created the **ReformANERR** portal (<https://reformanerr.com/>), which stands out in this group, for requesting quotes for renovation/retrofitting works and projects. The requests are sent to the associated companies so that they can offer these demands. The associated companies guarantee a quality service, immediate response to the requests of the applicants, free technical advice, and free estimate of budget without commitment.

This platform aims to be useful not only for private homeowners, but also for homeowners' associations and property managers, providing additional services that can be especially useful for them when undertaking a refurbishment, such as energy refurbishment feasibility studies and possible subsidies (these studies are not free of charge, but are fee-based).

On the other hand, other initiatives included in the report "Initiatives and business models for building renovation. A global comparative" (Naturgy Foundation, January 2021), also propose in their approach the collaboration with professional associations, among which property managers are usually highlighted. It should be noted that, in the case of business models and initiatives aimed at the refurbishment of multifamily buildings, a crucial success factor lies in achieving the alignment of all owners. **EOS Energy** (2019, Spain) **Operene** (2014, Spain) and **SiRE** (Spain, 2015) are among the business models targeting the OSS-based multifamily building market in this report. The aforementioned ReformANERR web is part of the SiRE platform, which aims to become the meeting point for all the actors involved in the refurbishment process. SiRE also provides citizens with advice, information, and knowledge on how to reduce their energy bills through retrofitting their homes.

Finally, private sector has started to run this path by its own, and we can find initiatives such as **Woab** - woningabonnement (www.woab.nl), a company that aims at supporting homeowners of single family houses, also from low income, go through the whole customer energy renovation journey, including financing or **Energiesamen** (<https://energiesamen.nu/>), an umbrella organisation which aims at helping local initiatives with sustainable goals.

D. In-store assistance

In recent years, many DIY, material/supply and even furniture retail chains have expanded their business and started to include services for renovation works to their customers. They usually work as intermediaries, putting users and professionals in contact with each other, and selecting and evaluating companies.

One of the best-known examples is **Leroy Merlin's** Hogami marketplace, already tested in Madrid and the Canary Islands and currently operating in six autonomous communities, where customers can find professionals offering several home-related services. Leroy Merlin selects the professionals, who gain visibility by being on the platform, and charges a commission for the works. Another example is the renovation services offered by **IKEA**, with has REHUBIK, a company in the construction sector, dedicated to renovations exclusively for them.



4 The pilot cities ecosystems

According to Objective 1 (to make home renovation easier, faster and more affordable for homeowners by designing an economically sustainable citizen-oriented OSS model, 'Citizen Hub', to be deployed by municipalities), the 'Citizen Hub' is an OSS model endorsed by a municipality, a trustworthy entity ensuring that the process is independent, transparent and of high quality for their citizens. It is specifically focused on enhancing the homeowners' experience throughout the home renovation journey, and therefore, the Citizen Hub modules (technical renovation kits, financing offers, audits, etc.) are to be developed by relevant local experts and combined into a holistic offer endorsed by municipalities.

Sav€ the Homes will create innovative 'integrated home renovation services' within already established frameworks for OSS networks at the City of Rotterdam, the Netherlands, and Municipality of Valencia, Spain. The project builds upon the existing climate targets set by the two cities (according to the initiative of Covenant of Mayors (CoM) for Climate & Energy, 15% of the mitigation actions and 9% of the adaptation actions proposed by cities in their Sustainable Energy and Climate Action Plans address residential buildings²).

4.1 Comunitat Valenciana – ES

The Comunitat Valenciana (Valencia Region) is a region of Spain. With more than 5 million inhabitants, it is the fourth most populous region in the country, and its capital city, Valencia, is the third largest city and metropolitan area in Spain. It is located along the Mediterranean coast on the east side of the Iberian Peninsula.

The geographical scope for this pilot experience will be local at first instance, and then regional, as a replication phase). Therefore, cities involved are the City of Valencia (815,440 inhabitants) as front-runner and partner of the project, and the follower cities in the region: City of Elche (230,000 inhabitants), City of Gandía (74,000), Municipality of Onda (12,000 inhabitants) and City of Alcoi (59,000 inhabitants), supported by the Regional Government (all of them signed project Letters of Support)

4.1.1 Actors involved

The Valencian OSS service provider presents a combination of three **project partners**: VEC, IVE and VRCP. Thus, Citizen Hub will be facilitated through the network of VCE (an entity promoted by the City Council of Valencia) providing the service for the city of Valencia; IVE supports the network of OSS offices through knowledge, expertise and tools for deep renovation; and VRCP acts as the main contact point with individual owners. Furthermore, Valencian Government of Housing and Bioclimatic Architecture (LoS), supported by IVE, will be promoted the establishment of OSS offices along the region.

Also, the Sav€ the Homes **Advisory Boards** (StHAB) have a pivotal role in establishing sustainable networks to support the local eco-systems and have four working sub- groups each representing different target groups, each one linked to a specific work package, to support its objectives. For WP2, the Demand and Supply side Advisory Boards are to be set up on. For a maximum impact and to ensure that the final results will be rolled out on a larger scale, the members of this boards are to be actively

² Covenant of Mayors figures: <https://www.covenantofmayors.eu/about/covenant-initiative/covenant-in-figures.html>



included during the project as advisers. For the Spanish pilot, boards are based on stakeholders supporting the project through LoS and will be enlarged according to project progress. Therefore, initial contacts made for this task include:

Demand side – Private AB: Building owners and organizations (association of final users and consumers)		Demand side – Public AB: City councils, local governments, and regional/national organizations such as Public Housing Providers or Associations of public condominium members		Supply side AB: Producers, suppliers, contractors etc. with good reputation and references on local level	
Consumers associations	Unió de Consumidors de la Comunitat Valenciana	Local government	Ajuntament d’Onda	Property Managers	VRCP – Colegio de administradores de fincas
	Asociación Valenciana de Consumidores y Usuarios (AVACU)		Ajuntament de Gandia		Consejo Valenciano de Colegios de Agentes de la Propiedad Inmobiliaria (API)
condos	N condominiums through VRCP members		Ajuntament d’Alcoi		Asociación española de Gestores Públicos de Vivienda y suelo (AVS)
Neighbours’ association	N associations through VCE contacts		Diputació de València	Professionals	Colegio Oficial de Arquitectos de la Comunidad Valenciana (COACV)
	N associations through IVE contacts		Promociones e Iniciativas Municipales de Elche (PIMESA)		Colegio Territorial de arquitectos de Castellón (CTAC)
			Federació Valenciana de Municipis i Províncies (FVMP)		Colegio Oficial Ingenieros Industriales (IICV) - contacto VCE
		Conselleria d’Habitatge i Arquitectura Bioclimàtica	COGITI - contacto VCE		
		Basque Government - Environment, Territorial Planning and Housing	Unión Profesional (contacto VRCP)		
Financial side AB: Banks or other financial entity facilitating financing of renovation works (linking demand and supply)				Companies	Asociación Valenciana de Empresas del Sector Energético (AVAESEN)
Banks	Arquia				Asociación de empresas Promotoras de Valencia (APROVA)
	Triodos				Federación Valenciana de Empresarios de la construcción (FEVEC)
	Caixa Popular				Asociación de Promotores Inmobiliarios de la Provincia de Alicante (PROVIA)
	Banco Sabadell				Plataforma Tecnológica Española de Construcción (PTEC)
	Deutsche Bank				ATECYR – Spanish Technical Association of Air Conditioning and Refrigeration
Aggregat.	Prodinamia				
Crowd sourcing	eCrowd				

Table 1.- Initial composition of the Spanish Advisory Boards



4.1.2 Data sources & Collection

(Bottom-up – participatory approach – questionnaires & surveys and Top-down – official standardized statistical sources – data mining)

A. Bottom-up

For this approach, VCE surveys for every visitor, and annual activity report for 2019 and monthly activity report for first semester of 2020 was used.

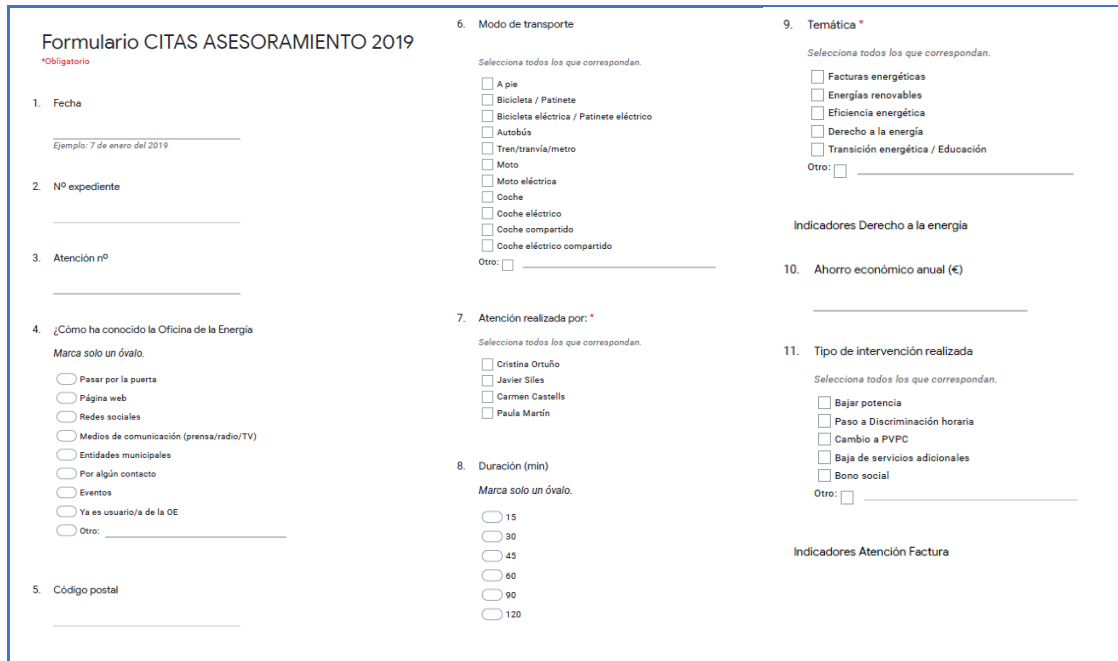


Figure 2.- Energy Office of Valencia survey for individual appointments (via VCE)

Also, a workshop with Property administrators organized by VRCP was used to get feedback from the field.

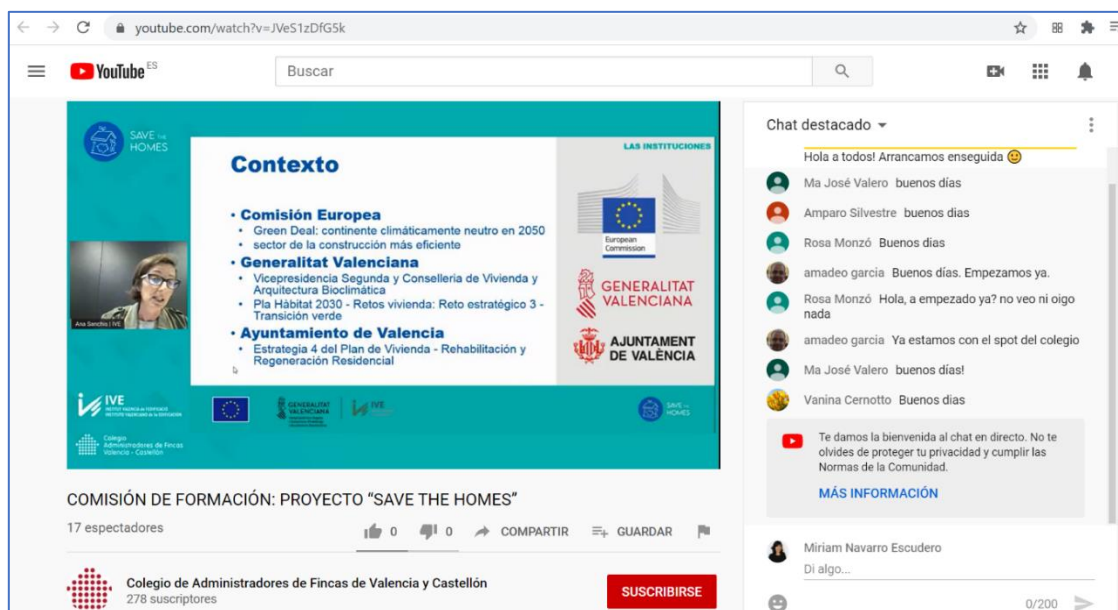
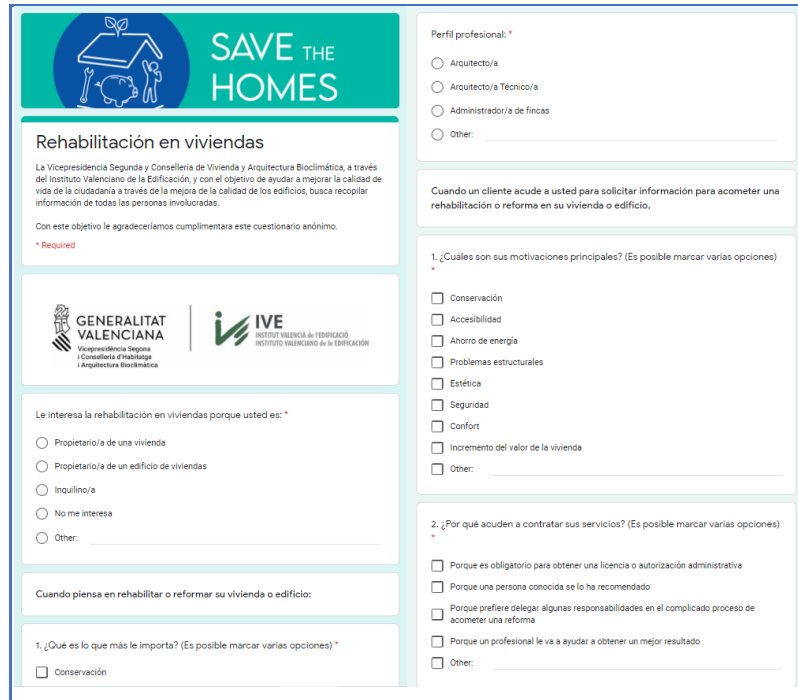


Figure 3.- Screenshot from workshop 1 with property administrators (via VRCP)



And IVE prepared a set of questionnaires distributed during informative sessions on energy renovation experiences and available grants.



SAVE THE HOMES

Rehabilitación en viviendas

La Vicepresidencia Segunda y Conselleria de Vivienda y Arquitectura Bioclimática, a través del Instituto Valenciano de la Edificación, y con el objetivo de ayudar a mejorar la calidad de vida de la ciudadanía a través de la mejora de la calidad de los edificios, busca recopilar información de todas las personas involucradas.

Con este objetivo le agradeceríamos cumplimentar este cuestionario anónimo.

* Required

GENERALITAT VALENCIANA
Vicepresidència Segona
Conselleria d'Habitatge
i Arquitectura Bioclimàtica

IVE
INSTITUT VALENCIÀ D'EDIFICACIÓ
INSTITUTO VALENCIANO DE LA EDIFICACIÓN

Le interesa la rehabilitación en viviendas porque usted es: *

Propietario/a de una vivienda

Propietario/a de un edificio de viviendas

Inquilino/a

No me interesa

Other: _____

Cuando piensa en rehabilitar o reformar su vivienda o edificio:

1. ¿Qué es lo que más le importa? (Es posible marcar varias opciones) *

Conservación

Perfil profesional: *

Arquitecto/a

Arquitecto/a Técnico/a

Administrador/a de fincas

Other: _____

Cuando un cliente acude a usted para solicitar información para acometer una rehabilitación o reforma en su vivienda o edificio.

1. ¿Cuáles son sus motivaciones principales? (Es posible marcar varias opciones) *

Conservación

Accesibilidad

Ahorro de energía

Problemas estructurales

Estética

Seguridad

Confort

Incremento del valor de la vivienda

Other: _____

2. ¿Por qué acuden a contratar sus servicios? (Es posible marcar varias opciones) *

Porque es obligatorio para obtener una licencia o autorización administrativa

Porque una persona conocida se lo ha recomendado

Porque prefiere delegar algunas responsabilidades en el complicado proceso de acometer una reforma

Porque un profesional le va a ayudar a obtener un mejor resultado

Other: _____

Figure 4.- Citizen or professional oriented questionnaires (via IVE)

B. Top-down

For this approach, national data sources (Cadastré³, INE⁴, Government Reports...), regional sources (ICV-GVA thematic cartography⁵, Libro Blanco⁶...), and local sources (Oficina d'Estadística⁷...) were used.

4.1.3 Massive characterization & Segmentation

(characteristics and values on which we focus to segment 'populations')

From analysis of previous experiences in the local context and bottom-up approach, a series of attributes were selected which were affecting the renovation market, so a massive characterization and segmentation could allow to quantify and locate the different groups of interest or clusters (top-down approach)

The demand side mapping and segmentation covers both, buildings as the building's owners so to study the building owners' profiles (household size, age, background, education, literacy, etc.) in order to understand their needs and opportunities for engagement campaigns and several buyer's persona will be created (T2.2). The buildings segmentation allows to understand better which neighbourhoods should be renovated first (buildings typologies) or how to efficiently address their renovation (T2.5).

³ http://www.catastro.minhfp.es/esp/estadistica_4.asp; http://www.catastro.minhfp.es/esp/acceso_infocat.asp

⁴ <https://www.ine.es/censos2011/tablas/Wizard.do?WIZARD=1&reqCode=paso1>

⁵ <https://visor.gva.es/visor/?idioma=es>

⁶ <http://habitatge.gva.es/es/web/vivienda-y-calidad-en-la-edificacion/libre-blanc-de-l-habitatge-c.v>

⁷ <https://www.valencia.es/val/estadistica/mapa-districtes>



The supply mapping and segmentation helps realising the renovation solutions prescribed for building typologies or components and define how to channel their offer through the OSS (T2.3). An exhaustive and separated analysis of the financial side, facilitation the realization of the projects and linking demand and supply side is described in D2.6.

A. Demand side (buildings)

The objective for mapping and segment buildings is to get the greatest effectiveness in the impacts achieved through the renovation process.

As described in Section 3, residential building stock and its renovation **context** in our region is affected by some characteristics such as the introduction of building regulations around 1980; mandatory IEE for 50 years old buildings; EP Certificates not so extended, just when owner wants to rent or sell; good climate so usually no heating systems and bad insulation (mostly windows); protecting from sun heat is important; mostly condominiums with difficult collective decision making; grants for some components; or tax benefits for some components.

Actual zone where the Office is located has been chosen according to demographic criteria (energy vulnerability), but in the future, **zones** are to be chosen in a combination of demographic criteria and residential building typological criteria:

- Building composition: In Valencia, over 90% of residential buildings are **Multi Family Houses (MFH)**, in relation to other typologies shown in Figure 5, such as Apartment Block (AB), Single Family Homes (SFH) or Terraced Houses (TH).

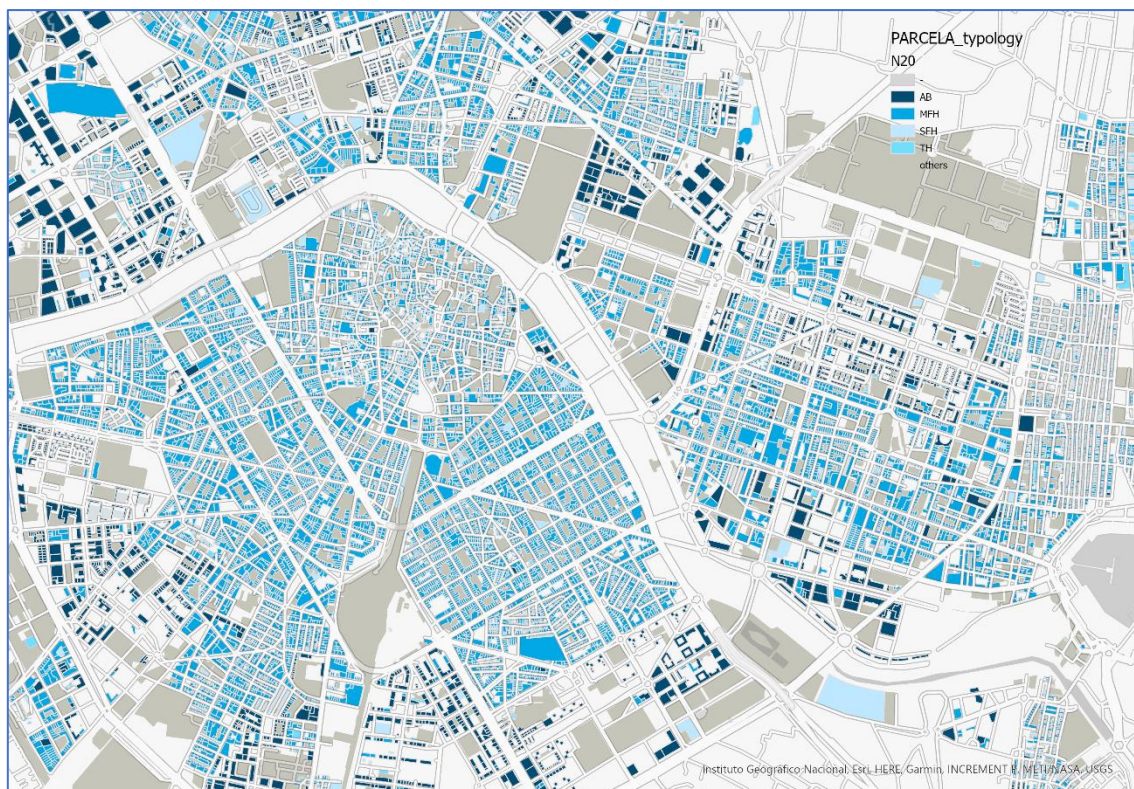


Figure 5.- Building typology distribution in Valencia

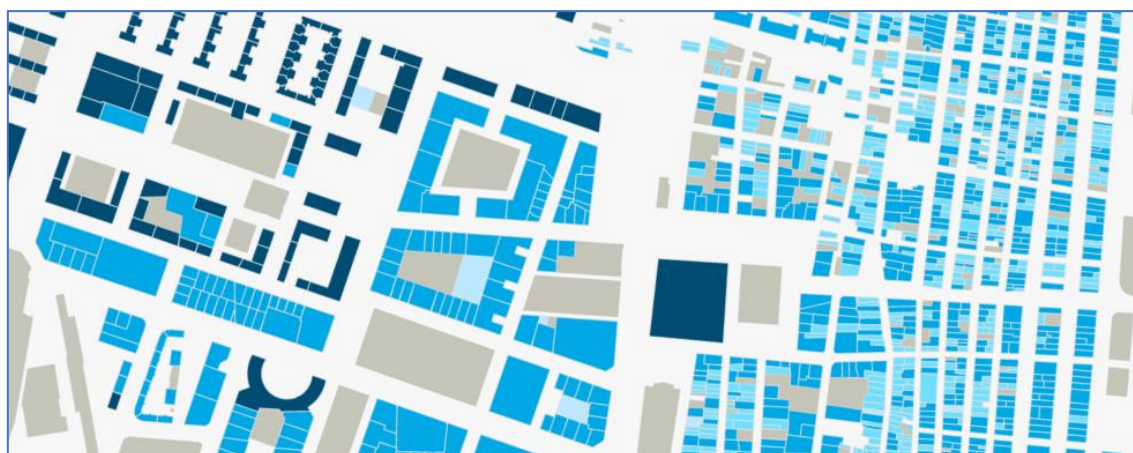


Figure 6.- Building typology distribution around Energy Office)

- Ownership: most of them are **private**
- Tenancy: Most vulnerable population usually lives under rental schemes (75%)⁸, but in general, Spanish (Valencia Region) market is characterized by a very high **ownership** rate (around 75%). Dwellings under rental schemes are clearly worse maintained than the ones under property schemes⁹.

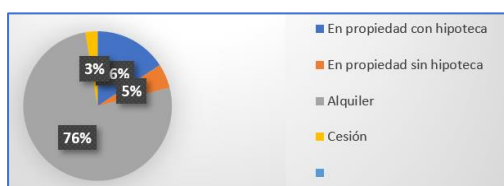


Figure 7.- energy vulnerable consumers tenancy scheme

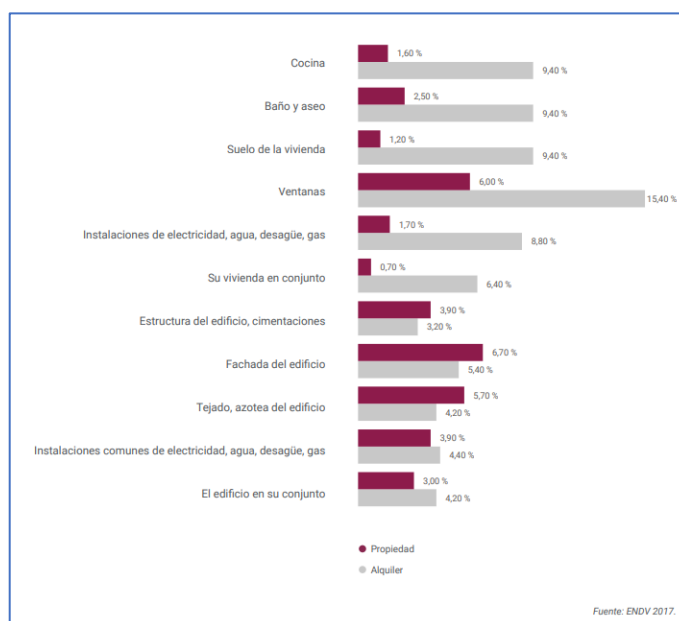


Figure 8.- bad or poor conservation according to tenancy scheme

- Area: m2 per resident; Accessibility: Residential building **accessibility** is under 25% in Spain (40-60% if 6 or more floors)¹⁰; and Residential use cadastral value. These variables determine the **Residential Vulnerability** Level pictured in Figure 9 as per quartiles (Q) distribution¹¹, from no vulnerability (Q1) to high vulnerability (Q4).

⁸ VCE surveys

⁹ Libro Blanco

¹⁰ <https://apps.fomento.gob.es/CVP/handlers/pdfhandler.ashx?idpub=BAW043>

¹¹ <https://descargas.five.es/calab/Resumen%20VEUS2020.pdf>

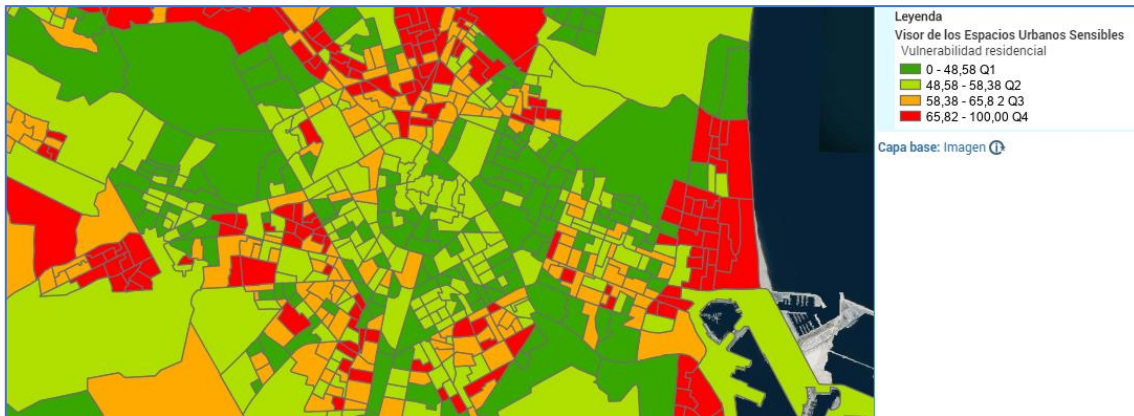


Figure 9.- Residential vulnerability per census section (various blocks)¹²

- Rental value: **higher rates** mean more benefits for owners¹³, who can try to improve their stock and reach the higher prices. Map below pictures moderate (Q1), medium (Q2) and high (Q3) rental prices.



Figure 10.- Rental value per district

- Age: by 2030, more than 50% will be more than **50 years old** (pre-building regulation – bad insulation)¹⁴

¹² Residential vulnerability according to VEUS: <https://calab.es/observatorio-del-habitat/veus/>

¹³ <https://calab.es/observatorio-del-habitat/precio-de-referencia/>

¹⁴ Libro blanco

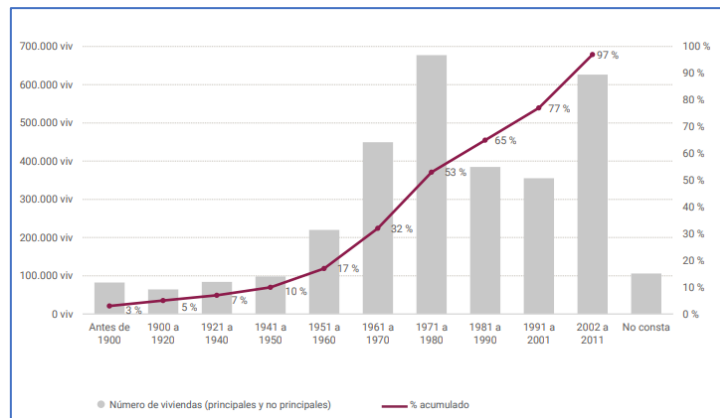


Figure 11.- Residential buildings age



Figure 12.- Building age distribution

- IEE – Building Evaluation Report mandatory – including EPC¹⁵
- **Conservation:** around 75% dwellings are reported to be in good shape, and problems are mainly related to water, leaks or dampness, mould, or visible cracks or fissures. Most frequently damaged elements are windows, facades, roofs, bathrooms and common elements such as electricity or structure.

¹⁵ <https://calab.es/observatorio-del-habitat/ieev-cv/>



Figure 13.- Residential buildings older than 50 years, with BER, with Urgent works pending

- **Quality:** Cadastral category (7, 8, 9) refers to the quality of the building materialization being the higher values the lowest qualities. Red buildings in map below highlight those poor-quality buildings (*) with residential use.

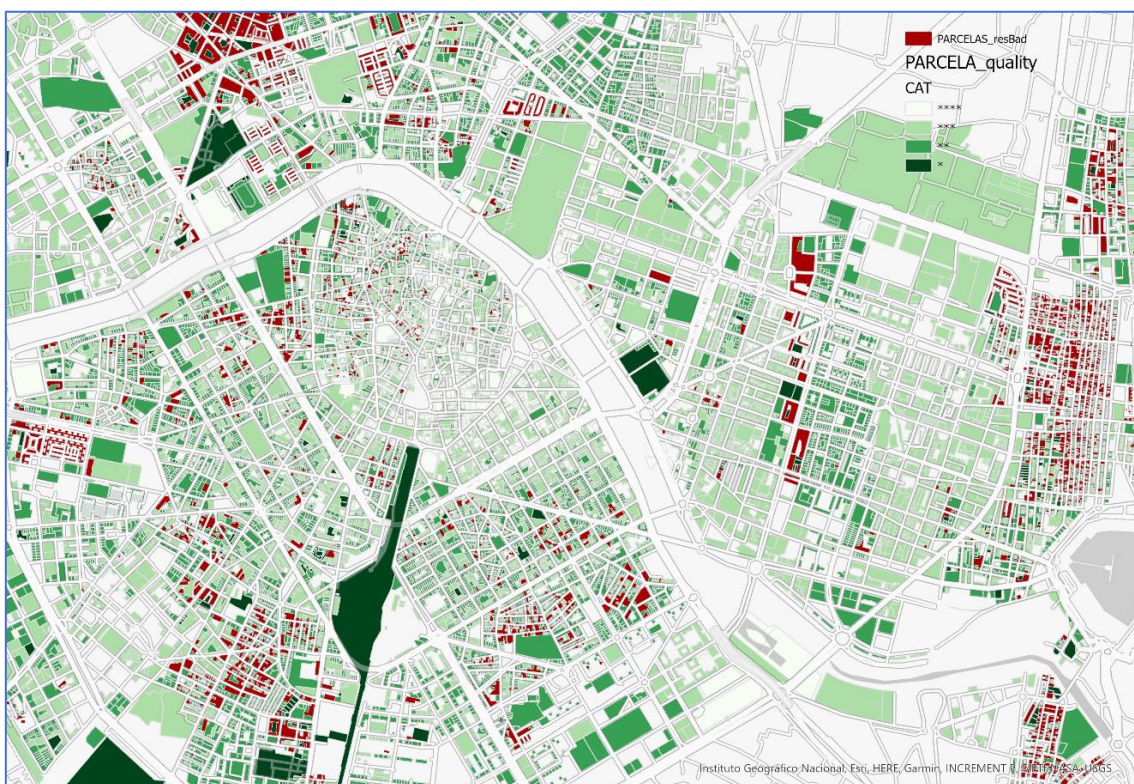


Figure 14.- Residential buildings with lower cadastral categories (bad quality)

- **Energy Class:** lower certifications E, F, G¹⁶ show the buildings with more room for improvement:

¹⁶ <https://calab.es/observatorio-del-habitat/ieev-cv/>; <https://calab.es/cee-cv/>



Figure 15.- Energy Certificates per dwelling

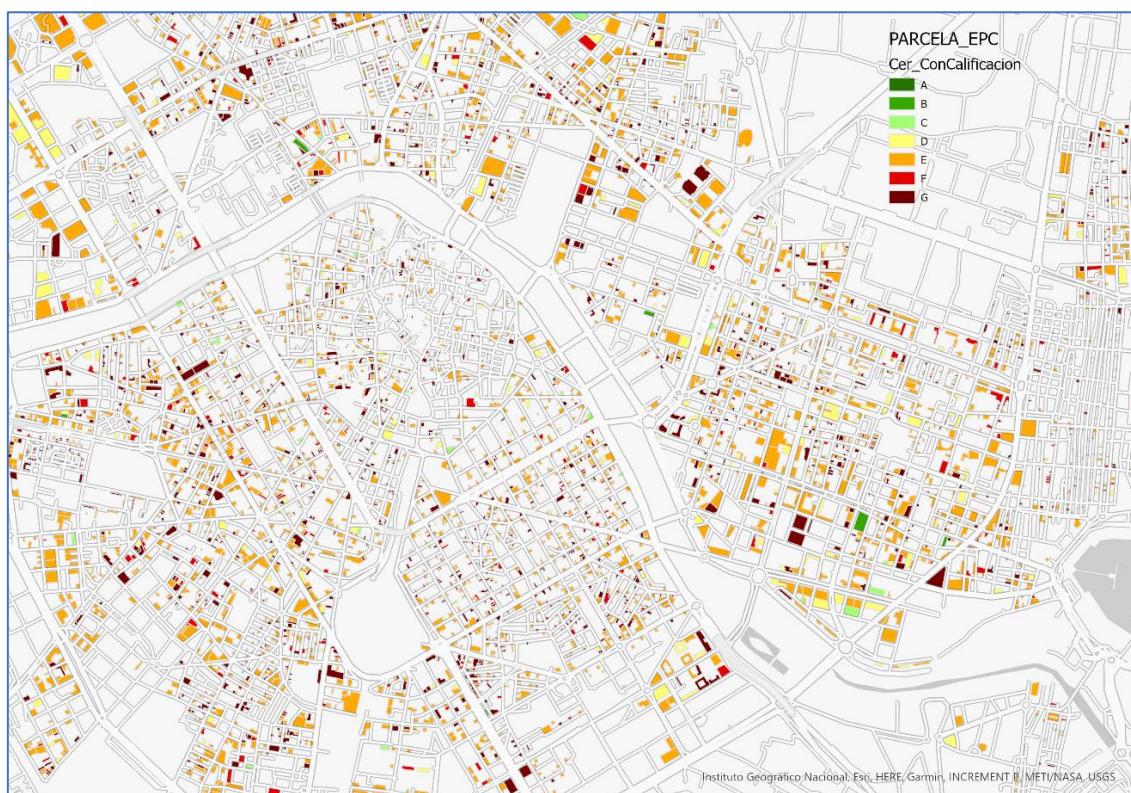


Figure 16.- Energy efficiency distribution

A. Target Buildings

In summary, we find 4 different building profiles in order to achieve the greatest impacts:

- 1) **Old buildings** (152.340 dwellings in 16.662 buildings): pre-regulations, MFH with more than 50 years, IEE mandatory highlighting urgent interventions in the different building components which could allow for the standardization of renovation paths.

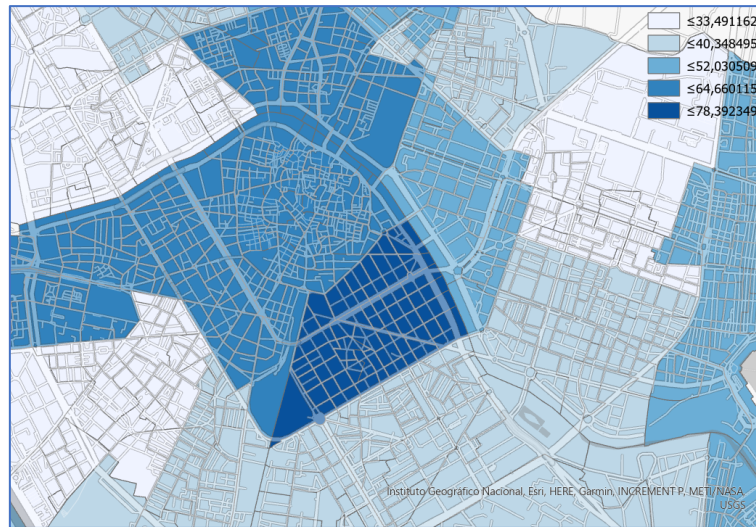


Figure 17.- Buildings with more than 50 years concentration

- 2) **Neglected buildings** (35.325 dwellings): Those presenting deficient conservation or status might fall into legal procedures highlighting urgent interventions in the different building components which could allow for the standardization of renovation paths.

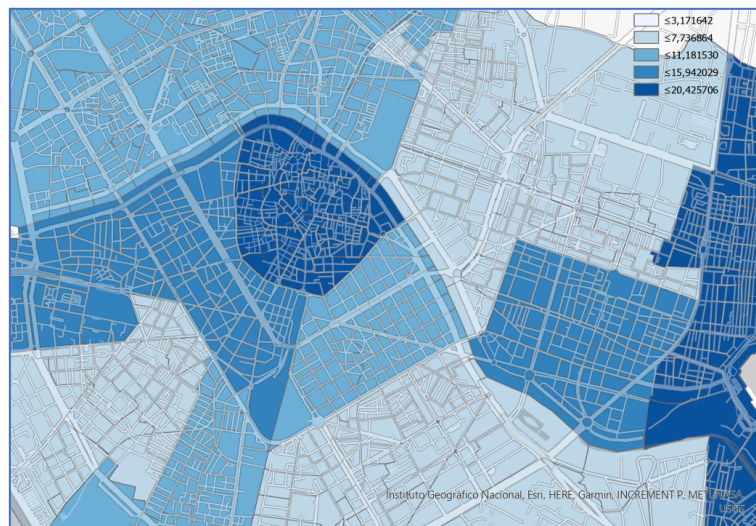


Figure 18.- Buildings with deficient to ruinous status concentration

- 3) **Bad buildings** (141.925 dwellings in 13.469 buildings): those presenting poor quality materialization might be used for prioritizing interventions, since they will have more room for improvement.

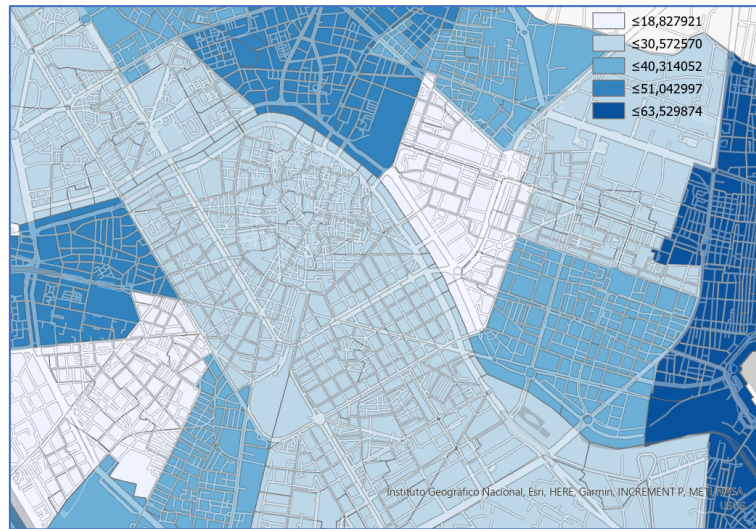


Figure 19.- Poor quality buildings concentration

- 4) Inefficient buildings (5.309 buildings):** lower energy performance certificates present more room for improvement, and those related to existing buildings already include recommendations for realizing those improvements. The study of these could allow for the standardization of renovation paths.

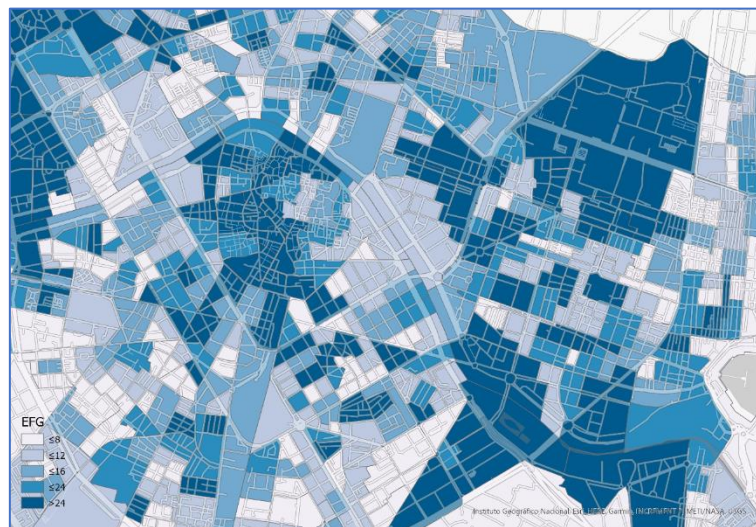


Figure 20.- Inefficient buildings concentration

Finally, according to previous analysis, and over the long-term strategy to be designed for the OSS offer, a pre-selection on potential **quick-wins** is defined as per those solutions which might present low complexity for both decision making and design, and medium-high impact on energy savings, according to the building typology and components, and building renovation context, such as:

- High concentration of bad quality (> 6) and single-family typology (=TH) with small façades, could allow for low complex solution on roof, with high impact on energy demand (biggest envelope component) and on the neighbourhood renovation rate (most numerous typology).
- High concentration of multi-family typology (=AB) with façades on all orientations facilitates the neighbourhood focused offer of very low complexity shadowing solutions, with low impact on energy efficiency but high impact on comfort and penetration rate in the neighbourhood.

- Grants for windows, heating systems or renewable energy sources are to be capitalized by lowering the complexity of application, to exploit their high impact potential on energy savings.

Features (1)	Typologies (2)	Objectives (3)
Use	Old	Replication
Ownership	Neglected	Health & Security
Value	Bad	
Conservation	Inefficient	
Quality		
Energy Class		

Figure 21.- Buildings Mapping summary

B. Demand side (people)

The objective for mapping and segment people is to get the greatest effectiveness in the onboarding, involving and engagement with the renovation process.

Targets are chosen according to different demographic, economical or motivational criteria.

- Population sector: according to VCE historical registries, interest is shown more from **women** over man, and from **adults** over other age frames

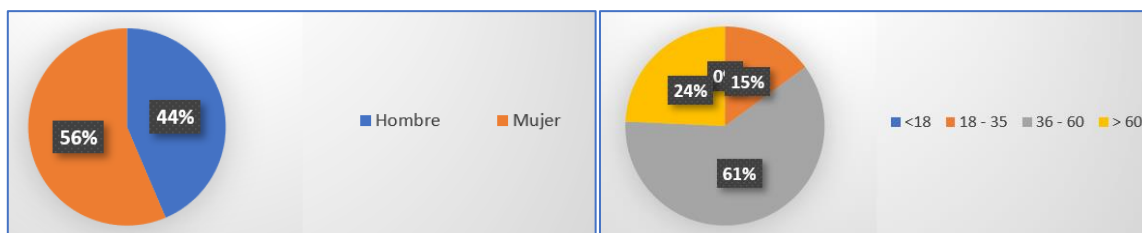


Figure 22.- Demographic analysis from the visits to the Energy Office in Valencia

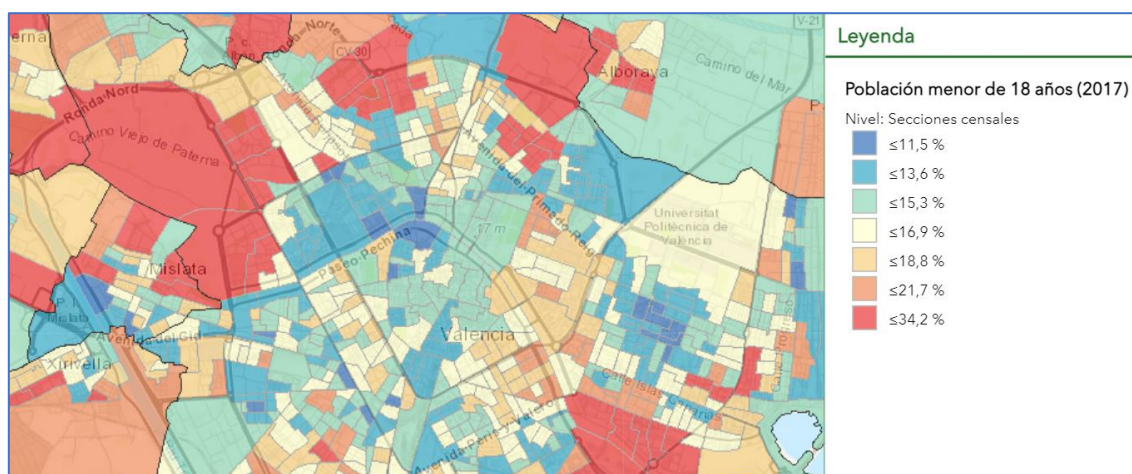


Figure 23.- Minors' concentration¹⁷

¹⁷ <https://inespain.maps.arcgis.com/apps/webappviewer/index.html?id=9e6cecc790c4470dbe66bd941693d477>

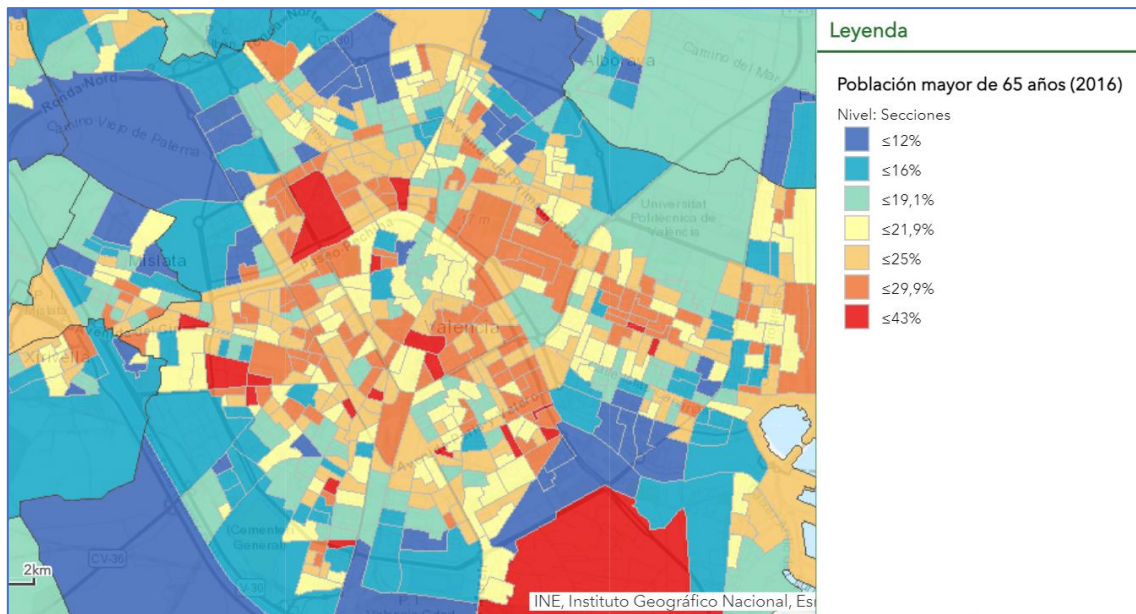


Figure 24.- Seniors concentration¹⁸

- Income¹⁹ per household is an important attribute due to the budgets needed for energy renovation. It is considered to further elaborate on the income variable in following tasks (T3.2 & T3.3) so to cross the four target buildings categories with the income distribution.

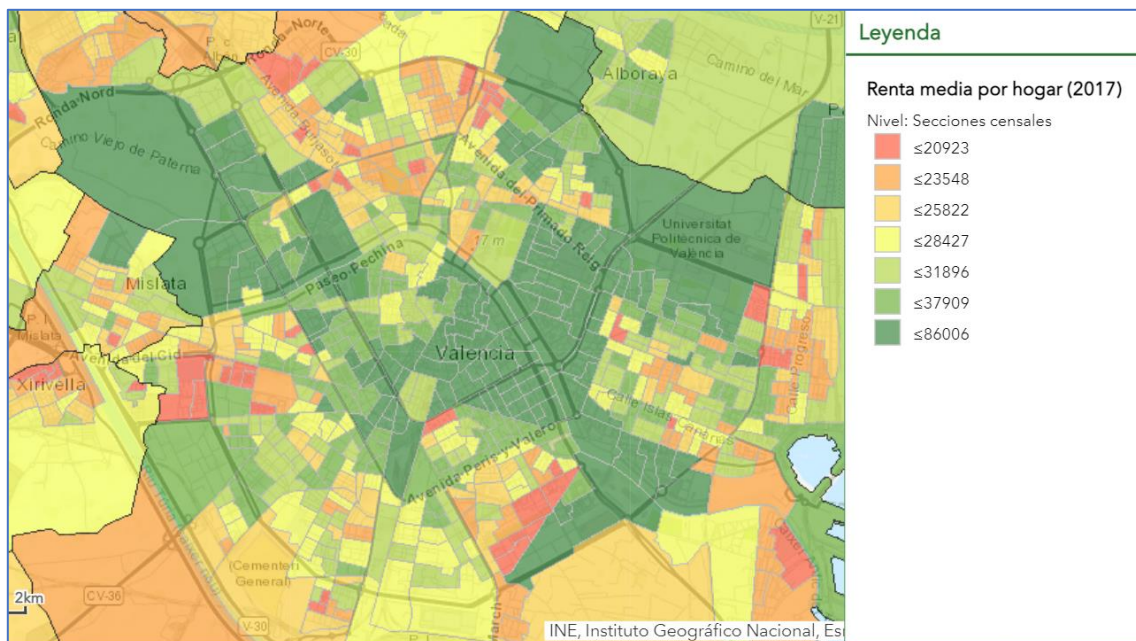


Figure 25.- Average income per household distribution²⁰

¹⁸ <https://inespain.maps.arcgis.com/apps/webappviewer/index.html?id=2e4d1a49d3d94fb0b280488c232b45d7>

¹⁹ <https://inespain.maps.arcgis.com/apps/MinimalGallery/index.html?appid=c8b41b2c471845afbc8f8eb20c54382e#>

²⁰ <https://inespain.maps.arcgis.com/apps/webappviewer/index.html?id=c6c81a7c92704169afa4c09a8f154633>

- Vulnerability²¹: assigned by Social Services from Public Administration, includes, on one hand, **gender, immigration, mortality and privation**; and on the other hand, **educational level, income and unemployment**

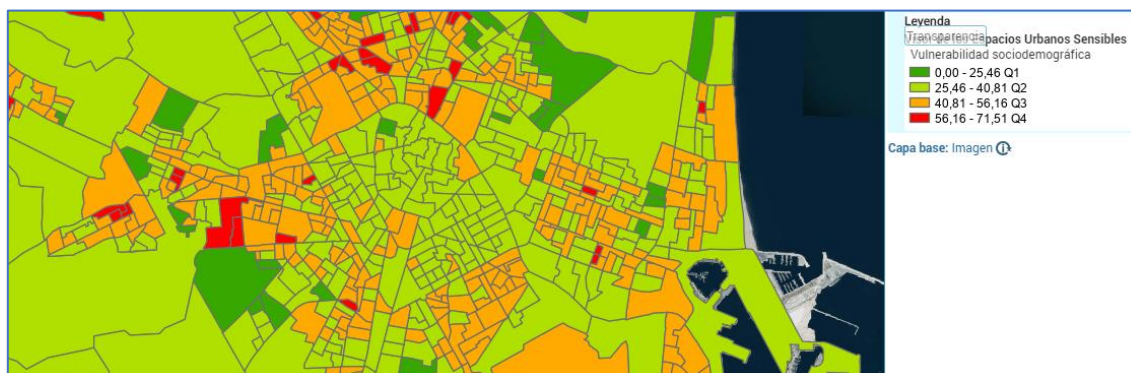


Figure 26.- Sociodemographic vulnerability per censal section (various blocks)

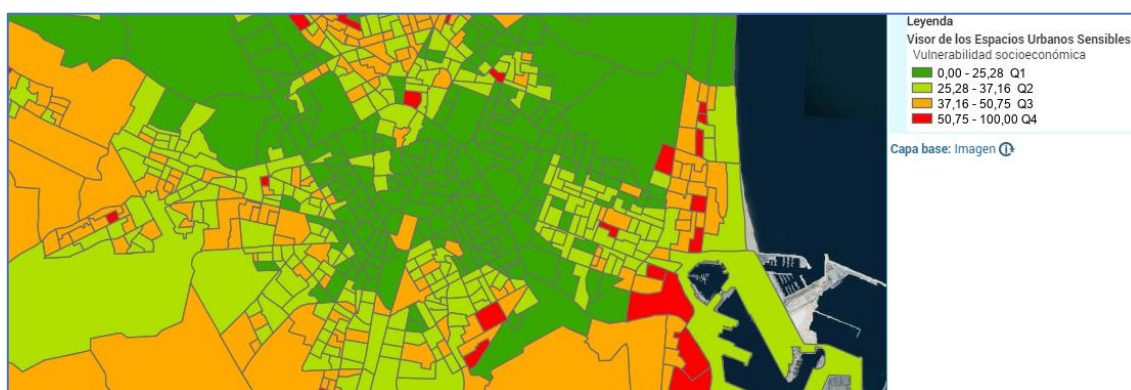


Figure 27.- Socioeconomical vulnerability per censal section (various blocks)

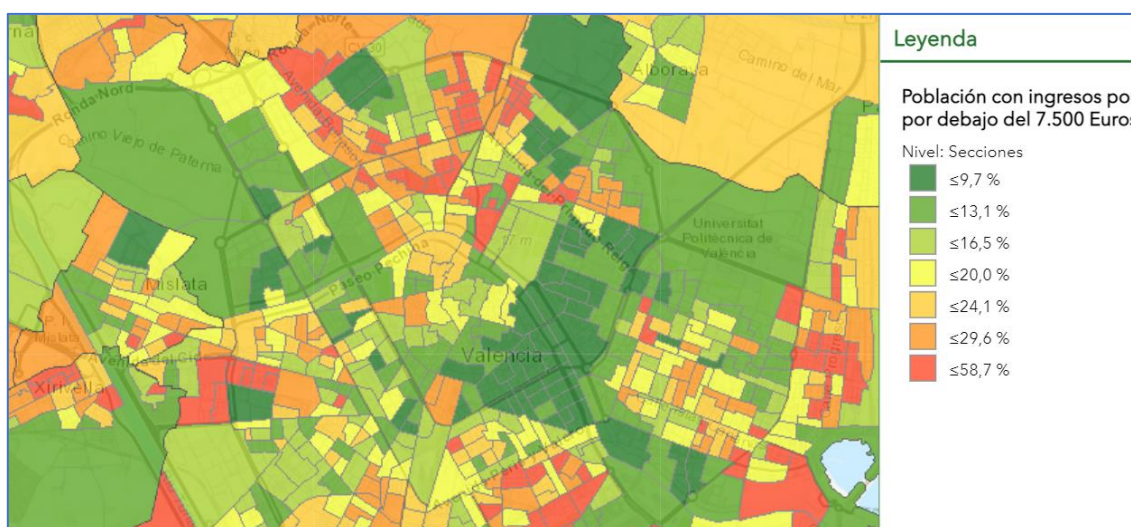


Figure 28.- Household income under 7.500 €/yr concentration

²¹ <https://calab.es/observatorio-del-habitat/veus/>

- Consciousness/ curiosity: **Neighbours** walk into the Office for the first time without previous communication or awareness actions, or successive times after a first advise.
- Mouth to ear: people heard about another person experience (**‘local hero’** or **‘influencer’**)

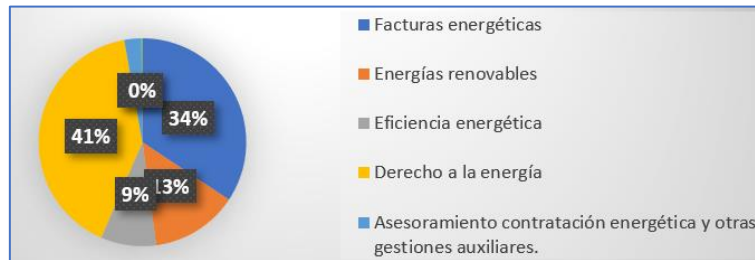


Figure 29.- Interest of visitors to the Energy Office in Valencia

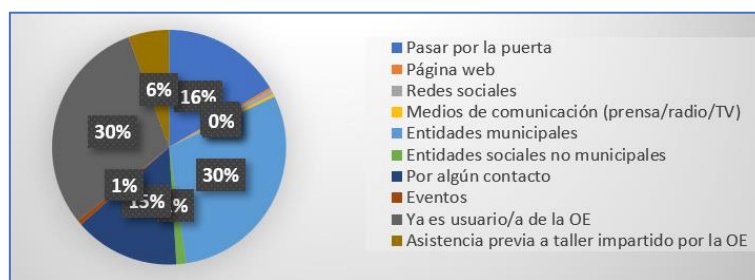


Figure 30.- Channels used by visitors to get to the Energy Office in Valencia

- Condominiums (**MFH private owners**) which are to undertake a renovation/ conservation/ improvement work
- Ownership: most of them are **private, but sharing** common components (e.g., roofs, façades)
- Tenancy: in general, Spanish (Valencia Region) market is characterized by a very high **ownership** rate (around 75%), but dwellings under rental schemes are clearly worse maintained than the ones under property schemes²².

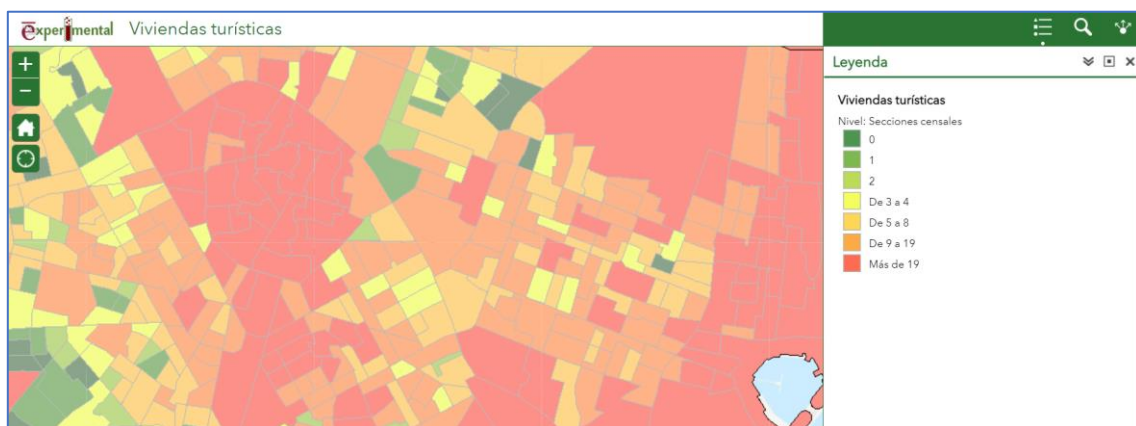


Figure 31.- touristic rentals concentration²³

²² Libro Blanco

²³ <https://inespain.maps.arcgis.com/apps/webappviewer/index.html?id=a304c973b12848159d2d308cfbb50b24>



 AJUNTAMENT DE VALÈNCIA <small>OFICINA D'ESTADÍSTICA</small>		BARÒMETRE MUNICIPAL D'OPINIÓ CIUTADANA 				
VIVENDA I LLARS						
Pregunta 10.1						
A més de la vivenda en la que viu, té una altra vivenda deshabitada?						
	Percentatge					
	Sí	No	No sap	No contesta		
Total	2,7	97,3	0,0	0,1		
11. Poblat Marítims	0,8	99,2	0,0	0,0		
12. Camins al Grau	3,7	96,3	0,0	0,0		
13. Algirós	12,0	88,0	0,0	0,0		
Pregunta 10.2						
La té oferida en lloguer o venda?						
	Percentatge					
	Sí	No	No sap	No contesta		
Total	40,2	59,8	0,0	0,0		
11. Poblat Marítims	0,0	100,0	0,0	0,0		
12. Camins al Grau	39,5	60,5	0,0	0,0		
13. Algirós	26,2	73,8	0,0	0,0		
Pregunta 10.3						
Està situada al municipi de València?						
	Percentatge					
	Sí	No	No sap	No contesta		
Total	43,8	56,2	0,0	0,0		
11. Poblat Marítims	100,0	0,0	0,0	0,0		
12. Camins al Grau	40,1	59,9	0,0	0,0		
13. Algirós	42,9	57,1	0,0	0,0		
Pregunta 10.4						
Per quina raó està la vivenda deshabitada?						
	Percentatge					
	Per desconfiança cap a les persones inquilines	Està en venda	Assumptes familiars/ relacionats amb l'herència	Segona residència	Es troba en mal estat	Assumptes bancaris
Total	33,2	22,9	19,8	12,8	8,9	2,4
11. Poblat Marítims	100,0	0,0	0,0	0,0	0,0	0,0
12. Camins al Grau	40,1	19,8	0,0	40,0	0,0	0,0
13. Algirós	34,4	18,9	13,9	20,9	12,0	0,0

Figure 32.- Municipality of Valencia survey on dwellings status - private landlords²⁴

- **Household size** and composition has revealed in previous studies as a capital attribute for energy renovation investment.

²⁴ <https://www.valencia.es/val/estadistica/mapa-districtes>

B. Target Population

On previous projects in the context of CV and EU (i.e., TripleA-reno²⁵ Ethnographic works), extensive work on personas approach and ethnography (e.g., Spain: 1 workshop, 500 questionnaires, 3 observation, 5 interview, 1 focus groups) was carried out, leading to the definition of a set of **users' profiles**:

- 1) **single occupant** households (93.835 persons and dwellings): one of the key considerations was their age. Younger interviewees were more likely to be renting a housing unit and considered themselves temporary occupants. As a result, they were generally not interested in making big investments into making their home more energy efficient or comfortable. Interestingly the same attitude was observed with single occupants in their third age of life. The latter had often been living in the same housing unit for most of their lives. Besides not seeing much sense in investing in an apartment they are well used to, many pointed out that they are uncertain about how many years of life they are left with (household size = 1 person)

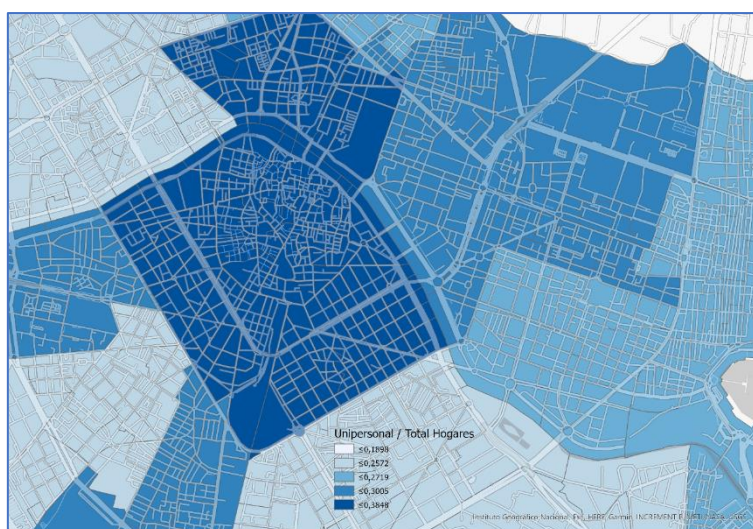


Figure 33.- Single occupant households %

- 2) **Couples'** households (129.715 persons in 64.855 dwellings): in comparison with the single occupant households, double occupant households are often financially stronger (double income) and have a more defined vision of the future relation with their dwelling. Depending on the life stage and style, they are likely to be both interested and able to afford renovations and improvements. As with the single occupant households, age and lifestyle plays an important role (household size = 2 person AND family type = without children)

²⁵ <https://triplea-reno.eu/wp-content/uploads/2020/09/D2.2-Inventory-of-user-groups-1.pdf>

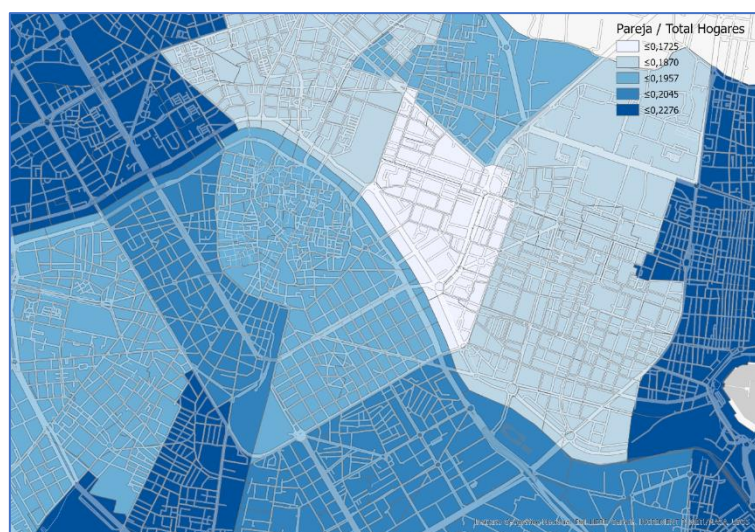
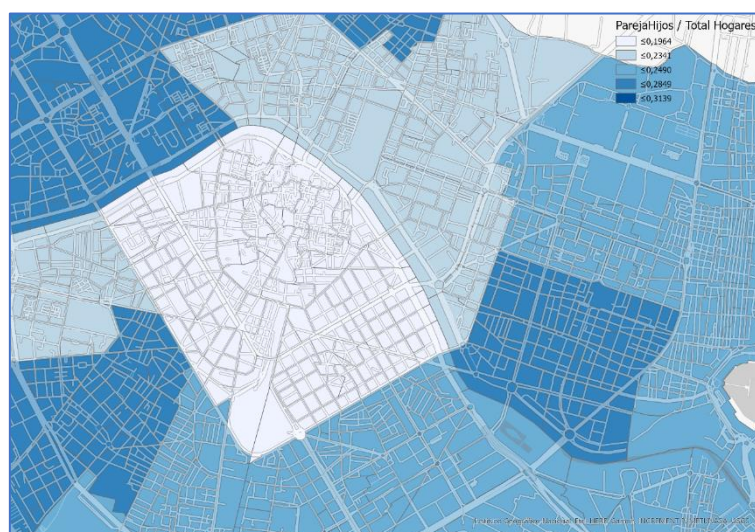


Figure 34.- Couples concentration

- 3) **Families with children** (398.745 persons in 101.430 dwellings – 80.765 of them with at least one child under 25): typically comprised of two adults between 20 and 50 years old with one or more children. The household would typically have a steady income, which varies extensively from case to case, and would have a long-term vision of staying in the same housing unit. Decisions for investments towards improvement of the quality of indoor environment would often be based on concerns of healthy and comfortable life of their children. Their motivation factor for renovation is often the benefit of their children/family – it rises the value and liveability of the property. Interestingly, pets and plants sometimes have the same effect on people’s reasoning about the quality of indoor environment and housing renovation as children (household size ≥ 2 person AND family type = with children)



- Figure 35.- Couples with minor children concentration

- 4) **Absent landlord** (47.655 rented households): in case of rental apartments, the decision maker is the property owner. These are not interested in building renovation by default. Often, they avoid long-term investments because of speculation. They are waiting for the right moment to sell the property or are waiting to renovate the property once one of their family members or children decide to move in. It is important to emphasize that their view of the renovation is less related with concerns about the quality of indoor environment and comfort, because they do not actually

use the apartments. They tend to think and act primarily through financial terms. In this respect, the strongest incentive for the renovation is higher value of the property after renovation (tenancy = rental scheme)

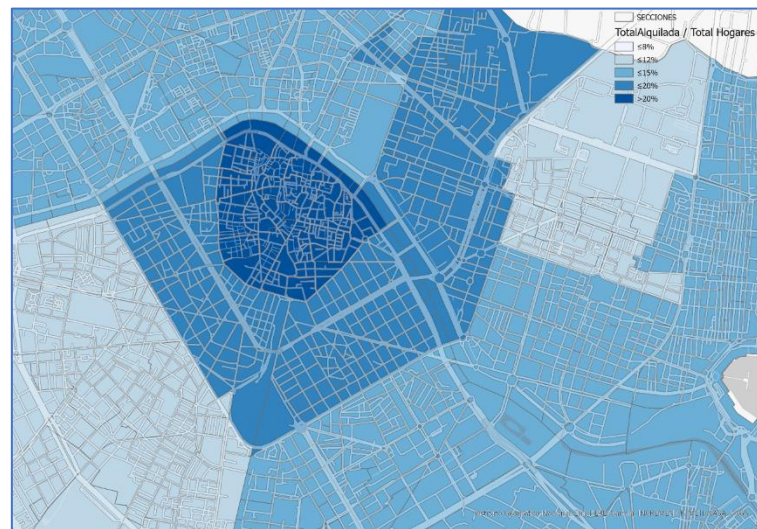


Figure 36.- Higher rental schemes concentrations

- 5) **“local heroes”**: these individuals typically have both strong personal interest in the renovation of the building and the capacity to advocate for, promote or even lead the process of renovation on behalf of their households and/or community of supporters. To act as local heroes, they have to be willing and capable of committing actively to the promotion and success of the project. Usually they are equipped with skills and/or knowledge that enable them to push their agenda forward regardless of the obstacles they encounter on their way. Among others, these obstacles can be conflicts among different individuals involved in the process, legislative obstacles, financial impotence of involved stakeholders etc. Local heroes often function as the catalyst of the renovation process and bridge the gap between management, experts, planners and the building occupants.

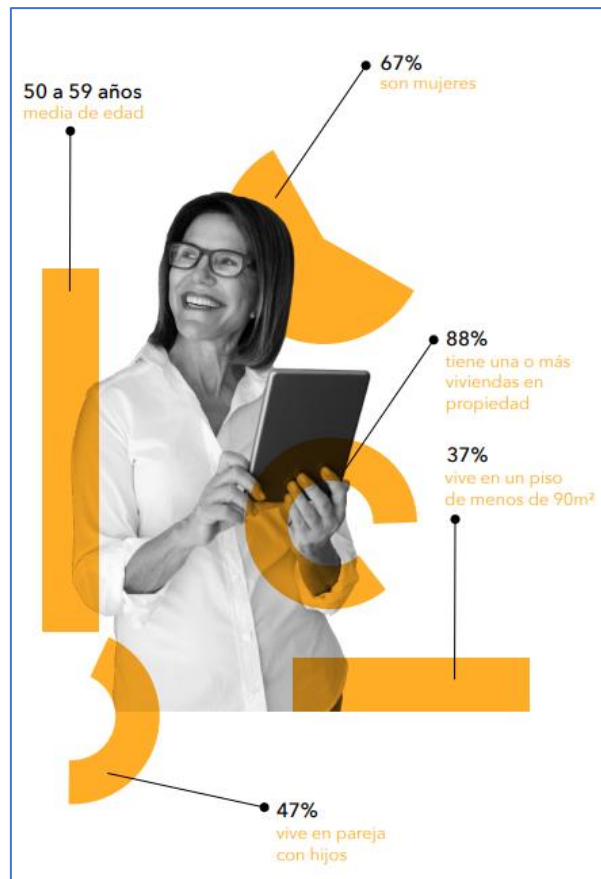


Figure 37.- 2020 home renovation demand characterization²⁶

On the other hand, it was also detected other profiles which, while not our targets, have to be taken into account:

- **Multiple occupants' households** (10.805 persons → 4.735 dwellings): housing units where individuals typically share most of the areas (kitchen, bathroom, hallways, basements etc.) except for their bedrooms. These are especially common among younger population – students and young adults – who are transitioning from one life stage into the other. Typically, these households would be rental households and tenants would see it as a temporary solution. As a result, occupants would not be interested in investing into costly renovations and improvements individually (household size ≥ 3 person AND family type = without children)
- The **“antagonists”**: those who will deny support of the renovation project or even obstruct it. Their motivations, interests and ways are varied, and often, assigning the antagonist label to someone will depend on the point of view: the antagonist is a role that can be played by all the other users' profiles, usually presenting a conservative thinking and lack of finance.

Finally, consider that within the same building we are likely to encounter individuals with divergent interests, perspectives of time, affordability, aesthetics, values etc. As a result, they are just as likely to have very different motivations and interests regarding building renovation (**condominiums**)

Then, following the same strategy as in the building analysis, according to previous analysis and over the long-term communication strategy to be designed for the OSS, a pre-selection on potential **quick-**

²⁶ habitissimo.es

wins is defined as per those profiles who might present low complexity for both decision making and realization, and medium-high impact for replication or influencing purposes, according to the surrounding renovation context, such as:

- Local heroes or early adopters (low complexity) detected by the energy Office among their customers/ visitors, could work as testers and showcasers for their neighbours, who will rely on close references instead of aseptic unrelatable experts' opinions (high impact). Profiles characterized by their higher income can also be driven by energy efficiency and sustainability trends in renovation works and be considered as early adopters for show.
- Property administrators are OSS' great allies and could channel condominiums to energy renovation related grants. Giving them tools for making the process transparent for the community is capital to exploit their high impact potential on energy savings.
- Vulnerable consumers come mandated by the Municipal social services and a proper solution pack adapted to their common circumstances should be made available instantly

Profiles (2)	
	single occupant
	Couples (+ single occupant?)
	Families with children
	Multiple occupants
	Absent landlord
	"local heroes"
	"antagonists"
	Condominiums (several types)

Features (1)	Objectives (3)
household size	renovation
age	replication
family type	influence
tenancy	Reduce vulnerability
income	

Figure 38.- Demand mapping summary

C. Supply side

The objective for mapping and segment suppliers is to get the greatest effectiveness in the implementation quality and user satisfaction through the renovation process.

Finally, the Offices should consider the whole renovation process stages to design the best services to offer, according to target groups and zones. For doing so, the supply side of the renovation market is to be scouted on all stages:

- Start – Awareness: dissemination (unidirectional) and communication (interaction)
- Stage 1 – Design: auto evaluation, assisted diagnosis, design
- Stage 2 – Elaboration: selection and formalization (contracts, permits, applications)
- Stage 3 – Realization: progress reporting, self-assessment, quality assurance and training
- Stage 4 – Validation: comparison, follow-up or feedback, monitoring, certifying

Decision is to be made for maximizing impact, according to targets groups and building zones, and energy renovation market solutions and suppliers.

In Spain, **construction market** is fragmented and non-professional:

- Activities: total turnover in construction activities is around 150.000 million euros. Renovation and conservation of residential buildings represent around 20%²⁷

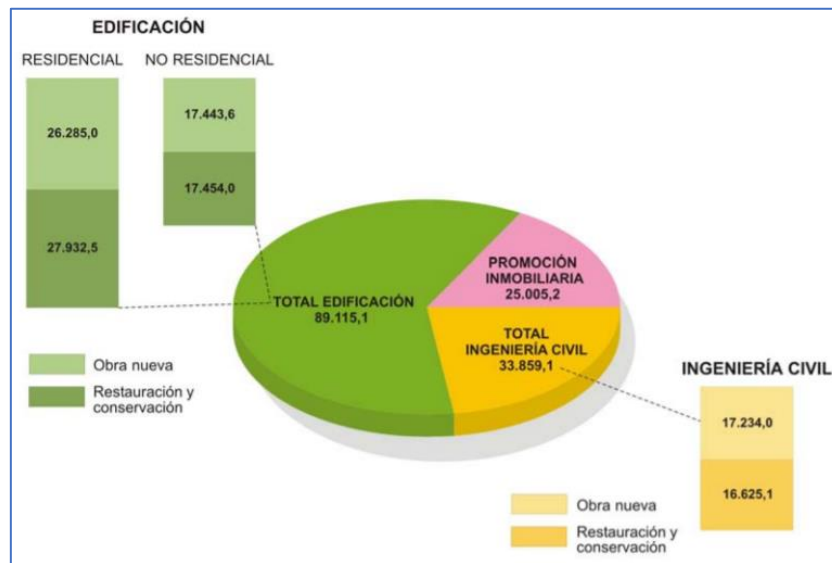


Figure 39.- Construction sector turnover for 2019

- Size (persons and business): 98% small enterprises (under 20 employees), being around 55% companies without any employee. They represent the 50% of the construction sector turnover, and the 85% of the renovation and conservation of residential buildings activity²⁸.

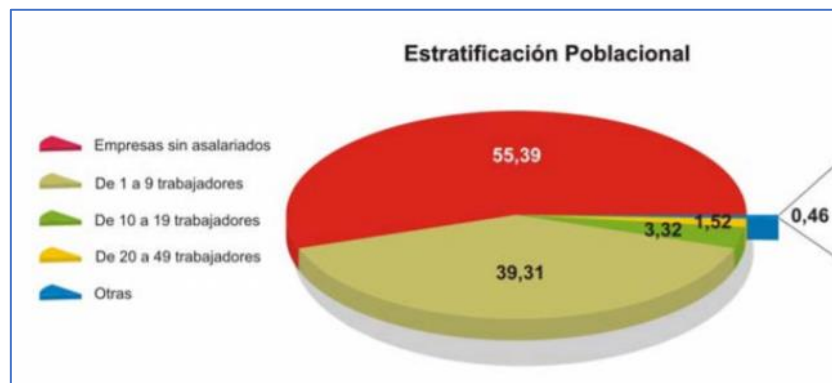


Figure 40.- Construction sector companies' size in 2019

²⁷ https://www.mitma.gob.es/recursos_mfom/listado/recursos/ec2019.pdf

²⁸ <https://apps.fomento.gob.es/CVP/handlers/pdfhandler.ashx?idpub=BAW043>

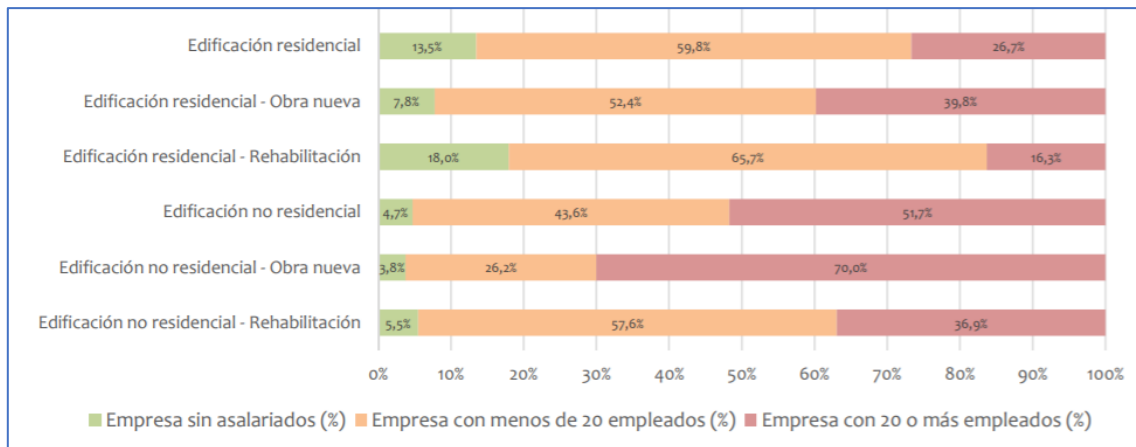


Figure 41.- Size vs turnover on the Spanish construction sector

- Life expectation: short for companies, normal for freelancers²⁹

46 Valencia/València		
División CNAE	Cohorte 1 enero 2020	Supervivencias tercer trimestre
	Número	%
Total	66.014	82,78
41 - Construcción de edificios	2.913	76,55
43 - Actividades de construcción especializada	3.862	77,16

Figure 42.- survival rate of construction sector companies during 2020

46 Valencia/València			
División CNAE y Sexo		Cohorte 1 Enero 2020	Supervivencias tercer trimestre (1 Octubre 2020)
		Numero	%
Total	Total	171.654	88,89
	Hombre	107.932	89,74
	Mujer	63.722	87,46
41 - Construcción de edificios	Total	5.864	88,59
	Hombre	5.004	88,95
	Mujer	860	86,51
43 - Actividades de construcción especializada	Total	12.867	90,78
	Hombre	11.754	91,06
	Mujer	1.113	87,87
71 - Servicios técnicos de arquitectura e ingeniería; ensayos y análisis técnicos	Total	3.806	89,67
	Hombre	2.796	90,09
	Mujer	1.010	88,51

Figure 43.- survival rate of construction sector professionals during 2020

- Regulation: most of them are illegally established, operating, charging and/or employing
- Qualification: employees are often underqualified and suffer high temporality and instability³⁰

²⁹ INE

³⁰ <https://www.observatoriodelaconstruccion.com/uploads/media/FrjP4j3Xoh.pdf>



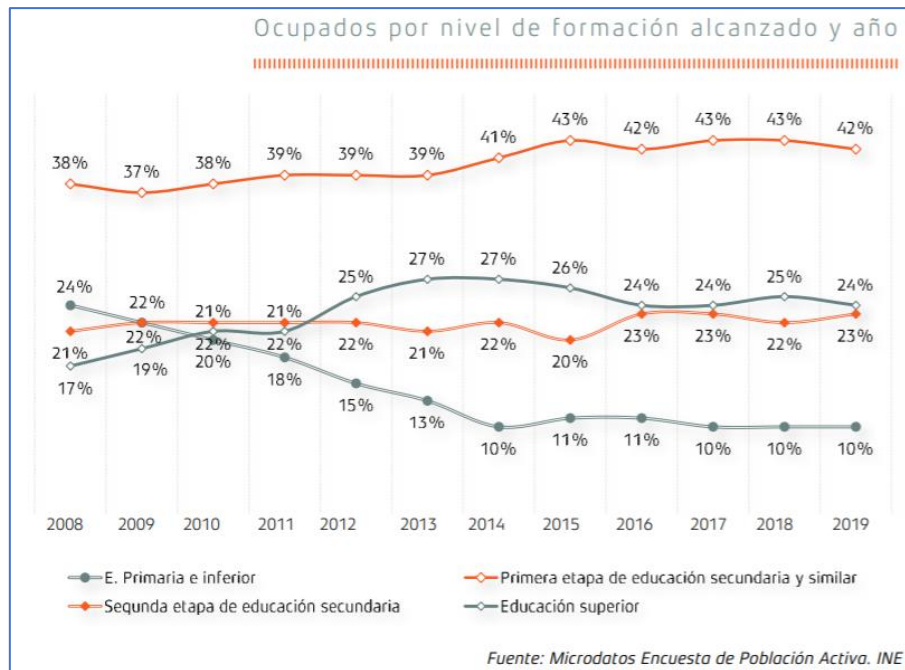


Figure 44.- Workforce educational level

- Workforce age: ageing, with no replacement.

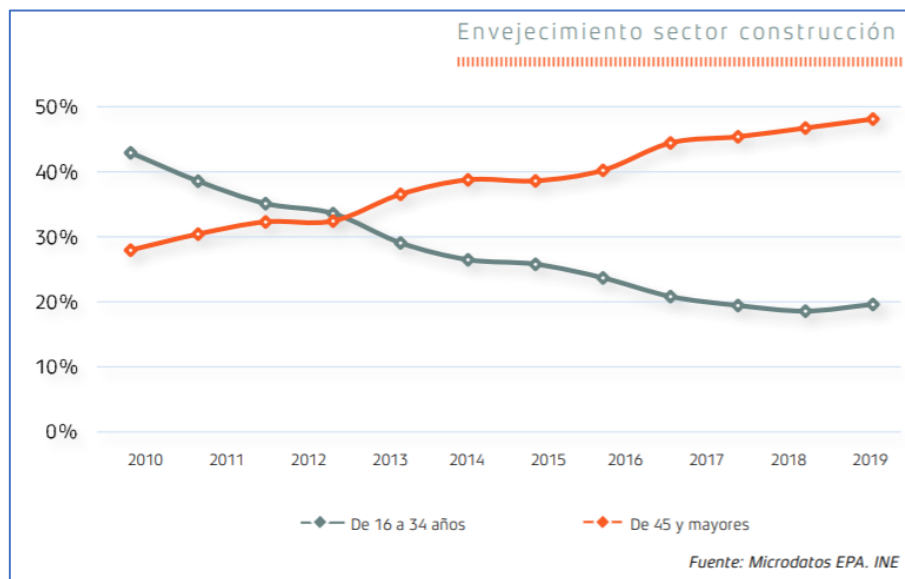


Figure 45.- construction sector workforce age



Figure 46.- 2020 home renovation supplier³¹

- Sub-sectors: Important insights may be gained from the analysis of the sales of building materials and equipment somehow related to energy renovations: trends of the sales of materials and equipment yield the following macro categories³²:
 - Thermal insulation
 - Glazing
 - Heating solution
 - Renewable Energy

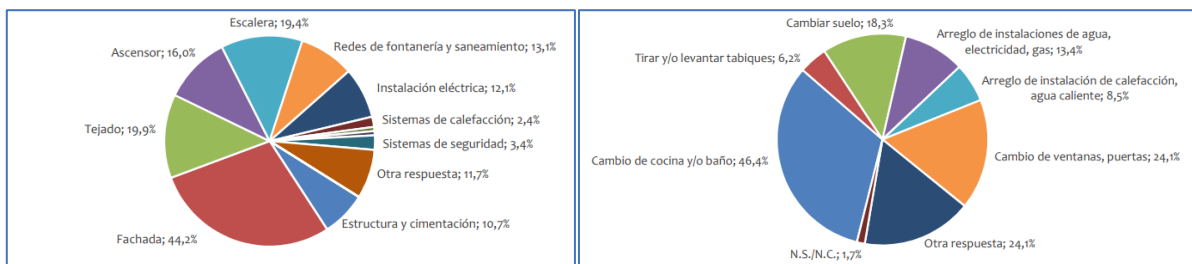


Figure 47.- Type of renovation works in residential buildings (left) and dwellings (right)

³¹ habitissimo.es

³² https://www.stunning-project.eu/fileadmin/user_upload/data_repository/WP4/D4.1_FINAL.pdf



Figure 48.- Energy efficiency related consults during summer 2020³³

From the VCE survey we get **users' concerns** about the energy related options in their homes:

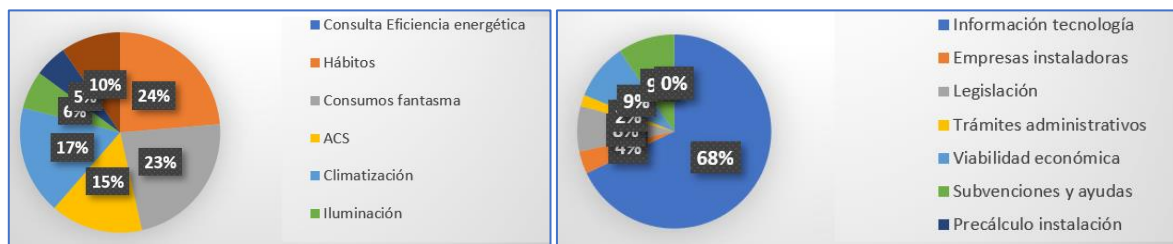


Figure 49.- Energy Efficiency consultations & barriers

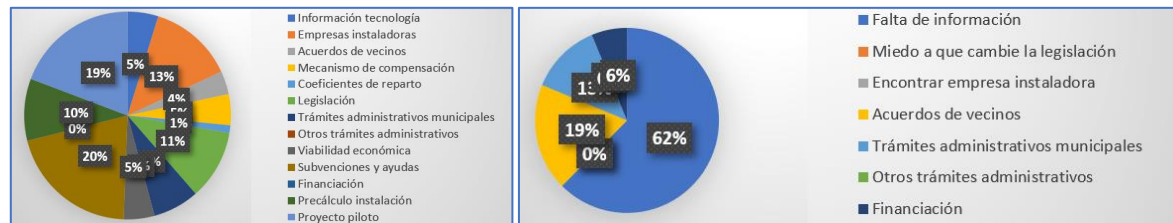


Figure 50.- RES consultations & barriers

For the great share of lack of information about technologies or behavioural change, professionals and educational companies are to be targeted, but in general, it can be distilled that users are asking for reliable information in the design stage, and for professionals and contractors in the realizations stage.

For the moment, the Energy Office (VCE) is building a Contractors' list based on the criteria below:

- Trust: legally established and operating, capacity and soundness
- Adequacy: to type of the renovation work demanded (exhaustive list of specific works)
- Implantation: proximity and tradition
- Responsibility: quality seals and social responsibility
- Reputation: to be implemented through feedback and rating mechanisms

IVE is also building a Regional Registry, under similar criteria, structured as:

³³ habitissimo.es





- a) Materials, products and construction systems: Products with a Quality Label and Products with a distinctive environmental or sustainable character.
- b) Companies, services and professionals: Construction Companies Specialized in Rehabilitation and Real Estate Agents
- c) Buildings and urban spaces: with BES certificate (or others?)

VRCP is also structuring the multiple data managed by its members in a unified registry.

Finally, Spanish ABs members also own registries of their associates and Task 2.3 will dig further into them.

The challenge is to align, interoperate or allocate each registry within a unique service in the Offices.

On the other hand, services provided will depend also in the side-services related to the renovation process per se (which have also arisen from VCE surveys), such as permits processing, applicable legislation unravelling or benefits applications. Among them, the most prominent are the **Public sector grants and subsidies** related services.

10. Areas of action:

Select all that apply:

- Energy efficiency certificates and energy audits
- Drafting of basic project, executive or technical reports
- Facade, roof or ground insulation
- Window replacement
- Exterior sun protection
- illumination
- Natural gas condensing boilers
- Heat pumps
- Heat exchangers
- Connection to district heating network
- Micro-cogeneration units
- Aerothermal systems
- Biomass boiler
- Solar thermal for single family
- Solar thermal for multi-family
- Low temperature geothermal energy
- Isolated photovoltaic installation
- Grid-connected photovoltaic installation
- Individual photovoltaic installation
- Community photovoltaic installation
- Collective photovoltaic installation
- Improvements in water consumption
- Management and home automation improvements
- Housing rehabilitation
- Electric car charging points
- Electricity discharge bulletins
- Connection by old electrical installation
- Failure of any point of light or electrical appliances
- Others: _____

Box 1.- Energy Office contractors' list questionnaire

C. Target Providers

From all above, providers are to be targeted on the one hand according to the **object** of the service provided, on the other hand, according to the **subject** providing the service, and finally, according to the **role** they play on the renovation process:

Object (service provided)	Subject (providing a service)	Role (in the renovation process)
Walls (windows, shadows & insulation)	The informal	The facilitator
Roofs (insulation)	The professional	The reseller
Heating	The SME	The installer
Renewable energy sources	The big company	The all-in

Table 2.- Providers' segmentation matrix

Features (1)	Profiles (2)	Objectives (3)
Size (employees, turnover...)	The informal 'bungler'	renovation activation replication professionalization
age	The informal 'handyman'	
Qualification	Young prepared 1P/SME	
N services offered	Experienced 1P/SME	
regulation	Experienced super specialized company	
certification	Big all-in company	
Social consciousness	...	

Figure 51.- Mapping supply summary



4.1.4 Summary

Demand analysis brought us to define a first area around the actual Energy Office in Valencia, which defines the base zone where implementing the main activities, trying to achieve the level 1 impacts.

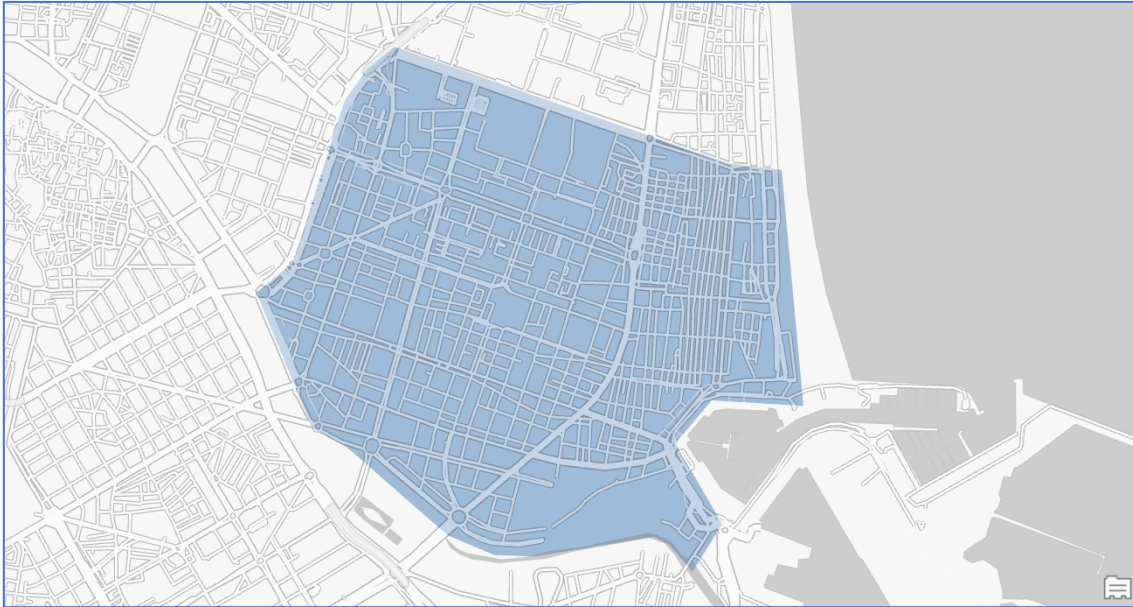


Figure 52.- Zone 1 – Districts 46250011, 12 and 13, around Energy Office of Valencia (level 1)

Zone 1 around Energy Office has a medium rate of old building, and high rates of neglected and bad buildings. We will find there mostly families with children and vulnerable energy consumers.



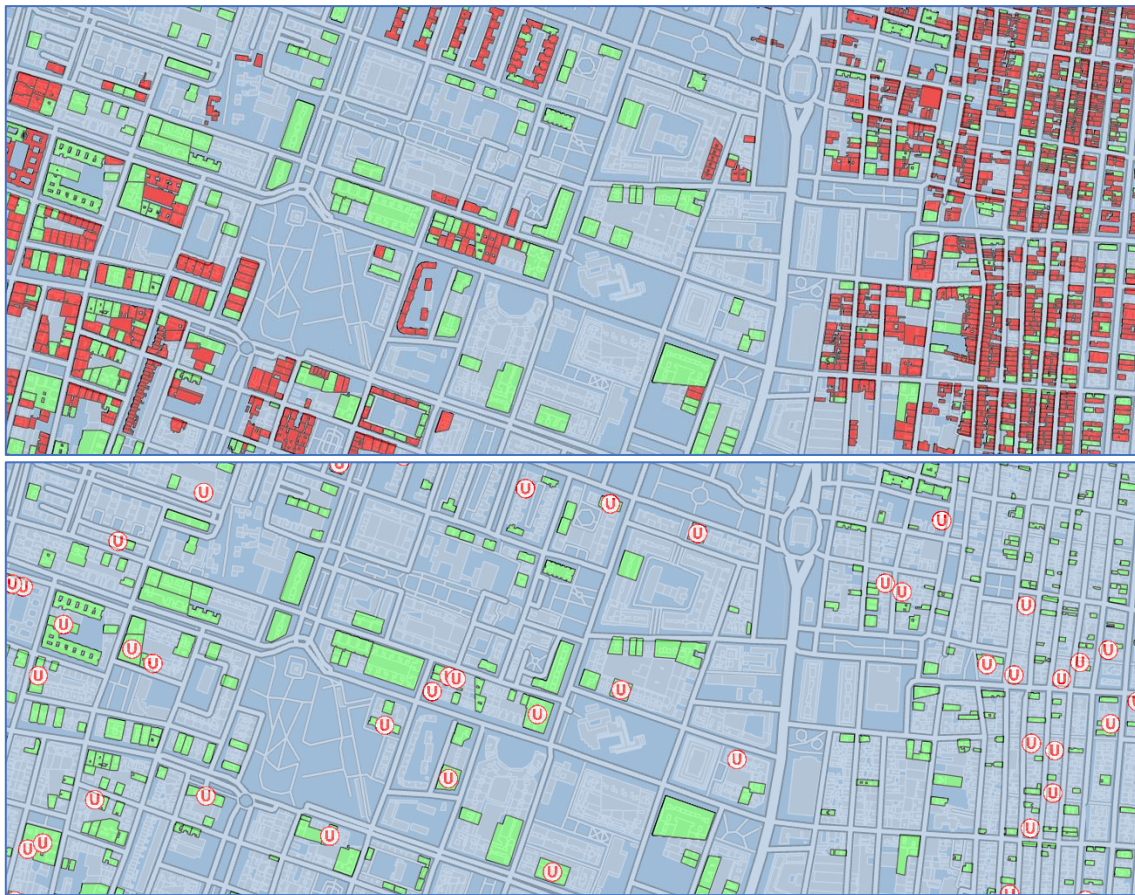


Figure 53.- From up to down: vulnerable zones (pink), old buildings (red), IEE Reported (green), and Urgent Measures Reported (U)

Indicator:	Buildings	Dwellings	Persons
Zone 1 (around Oficina de l'Energia)			
Total (first residence):	6.292	66.020	160.925
with EPC category E, F or G:	876	-	-
with more than 50 years:	4.990	47.425	-
with IEE:			
with Urgent Measures in IEE:			
with Urgent Measures in IEE related to Building envelope:			
Renovations:			

Table 3.- Zone 1 potential impacts measurement road³⁴

³⁴ According to 2011 census: <https://www.ine.es/censos2011/tablas/Inicio.do>



Replication in the whole city will also contribute to level 1 impact achievement.

Valencia	Indicator:	Buildings	Dwellings	Persons
	Total (first residence):		328.980	790.755
	with EPC category E, F or G:		-	-
	with more than 50 years:	21.825	258.355	-
	& with IEE:	5.340	126.219	-
	& with Urgent Measures in IEE:			
	& with Urgent Measures in IEE related to Building envelope:			
	Renovations:			

Table 4.- level 1 potential impacts roadmap³⁵

Also, regional replication defines the zones where trying to achieve the level 2 impacts. We start defining municipalities who signed Letters of Support for the project, but we intend to add the cities adhering to the XALOC network agreement sponsored by the Regional Ministry of Housing and Bioclimatic Architecture.

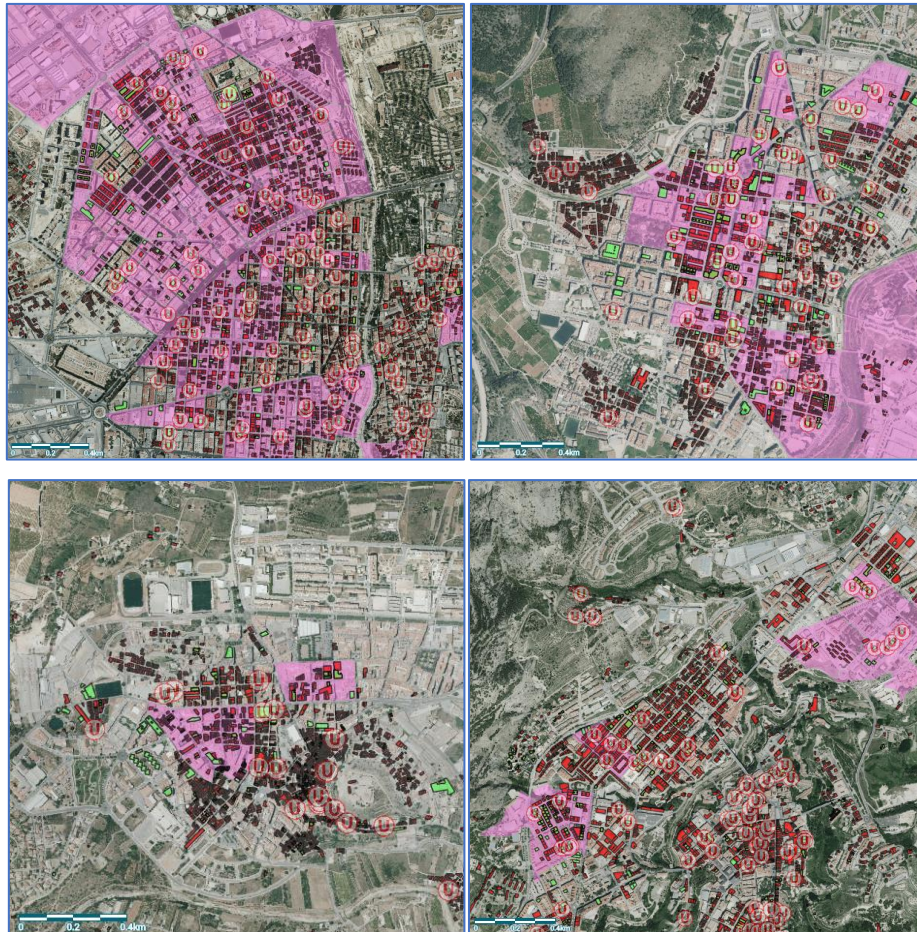


Figure 54.- Elche, Gandía, Onda and Alcoy - Regional level involved (level 2)

³⁵ Level 1 and 2 figures come from IEE.CV Register





	Indicator:	Buildings	Dwellings	Persons
Elche				
	Total:		86.120	226.815
	with EPC category E, F or G:		-	-
	with more than 50 years:	11.629	34.836	-
	& with IEE:	256	3.583	-
	& with Urgent Measures in IEE:			
	& with Urgent Measures in IEE related to Building envelope:			
	Renovations:			
Gandía				
	Total:		29.645	77.495
	with EPC category E, F or G:		-	-
	with more than 50 years:	3.742	18.145	-
	& with IEE:	222	5.339	-
	& with Urgent Measures in IEE:			
	& with Urgent Measures in IEE related to Building envelope:			
	Renovations:			
Onda				
	Total:		9.535	25.025
	with EPC category E, F or G:		-	-
	with more than 50 years:	2.612	6.658	-
	& with IEE:	223	1.130	-
	& with Urgent Measures in IEE:			
	& with Urgent Measures in IEE related to Building envelope:			
	Renovations:			
Alcoy				
	Total:		25.100	60.405
	with EPC category E, F or G:		-	-
	with more than 50 years:	3.451	16.907	-
	& with IEE:	658	4.218	-
	& with Urgent Measures in IEE:			
	& with Urgent Measures in IEE related to Building envelope:			
	Renovations:			

Table 5.- Local replication potential impacts measurement road

	Indicator:	Buildings	Dwellings	Persons
Valencia Region				
	Total:		1.986.895	4.990.345
	with EPC category E, F or G:		-	-
	with more than 50 years:	433.075	1.376.861	-
	& with IEE:	14.247		
	&with Urgent Measures in IEE:			
	& with Urgent Measures in IEE related to Building envelope:			
	Renovations:			

Table 6.- Regional replication potential impacts measurement road





To achieve these objectives, on these areas we will target the different citizens profiles (see **D2.2**) and focus on providing trustful services on the most effective supply side sub-sectors (see **D2.3**) delivering the most optimal solutions (see **D2.5**), according to reliable protocols and supporting tools (see **D2.4**) and facilitated by the most appropriate financing mechanisms (**D2.6**). Therefore, these tables will be completed during WP4 activities, while actions are implemented in the field.



4.2 Rotterdam - NL

Rotterdam's pilot area is district Prins Alexander, on the northeast side of the city (Figure 55). Although Prins Alexander contains some clusters of older buildings, most of the district was developed systematically over a long time span, from the 1960s until now. The district consists of eight neighborhoods (in order of built sequence):

- Kralingseveer (<1945)
- Het Lage Land (1960s)
- Ommoord (1960s-1980s)
- Prinsenland (1970s & 1990s)
- Oosterflank (1980s)
- Zevenkamp (1980s)
- 's-Gravenland (1990s)
- Nesselande (2000s-2020s)

As per January 1, 2021, Rotterdam has 651,269 inhabitants. Prins Alexander is the largest of the city's fifteen districts with a population of 95,445 and 45,869 dwellings.

The reason for choosing this district and its characterization in terms of built environment and some social aspects are explained in 4.2.3.

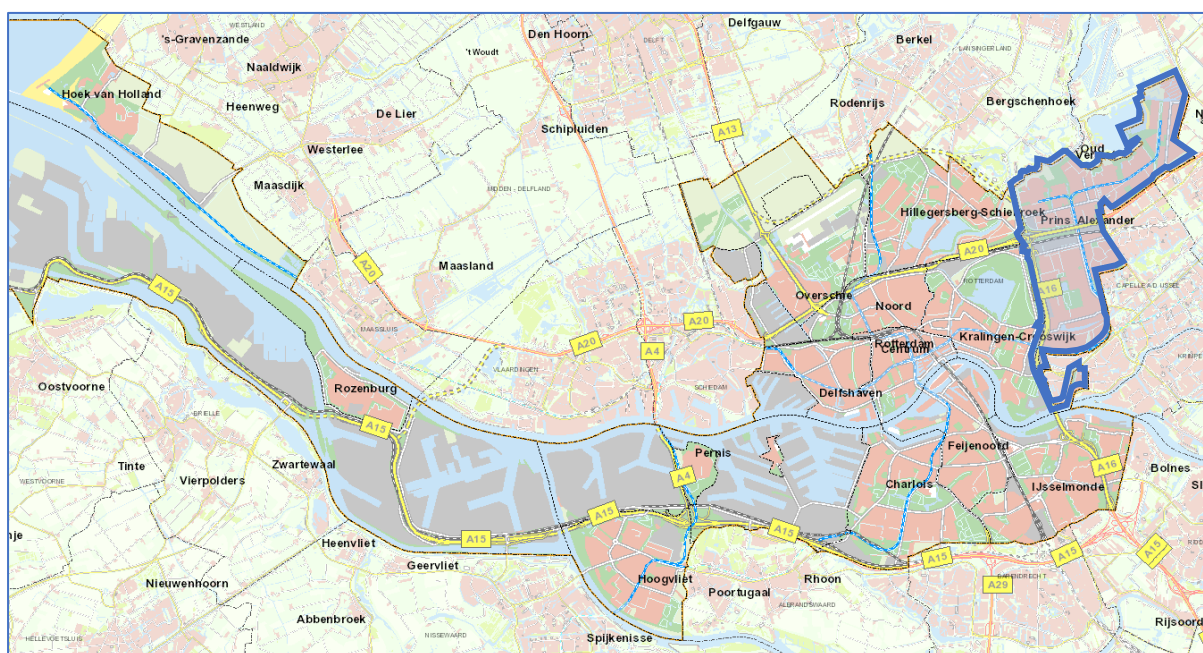


Figure 55.- District Prins Alexander in the northeast of Rotterdam.

4.2.1 Actors involved

At a city level, the city of Rotterdam co-financed the WoonWijzerwinkel as a one-stop-shop for about 24 other municipalities in the region Rijnmond & Haaglanden. Woonwijzerwinkel has been initiated by Innovatie Centrum voor Duurzaam Bouwen IcDuBo, which is a business-to-business organisation.

At a district level, the Rotterdam/Prins-Alexander pilot aimed at collaborating with local actors. The efforts of the municipality aims at building a trusted collaboration with the following actors to develop altogether the Citizen Hub of Prins-Alexander. In a trusted collaboration, letters of support should not be needed. To date the following actors have been identified to have a leading role in the pilot.

- Alex Energie: Energy community started in Feb 2020 with members coming from Prins-Alexander.
- HOOM: Energy cooperative aims at supporting energy communities or comparable actor.

4.2.2 Data sources & Collection

(Bottom-up – participatory approach – questionnaires & surveys... & Top-down – official standardized statistical sources – data mining)

A. Criteria used for analysis

Rotterdam used the following criteria to define its pilot area:

- number of owner-occupied houses
- number of terraced houses
- number of houses built before 1990

Applying these criteria ensures that the district is chosen that 1) contains a large number of dwellings that this project targets; and 2) contains a large number of dwellings that are suitable for implementing energy saving measures.

Because the districts are quite large, a second selection has been made of areas within the pilot district that will be focussed on in particular. More or less the same procedure has been applied, using the following criteria:

- number of owner-occupied houses
- number of terraced houses
- number of houses built before 1990
- household size
- residents' age

Rotterdam aims to select terraced houses from the same building period as much as possible, because neighborhoods with houses having the same characteristics ensure the efficiency and the repeatability of energy saving measures.

In addition, data are gathered on the energy certificates of buildings and lifestyles of the inhabitants.

B. Method and sources for analysis

For the first step, data are retrieved from *Onderzoek010* ('Research010', 010 being the area code for Rotterdam, www.onderzoek010.nl). The data regarding the selection criteria are put together in a table. The table shows which districts have the largest number of houses with the desired characteristics.

The website does not allow for different data to be combined, e.g. not all terraced houses are owner-occupied, and not all houses built before 1990 are terraced houses. Still, when the numbers are large, it is sufficiently certain that there are many houses that will meet the combined criteria.

After the district is selected that will be Rotterdam's Save the Homes pilot area, this district is further analyzed in order to determine what are the most promising parts of the district, so that the efforts can be focussed on these specific neighborhoods. Because the areas to be analyzed are now reduced in size, data on the smallest possible scale (within the boundaries of privacy protection) are obtained from the municipal data bases. The data are expanded with data showing residents' age category (residents older than 65 years are less inclined to take measures), household size (single-person households are less inclined to take measures) and attitude towards sustainability (in the lifestyle segmentation model that we use, the 'dutiful' and 'responsible' segments are most likely to take measures). Now, these data are combined to find the neighborhoods and even building blocks that meet multiple criteria at once. This has been done by overlaying maps based on those data.



The pilot area consists of the district that the first step of the analysis identifies as being most favorable. The second step in the analysis is a next step towards an engagement strategy for these districts.

First, the most favorable neighborhoods within the pilot areas are identified as those areas where the following criteria are simultaneously met:

- >1 terraced house
- >80% owner-occupied
- building period before 1990
- >50% of residents are between 15 and 65 years old
- >50% of households are larger than 1 person

We have done this by overlaying maps that we constructed from municipal data bases containing this information in a geographic information system (GIS).

Energy certificates issued for buildings have been retrieved from www.ep-online.nl/ep-online/PublicData.

Second, for the resulting neighborhoods, we have looked at the values and lifestyles of the residents, using data according to [Motivaction's Mentality Model](#) that Rotterdam acquired. The original eight segments of the model can be reduced to five ('Five Shades of Greener') when it comes to people's stance towards sustainability (Motivaction, 2018). Some segments are more inclined to take sustainable measures than others, and all segments take them for different reasons. For the most promising neighborhoods that we identified using the abovementioned criteria, we have shown the division of resident over the five segments, and the percentage of people that fall within the segments that are most positively inclined to energy saving measures. Thus, we gained insight in the motivations that residents have or lack when it comes to energy saving.

We also checked the Wijkprofiel ('neighborhood profile', www.wijkprofiel.rotterdam.nl), which shows the state of the neighborhoods regarding the built environment, the social environment, and safety. The scores are based on measurable facts and figures, and the Rotterdammers' opinion (gathered through surveys). The latest Wijkprofiel was scanned for information that could be helpful for this project.

Local businesses were inventorized by searches on Google and Google Maps.

4.2.3 Massive characterization & Segmentation

(characteristics and values on which we focus to segment 'populations')

From analysis of previous experiences in the local context and bottom-up approach, a series of attributes were selected which were affecting the renovation market, so a massive characterization and segmentation could allow to quantify and locate the different groups of interest or clusters (top-down approach)

The demand side mapping and segmentation covers both, buildings as the building's owners so to study the building owners' profiles (household size, age, background, education, literacy, etc.) in order to understand their needs and opportunities for engagement campaigns and several buyer's persona will be created (T2.2). The buildings segmentation allows to understand better which neighbourhoods should be renovated first (buildings typologies) or how to efficiently address their renovation (T2.5).

The supply mapping and segmentation helps realising the renovation solutions prescribed for building typologies or components and define how to channel their offer through the OSS.



A. Demand side (buildings)

The objective for mapping and segment buildings is to get the greatest effectiveness in the impacts achieved through the renovation process.

Table 7 shows the data regarding the defined criteria for Rotterdam's 15 districts.

city district	total # dwellings (2020)	# owner-occupied (2020)	# terraced houses (2020)	# houses built <1990 (2020)
Rotterdam Centrum	19,778	4,988	318	14,577
Delfshaven	35,270	8,876	1,712	28,336
Overschie	8,627	3,894	3,562	6,420
Noord	27,454	8,418	853	24,146
Hillegersberg-Schiebroek	20,805	10,061	8,503	16,202
Kralingen-Crooswijk	28,105	6,446	2,211	22,585
Prins Alexander	45,869	18,392	19,480	32,167
Feijenoord	35,913	6,836	8,912	23,907
IJsselmonde	28,682	10,055	10,422	24,086
Charlois	33,969	9,024	5,733	27,909
Pernis	2,259	1,496	1,905	1,863
Hoogvliet	16,101	6,615	9,552	10,770
Hoek van Holland	5,764	2,229	3,447	4,225
Rozenburg	5,826	3,004	3,866	5,259
Port/industrial	939	10	27	936
Total Rotterdam City	315,361	100,344	80,503	243,388

Table 7.- Data on houses in Rotterdam's districts (source: Onderzoek010, retrieved March 15, 2021)

Marked blue in the columns for number of owner-occupied houses, terraced houses, and houses built before 1990 are the three cells per column that show the highest numbers.

The table shows that district Prins Alexander consistently has the highest number of dwellings for each criterion (printed in bold letter). It is, therefore, the most favorable district for this project.

City district Prins Alexander consists of eight residential neighborhoods: Kralingseveer, 's-Gravenland, Prinsenland, Het Lage Land, Oosterflank, Ommoord, Zevenkamp, and Nesseland. Table 2 shows the same data as shown in Table 1, but now for the different neighborhoods of Prins Alexander. The table clearly demonstrates that Ommoord neighborhood has by far the highest number of dwellings, owner-occupied houses, terraced houses, and houses built before 1990.

Again, the data in the table, retrieved from *Rotterdam in cijfers* could not be combined.

neighborhood	total # dwellings (2020)	# owner-occupied (2020)	# terraced houses (2020)	# houses built <1990 (2020)
Het Lage Land	5,904	2,100	1,169	5,052
Kralingseveer	738	483	632	587
Nesseland	4,510	3,141	3,520	81
Ommoord	13,183	4,525	4,853	12,115
Oosterflank	5,587	1,708	1,520	4,947
Prinsenland	5,153	1,768	1,790	2,272
's-Gravenland	3,499	1,762	2,274	245
Zevenkamp	7,295	2,905	3,722	6,868
Total Prins Alexander	45,869	18,392	19,480	32,167

Table 8.- Data on houses in district Prins Alexander (source: Onderzoek010, retrieved March 15, 2021)

Table 9 contains the combined data. This clearly shows the value of combining the data. The number of dwellings that meet all three criteria is much lower than when each criterion is considered separately as in Table 8. The data are available on building block level. Combining the data therefore results in exact building blocks that meet all criteria simultaneously.

neighborhood	total # dwellings (2020)	# owner-occupied (2020)	# terraced houses, owner-occupied (2020)	# terraced houses built < 1990, owner-occupied * (2020)
Het Lage Land	5,904	2,100	946	865 (15%)
Kralingseveer	738	483	460	355 (48%)
's-Gravenland	3,499	1,762	1,483	165 (5%)
Prinsenland	5,153	1,768	1,199	161 (3%)
Oosterflank	5,587	1,708	1,002	974 (17%)
Ommoord	13,183	4,525	3,289	3,173 (24%)
Zevenkamp	7,895	2,905	2,489	2,404 (33%)
Nesselande	4,510	3,141	2,779	64 (1%)
Total Prins Alexander	45,869	18,392	13,647	8,161 (18%)

* The percentages refer to the share of terraced, owner-occupied houses built before 1990 in the total housing stock of the neighborhood.

Table 9.- Data on houses in district Prins Alexander (source: municipal data bases)

The data show that:

- Prins Alexander has a total of 45,869 dwellings
- 18,392 of those are owner-occupied
- of those owner-occupied houses, 13,647 are terraced houses
- of those 13,647 owner-occupied terraced houses, 60% (8,161) are built before 1990, and 56% (7,648) are built in the period 1960-1989 (not shown in Table 9)

In absolute terms, Ommoord has the highest number of homes that meet the criteria. In relative terms, Kralingseveer has the largest part of its housing stock that meet the criteria, whereas the absolute number of houses is very low. Zevenkamp is an in-between that has a high percentage of the housing stock and a high absolute number of dwellings that meet the criteria.

Prinsenland, 's-Gravenland, and Nesselande are the most unfavorable neighborhoods.

Although it may be practical to choose one neighborhood within Prins Alexander to direct all efforts towards, it is not strictly necessary. Ommoord has received quite a lot of attention in a previous project (Triple-A), and the residents indicate to have grown tired of the city's messages. Therefore, even though Ommoord presents the best figures, it may be wise to choose one or more other neighborhoods for Save the Homes.

Figure 56, Figure 57, and Figure 58 show the spatial distribution of dwellings for the criteria owner occupied, terraced houses, and year of construction. The maps must be read in sequence: first, the distinction between owner-occupied and rental houses is made. The next map, showing terraced houses, includes only the owner-occupied houses. Subsequent maps show only owner-occupied terraced houses.

The energy certificates (energy label) that are issued for dwellings (mandatory when selling a house) are shown in Figure 59. It is clear that the more recently built neighborhoods have the better energy certificates.

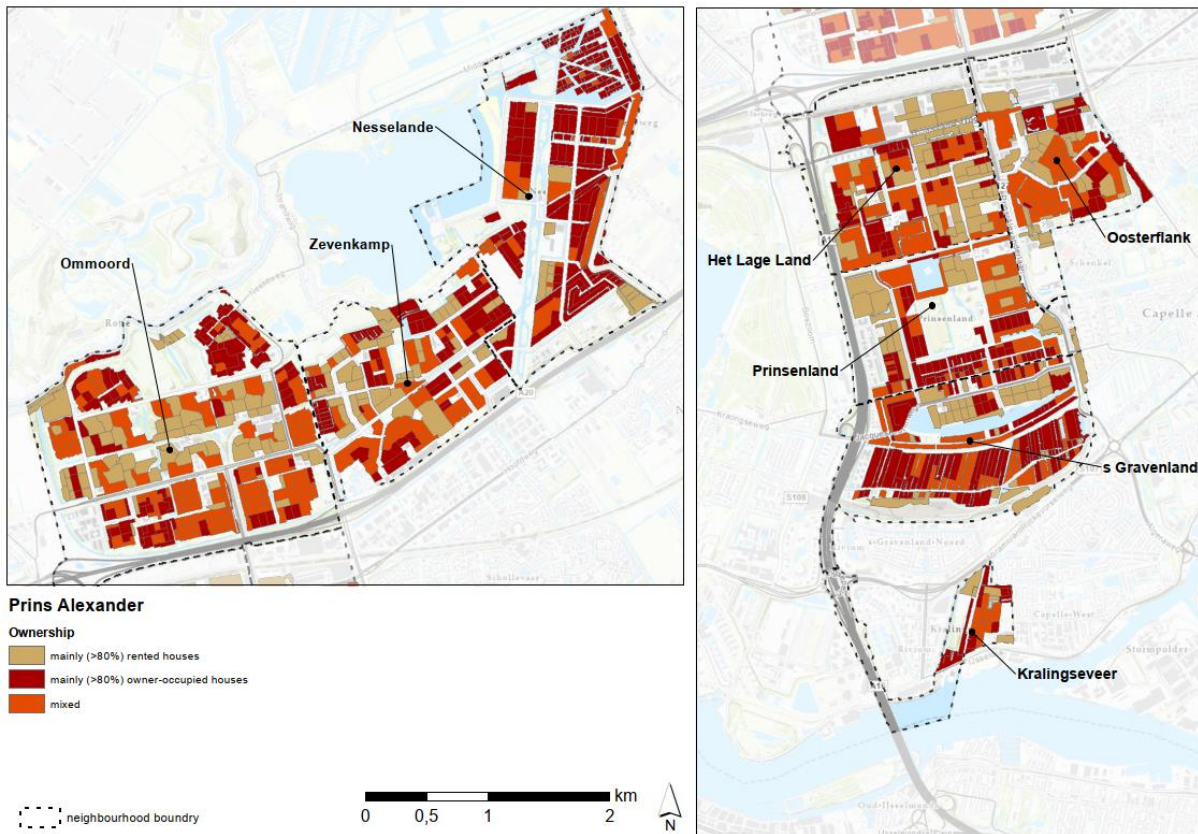


Figure 56.- Home ownership of all dwellings in district Prins Alexander.



Figure 57.- Building blocks with owner-occupied terraced houses in district Prins Alexander.

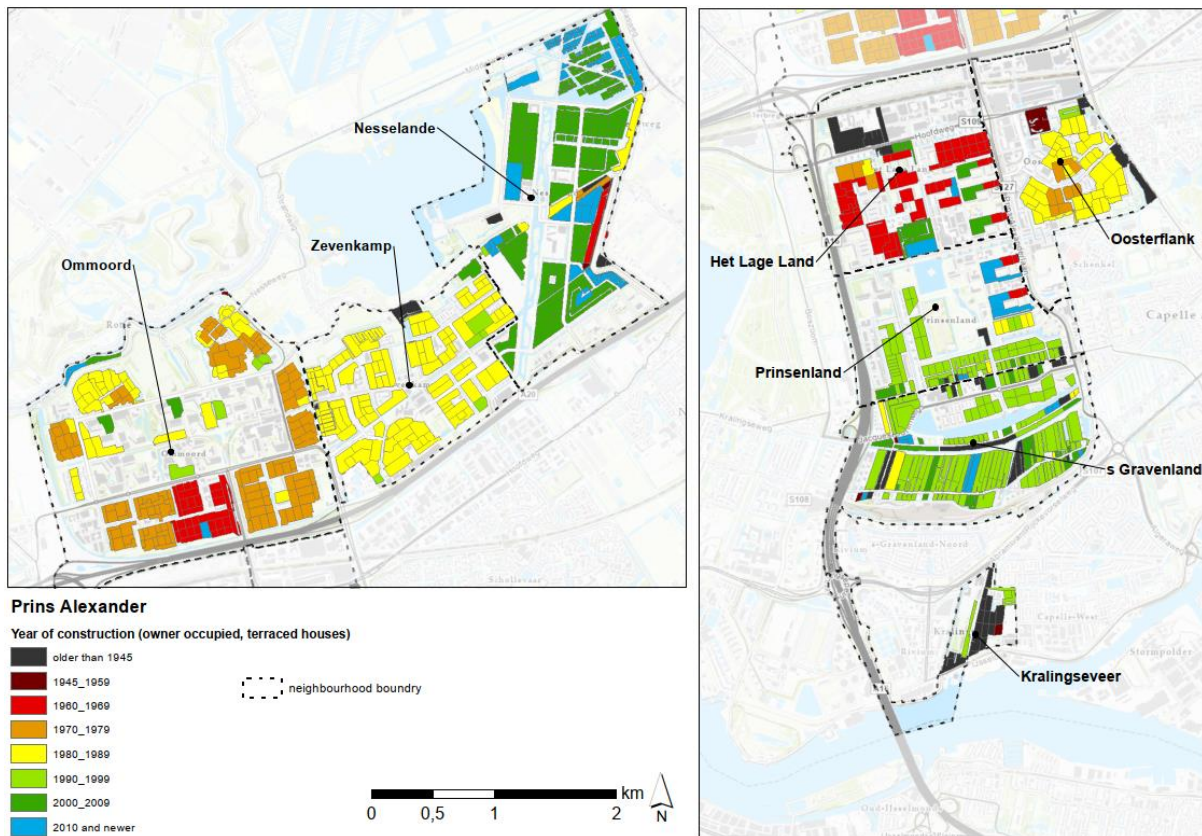


Figure 58.- Year of construction of all owner-occupied terraced houses in district Prins Alexander.

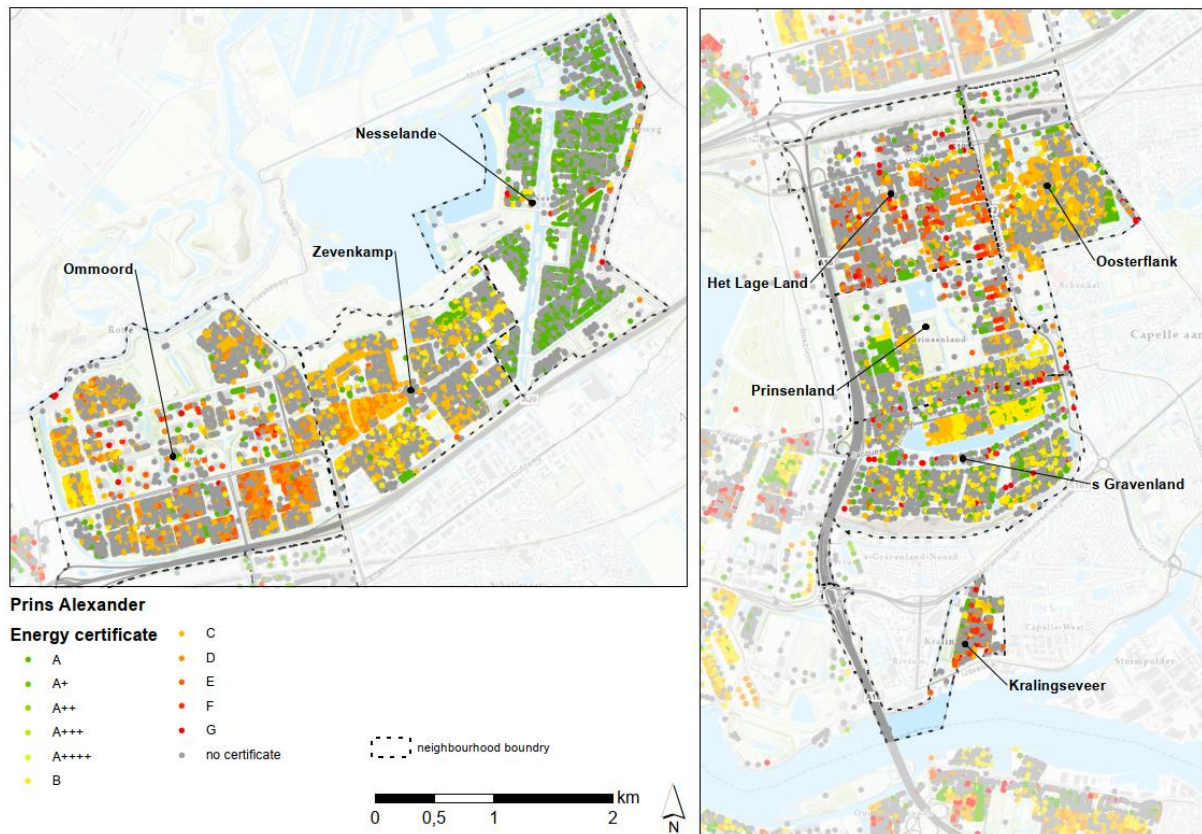


Figure 59.- Energy certificates (source: www.ep-online.nl/ep-online/PublicData).

Features (1)	Typologies (2)	Objectives (3)
Single family dwelling	Year of built	replication
Post-war buildings	Neglected	'aardgasvrije wijken'
Private home-owners	Inefficient	Improved sustainability
	Using natural gas	Co2 reduction
	Ownership	Energy saving
	Use	

Figure 60.- Buildings' mapping summary

B. Demand side (people)

The objective for mapping and segment people is to get the greatest effectiveness in the onboarding, involving and engagement with the renovation process.

Residents' age and household size

Knowing that single households, elderly people, and families with young children are less inclined to take energy saving measures, these data were also analyzed. Because of privacy regulations, these data are not available on building block level, but on a somewhat higher level, and they cannot be combined with the data on the housing stock to get exact numbers of homes. However, they can be used in GIS as an extra layer to select building blocks in areas with relatively high percentages of households of at least two persons and high percentages of people aged 15-64 years (Figure 61).

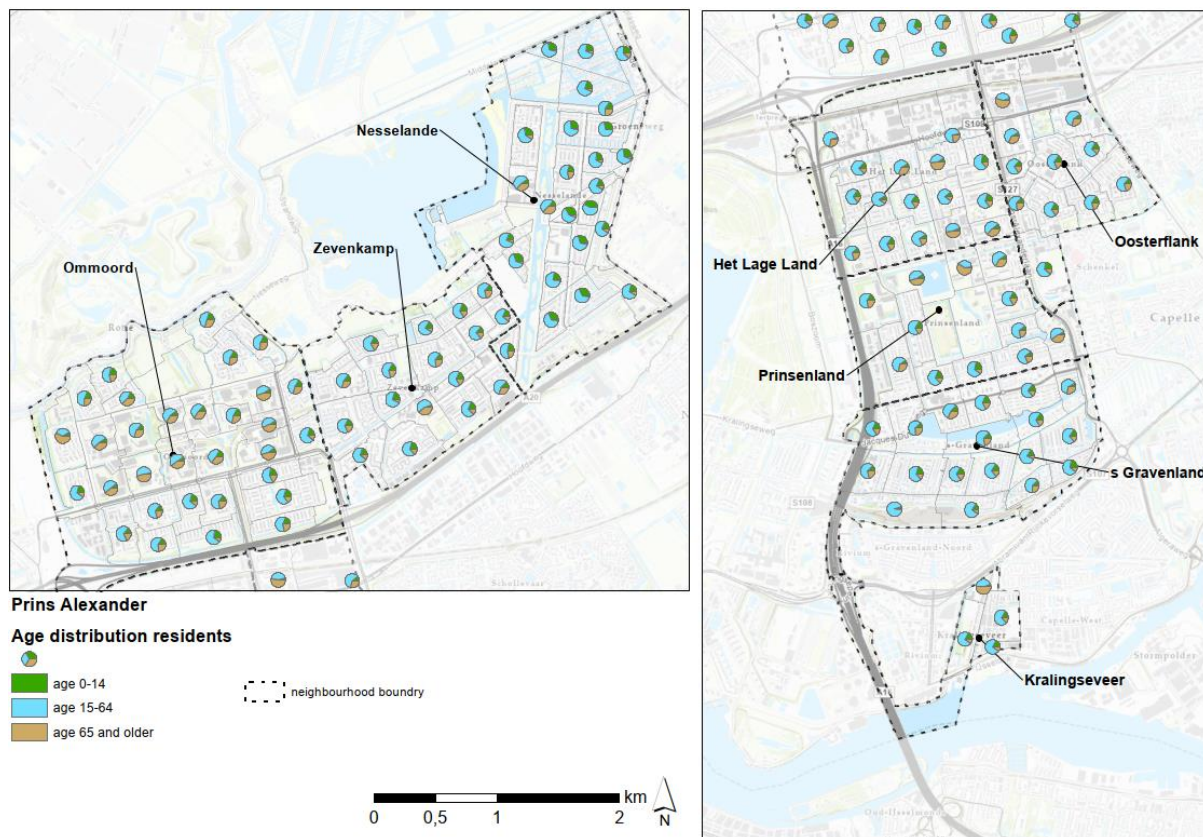


Figure 61.- Age distribution of residents in district Prins Alexander.

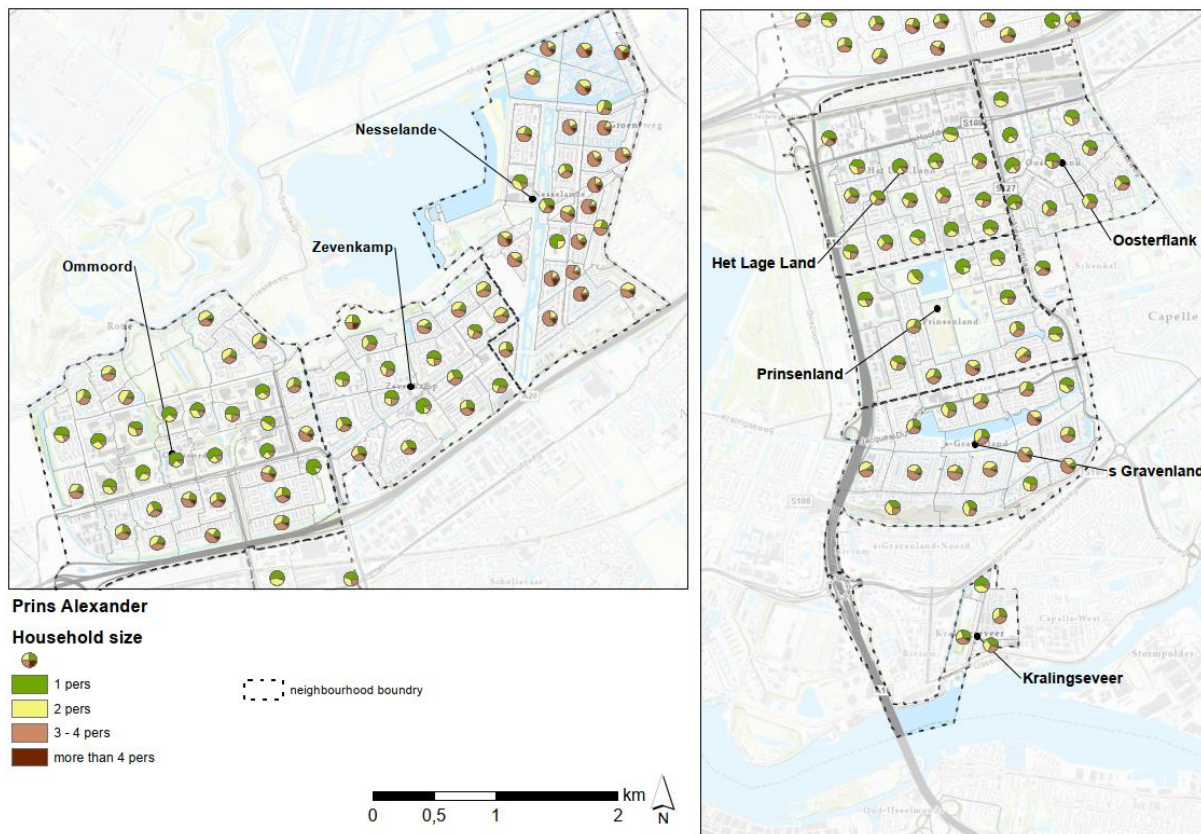


Figure 62.- Household size of households in district Prins Alexander.

Lifestyle segmentation

Rotterdam also knows what lifestyle segment from the Five Shades of Greener model is predominant and the distribution of residents over the five segments, per postcode (zip code)-5 area. The five value and lifestyle segments are:

- Responsible ones: socially engaged, politically interested people; critical but cooperative towards authorities; well informed; tolerant; international orientation; more often higher education, income above average; environmentally responsible, are willing to pay more for more sustainable products. Communication should focus on providing substantive and transparent information; offering different options.
- Dutiful ones: very socially engaged, especially when it concerns their own living environment; traditional norms and beliefs, conservative, strong sense of duty; peaceful and harmonious lives; have trouble understanding society's complexity; respect for authorities; often elderly people, lower educated, average income; sober and frugal lifestyle, avoiding damage to the earth, believe we use up too much resources. Messages should be simple and clear, directed towards their personal context.
- Structure seekers: these people feel underestimated in society, they strive for social recognition; they feel left out, don't have much faith in authorities; conformist, risk-avoiding; own family and friends come first; materialistic people, focus on pleasure; lower or average education, lower income; sustainability and climate change are not interesting; regard effects of their own behavior only on the short term; costs are important. Communication focussing on increasing knowledge and influencing values is not effective. Messages brought by charismatic (famous) persons might come across better.

- **Status conscious ones:** individualistic people: their own interest is more important than public interest; hard workers, striving for success and a good career; seek status and recognition; they are big and impulsive consumers, materialistic, throw away a lot, hurried living, impulsive, adventurous; new technologies, hip brands, and nicely designed gadgets are interesting; mostly young people, different educations and incomes; knowledge on sustainability is present, but they don't feel responsible; sustainability is only relevant when it brings personal advantages. They are sensitive to others' opinions. Communication should refer to their consumptive and impulsive lifestyle and focus on contemporaneity.
- **Self-developers:** socially engaged, want to be free, independent, and different; adventurous and impulsive, not materialistic, work is not the most important thing; critical towards society and government, don't want to be patronized; more young people, different educations and incomes; sustainability is not interesting, they don't feel responsible; they do live sustainably however, because they are not materialistic. Communication aimed at value transformation is not effective. Sustainability should be easy and correspond self-development.

The 'responsible ones' and the 'dutiful ones' are the segments most favorable to taking energy saving measures. However, the other three segments are not without a chance. With all segments it is a matter of tailoring the message well to meet the values and interests of the receiver.

Table 10 and Figure 63 show the distribution of residents over the five segments and the predominant segment, respectively.

The lifestyle segmentation according to the Five Shades of Greener model uses different boundaries than the municipal data shown above. Projecting these data onto the selected building blocks, therefore, is not 100% accurate, but it does give an indication of residents' stance towards sustainability. The 'responsible' and 'dutiful' segments are most positively inclined towards sustainability, of which the 'responsible' are easiest to reach and convince. Figure 63 shows that in 's-Gravenland, large part of the residents belongs to the 'responsible' segment, and it is also the predominant segment here.

More important than just focussing on the most promising segments is being aware of different views and values, and tailoring the message to meet the individual's personal goals. The segmentation model can be very helpful in this.

neighborhood	% dutiful [2016]	% structure seekers [2016]	% status conscious [2016]	% responsible [2016]	% self- developing [2016]
Het Lage Land/Oosterflank	6%	29%	24%	28%	13%
Kralingseveer	12%	40%	9%	14%	24%
's-Gravenland	7%	15%	22%	37%	19%
Prinsenland	12%	31%	27%	17%	13%
Ommoord/Zevenkamp	19%	33%	26%	16%	6%
Nesselande	7%	5%	42%	30%	16%
Total Prins Alexander	13%	28%	27%	22%	11%

Table 10.- Lifestyle segmentation of Prins Alexander residents (source: municipal database)

The neighborhoods Het Lage Land/Oosterflank, and Ommoord/Zevenkamp cannot be separated, because the zip codes don't follow these neighborhood boundaries but run right across them.

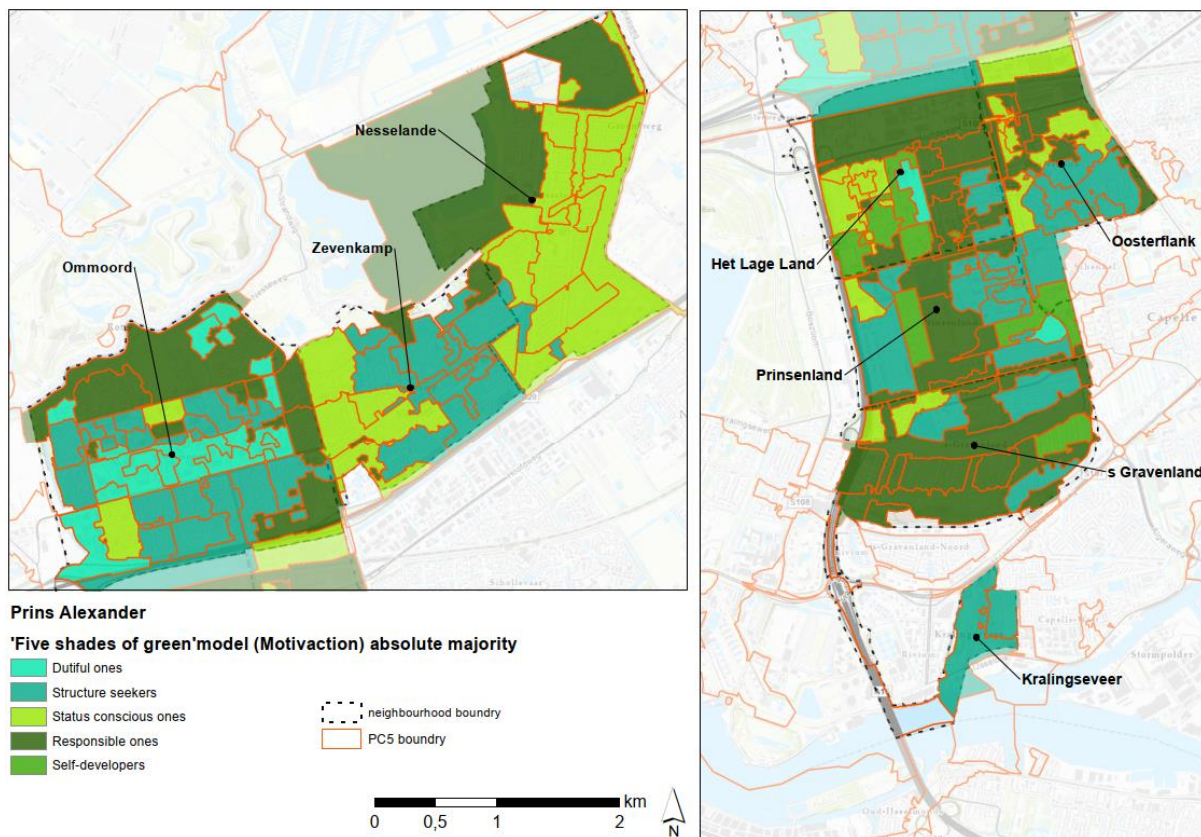


Figure 63.- Predominant lifestyle per postcode-5 area (source: municipal GIS).

Satisfaction with home

Every two years, Rotterdam conducts a survey among a representative part of its population on a large number of topics. One question that was asked in the last two surveys (2018 and 2020) was how satisfied residents were with the quality of their home, and specifically thermal insulation. The two maps in Figure 64 show the results for both years. The lower score for 2020 – on average, people were less satisfied with their home’s thermal insulation – may be an indication that residents have become more aware of the desirability of a well-insulated house (after all it is not very likely that the houses have become less well insulated). The winter of 2019 (the last winter before the survey for the 2020 report was taken) was very mild, and milder than the winter of 2017 (the last winter before the survey for the 2018 report), and therefore cannot explain the difference either. It is plausible to relate the greater dissatisfaction with thermal insulation to increased awareness of the need for thermal insulation. This should be helpful in convincing the homeowners to take insulation measures.

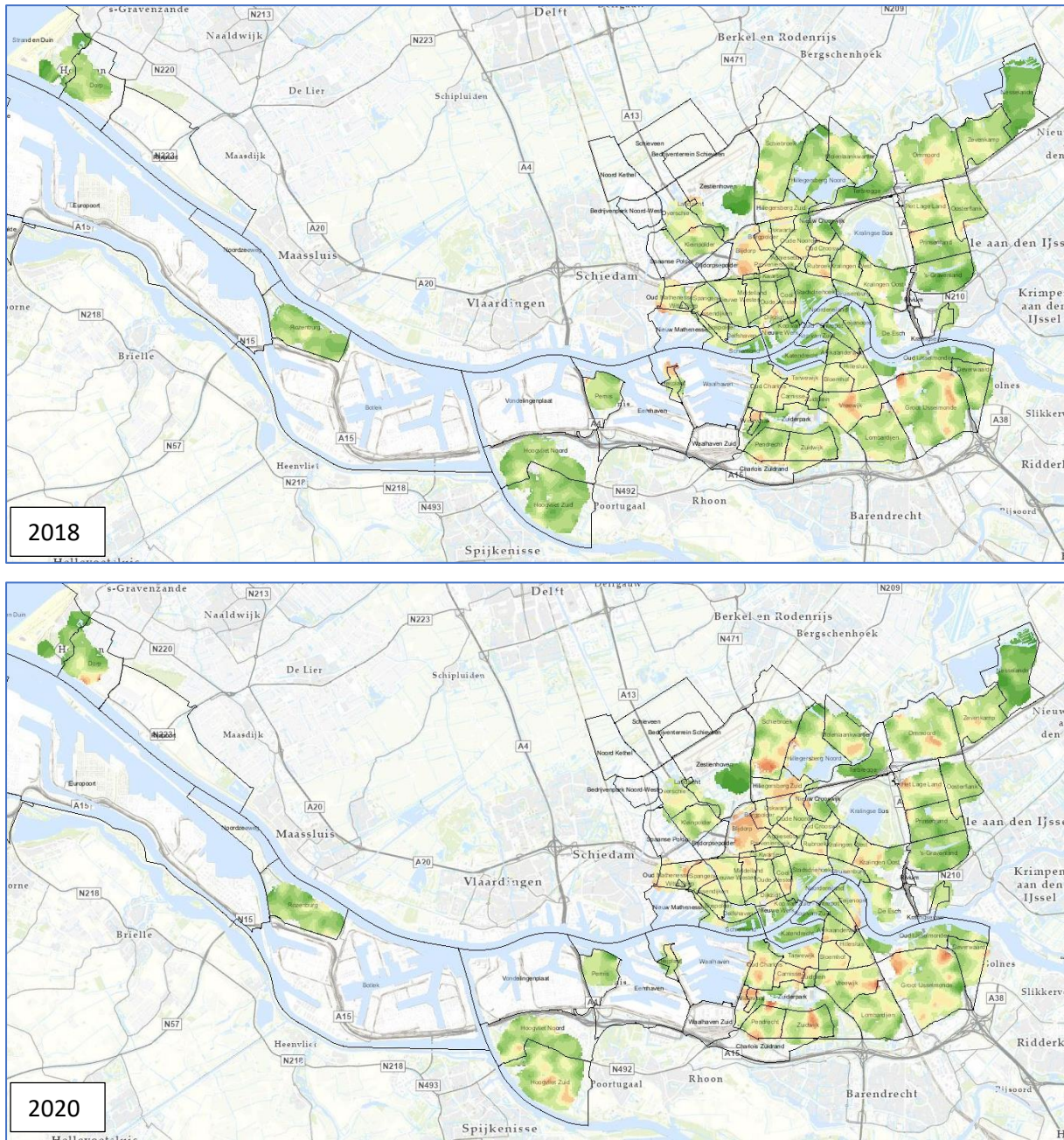


Figure 64.- Resident's satisfaction with the thermal insulation of their home in 2018 and 2020. Green = satisfied, red = dissatisfied. (source: Wijkprofiel Rotterdam, accessed March 15, 2021).

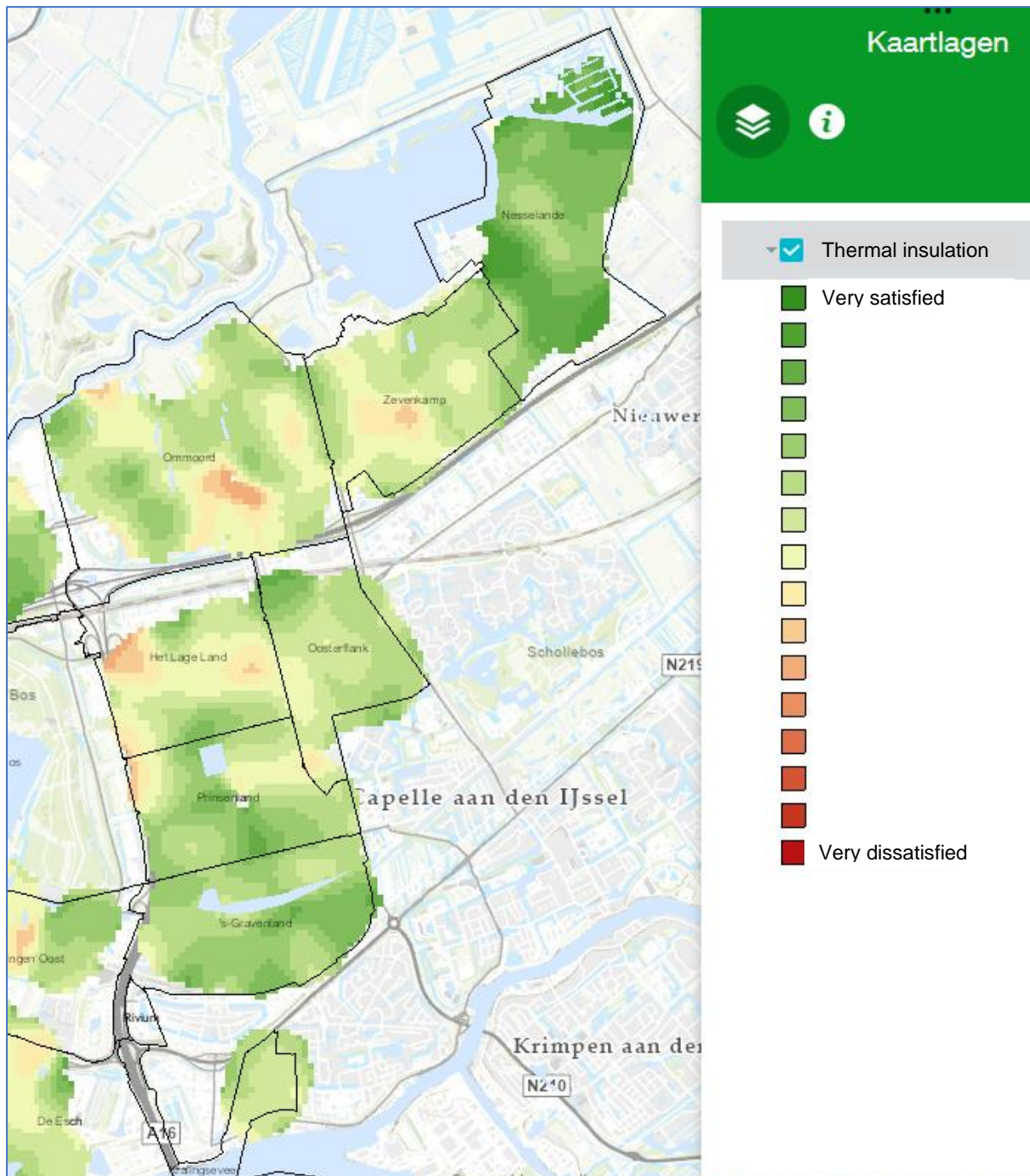


Figure 65.- Resident’s satisfaction with the thermal insulation of their home in 2020, zoomed in in district Prins Alexander (source: Wijkprofiel Rotterdam, accessed March 17, 2021).

Features (1)	Profiles (2)	Objectives (3)
Household size	Private home-owners	Renovation
Income	Early adapters / local heroes	Sustainability
Age	Owners associations	Replication
Origin		Scaling up

Figure 66.- Demand mapping summary

C. Supply side

The objective for mapping and segment suppliers is to get the greatest effectiveness in the implementation quality and user satisfaction through the renovation process.

Finally, the Offices should consider the whole renovation process stages to design the best services to offer, according to target groups and zones. For doing so, the supply side of the renovation market is to be scouted on all stages:

- Start – Awareness: dissemination (unidirectional) and communication (interaction)
- Stage 1 – Design: auto evaluation, assisted diagnosis, design
- Stage 2 – Elaboration: selection and formalization (contracts, permits, applications)
- Stage 3 – Realization: progress reporting, self-assessment, quality assurance and training
- Stage 4 – Validation: comparison, follow-up or feedback, monitoring, certifying

Decision is to be made for maximizing impact, according to targets groups and building zones, and energy renovation market solutions and suppliers.

Rotterdam would like to engage local businesses for installing energy saving measures. If the demand grows, local youngsters and job-seekers may be able to find work with these companies. Within Save the Homes, Rotterdam will first focus on roof insulation first. Therefore, we did a search for roofers in Prins Alexander (Figure 67).

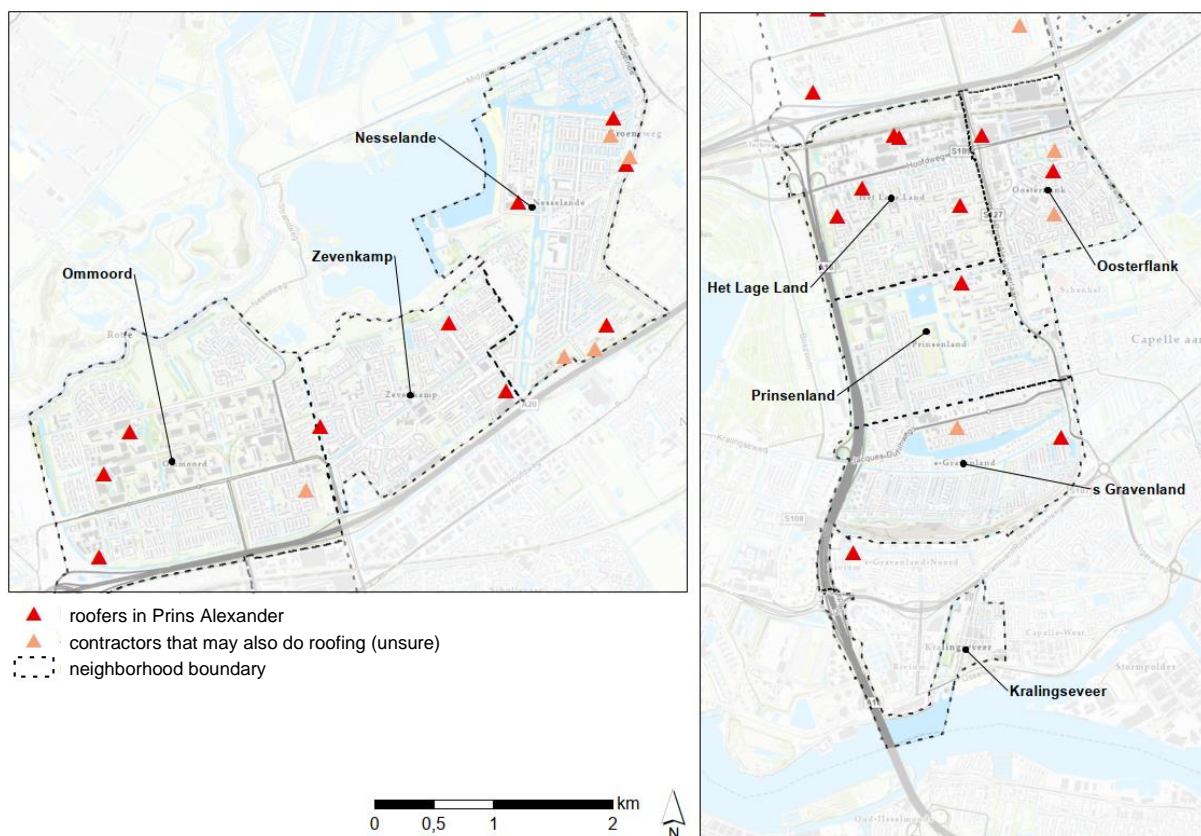


Figure 67.- Inventory of roofers and construction companies that may do roofing in Prins Alexander.

4.2.4 Summary

(Zones & Targets definitions & figures)

The combination of the criteria as mentioned in 4.2.2 leads to a selection of building blocks as shown in Figure 68. The criteria were:

- >1 terraced house
- >80% owner-occupied
- building period before 1990
- >50% of residents are between 15 and 65 years old
- >50% of households are larger than 1 person

The map shows that most building blocks that meet the criteria are situated in Ommoord and Zevenkamp, with Het Lage Land and Oosterflank next best.

If we ignore Ommoord, for their tiredness of municipal actions, then Het Lage Land has the energy certificates with the lowest scores, while Oosterflank and Zevenkamp also show room for improvement.

For the selected building blocks, Figure 68 also shows the distribution of the population (in the entire postcode 5-area) over the lifestyle segments of Five Shades of Greener. Knowing which segment(s) is/are the largest, communication channels and content of the messages can be tweaked in such a way that they correspond better to the residents' values and needs.

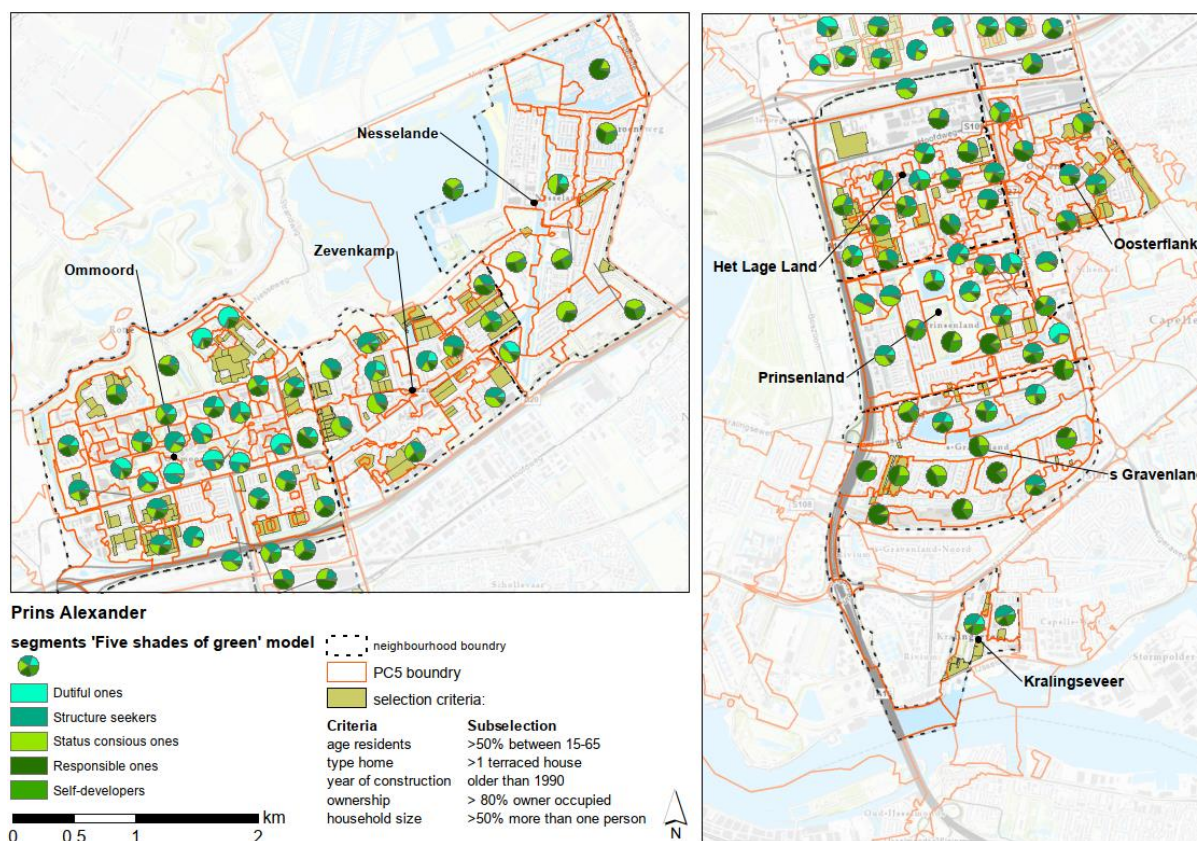


Figure 68.-Building blocks in district Prins Alexander where all five criteria stated in 4.2.2 are met simultaneously. For the selected blocks, the distribution of the population over the five segments of the Five Shades of Greener model in the postcode 5-area concerned is shown.

5 The follower cities test

According to Objective 4 (To deliver real benefits to citizens and other stakeholders in two cities as a result of the Citizen Hubs operating locally), the objective is not only to provide the integrated renovation services to the specific homeowners groups identified in the two pilot cities (Rotterdam and Valencia) but also to demonstrate the potential of the Citizen Hub concept to all relevant stakeholders in other municipalities, to regain trust and interest in building renovations and to further expand the Citizen Hub business model.

So, in order to roll out the Citizen Hub concept on a wider scale (regional, national and European), the Citizen Hub models developed for Valencia (ES) and Rotterdam (NL) will be one-on-one replicated for the two follower cities, Sant Cugat (ES) and Ljubljana (SI).

Sant Cugat – ES

(Fittingness in same country context)

The objective is to test the replication in the same country for Spanish pilot in Valencia and follower city Sant Cugat. The aim is to analyse all the benefits of having the structure and services developed in national language and based on national circumstances, legislation, culture and habits.

Sant Cugat Municipality is assessing the methodology and feedback will be reported during WP4 and WP5 activities for pilot experiences and replication and exploitation activities.

Ljubljana – SI

(Fittingness in different country context)

The objective is to test the replication between EU countries where the Citizen Hub mapping methodology and results for the Dutch city of Rotterdam will be replicated for the City of Ljubljana in Slovenia. The aim is to validate the effectiveness of the replication process between the different EU countries.

The city of Ljubljana is assessing the methodology and feedback will be reported during WP4 and WP5 activities for pilot experiences and replication and exploitation activities.





6 Conclusions

Form previous data collection and analysis, a generalization has been made and a methodology for mapping and segmenting the studied area is produced.

There is plenty of data sources stored in silos and not connected, uneven in format, granularity or up-to-date rate, so work here might not need to be as fine as foreseen at the beginning of the project, but more a high-level analysis **process highlighting which could help detect and prioritize**, on one hand, the quick-wins for the short term, for rapid consolidation; and the greater impact potential in the long term, for sustainability of the service, both based on the replicability and scalability of the solutions provided.

This methodology will be complemented with next steps on following deliverables for community building and communication strategy (**D2.2**), solutions design (**D2.5**) and supply network establishment (**D2.3**), together with protocols and supporting tools (**D2.4**) and financial mechanisms (**D2.6**), to be tested in **WP3** design tasks and **WP4** demonstrating activities.

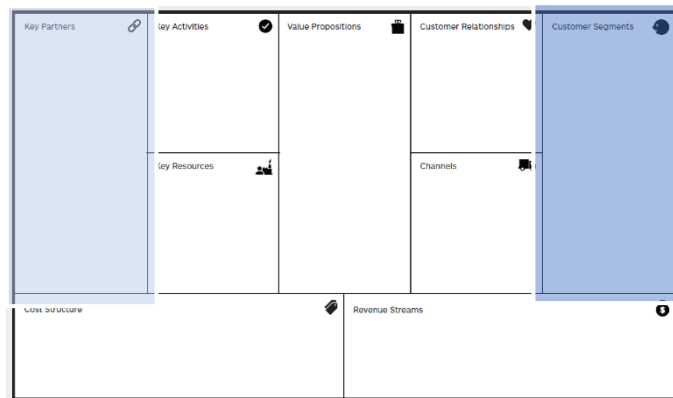




Annex 1 – StH Document 1: Mapping methodology

This document will help your Municipality or Region map demand and supply side of your renovation market as a first step to design an OSS service in your context and implement your own Citizen Hub. It is structured as a series of tables to be filled in a step-by-step process that will lead to the definition of your own targets and services. This document is completed with the corresponding spreadsheet and is available on the project web site.





StH - Mapping methodology – checklist

A. Presentation

Before starting this journey, present yourself and your friends:

Organization	Activity	Geographical scope	Contact

B. Objectives

Now, draft the main objectives pursued through the implementation of the OSS concept. This is important to orientate the search below.

- 1) My first objective is to _____
- 2) Also, I would like to _____
- 3) And, if possible, I would also address _____

C. Study area

Do you already have a physical office in place?

YES → define geographical area around it:

- _____ meters from the office
- Districts: [names, codes]
- The whole city: [name, code]

NO → define the wider geographical area under your scope (e.g., city):

- Districts: [name, code]
- The whole city: [name, code]
- The whole region: [name, code]





D. Mapping

D. 1 - Object (buildings)

The objective for mapping and segment buildings is to get the greatest effectiveness in the impacts achieved through the renovation process.

First collect information about your building stock context (regulations, history, grants schemes, bureaucracy, or other programs related to buildings):

Then select your characterization criteria:

- component approach for step-by-step renovation replicability
- morphology approach for integral renovation replicability

And list the attributes related to previous approach that you would need to analyse:

Attribute	availability	thresholds/ categories	source	format	granularity	date	comments

Now is time to mix, overlap, cluster: define your typologies, keeping in mind which context circumstances or potential impact related to your approach are interesting for you:

Typology	Attribute (interval)	Attribute (interval)	Attribute (interval)	Attribute (interval)	Attribute (interval)	Solution COMPLEXITY	comments

And finally, you need to quantify (& locate):

Typology	Area/ District/ City	Area/ District/ City	Area/ District/ City	City	Rate	IMPACT	comments





Number							
Rate							

According to previous data, select your target zones and typologies (quick wins for short term, targets for long-term):

- ⇒ Quick wins: _____
- ⇒ Typologies: _____
- ⇒ Zones: _____

D. 2 - Subject (citizens, owners, occupants...)

The objective for mapping and segment people is to get the greatest effectiveness in the onboarding, involving and engagement with the renovation process.

We follow here the same structure than for mapping buildings but related to the people living or owning those buildings (previously targeted).

First collect information about your demographic context (regulations, history, habits, traditions, problems...):

Then select your characterization criteria:

- Economic approach, for affordability
- Social approach, for motivation
- Organizational approach, for simplification

And list the attributes related to previous approach that you would need to analyse:

Attribute	availability	thresholds/ categories	source	format	granularity	date	comments





Now is time to mix, overlap, cluster: define your profiles, keeping in mind which context circumstances or potential drivers related to your approach are interesting for you:

Profile	Attribute (interval)	Attribute (interval)	Attribute (interval)	Attribute (interval)	Attribute (interval)	Solution COMPLEXITY	comments

And finally, you need to quantify (& locate):

Profile	Area/ District/ City	Area/ District/ City	Area/ District/ City	City	Rate	IMPACT	comments
Number							
Rate							

According to previous data, select your target profiles (quick wins for short term, targets for long-term):

⇒ Quick wins: _____

⇒ Target Profiles: _____

D. 3 - Means (products, services, tools...)

The objective for mapping and segment suppliers is to get the greatest effectiveness in the implementation quality and user satisfaction through the renovation process.

Now you know which buildings you want to address (for replicability) and who you will need to approach (for engagement) in order to trigger an effective and efficient renovation path. So you just need to find out how feasible and reliable those renovations are.

We follow here the same structure than for mapping buildings and citizens but related to the people and companies providing services and solutions for them (previously targeted).

First collect information about your construction sector context (regulations, history, market, business, traditions, problems...):



Then select your characterization criteria:

- Process approach, for accompanying and providing customized solutions (based on the strategies to be defined from the buildings’ typologies analysis). This approach is much related with the morphological approach for building characterization, intended for a full deep renovation.
- Solution approach, for providing specific products and/or services to be defined from the buildings’ typologies analysis. This approach is much related with the components approach for building characterization, intended for a step-by-step renovation.

And list the attributes related to previous approach that you would need to analyse:

Attribute	availability	thresholds/ categories	source	format	granularity	date	comments

Now is time to mix, overlap, cluster: define your supplier’s profiles, keeping in mind which context circumstances or benefits related to your approach are interesting for you:

Profile	Attribute (interval)	Attribute (interval)	Attribute (interval)	Attribute (interval)	Attribute (interval)	Solution COMPLEXITY	comments

And finally, you need to quantify (& locate):

Profile	Area/ District/ City	Area/ District/ City	Area/ District/ City	City	Rate	IMPACT	comments
Number							
Rate							



