4RinEU

Reliable models for deep renovation

D3.5
WP3

# Protocol for participative deep renovation design and user motivation

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# Foreword

Despite the low energy performances of the European building stock, the yearly renovation rate and the choice to perform a building deep renovation is strongly affected by uncertainties in terms of costs and benefits in the life cycle.

**The project 4RinEU faces these challenges, offering technology solutions and strategies to encourage the existing building stock transformation, fostering the use of renewable energies, and providing reliable business models to support a deep renovation.**

4RinEU project minimizes failures in design and implementation, manages different stages of the deep renovation process - from the preliminary audit up to the end-of-life - and provides information on energy, comfort, users' impact, and investment performance.
The 4RinEU deep renovation strategy is based on 3 pillars:

- *technologies* - driven by robustness - to decrease net primary energy use (60 to 70% compared to pre-renovation), allowing a reduction of life cycle costs over 30 years (15% compared to a typical renovation);
- *methodologies* - driven by usability - to support the design and implementation of the technologies, encouraging all stakeholders' involvement and ensuring the reduction of the renovation time;
- *business models* - driven by reliability - to enhance the level of confidence of deep renovation investors, increasing the EU building stock transformation rate.

4RinEU technologies, tools and procedures are expected to generate significant impacts: energy savings, reduction of renovation time, improvement of occupants IEQ conditions, optimization of RES use, acceleration of EU residential building renovation rate. This will bring a revitalization of the EU construction sectors, making renovation easier, quicker and more sustainable.
4RinEU is a project funded by the European Commission under the Horizon 2020 Programme and runs for four years from 2016 to 2020.
The 4RinEU consortium is pleased to present this report which is one of the public deliverables from the project work.

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# Executive Summary


## Purpose

The purpose of this study has been to identify barriers to renovation of public-owned social housing and develop guidance to help lower these barriers. The focus in this report is not the technical barriers, but the organizational and societal barriers. The aim is further to increase the stakeholders' motivation for deep renovation of public-owned social housing. To achieve this goal, it has been central to identify roles, needs and interests of owners, tenants and public authority.

## Methods

The study is based on the demo cases in the 4RinEU project, which are all public-owned residential buildings for social housing. The findings are based on:

- Literature study on the meaning of renovation for residents, and barriers towards renovation.
- Interviews of renovation experts in the demo-case organizations.
- Focus group interviews in three of the participating countries/ organizations. The interviews were not only about the demo cases, but also about the participants' experiences with renovation projects in their organization in general.

## Findings and guidance

The study has identified barriers for renovation in public-owned social housing related to type of residents, technical standard, financing, competence and strategies.

Based on the three case studies of organizations providing housing for disadvantaged groups, the following advice can be given on how to lower barriers and increase stakeholders' motivation for deep renovation:

### RECOMMENDATIONS FOR PUBLIC HOUSING PROVIDERS:

- Consider the renovation process as means to increase the residents' well-being and commitment to the dwelling. There can never be enough information about the process for the residents. Formalize the information process towards the residents, to avoid the dependence on enthusiasts in the organization.
- Technical standard should be adapted to the residents' skills. Go for robust technology that works regardless of the skills of the residents. Advanced technology must be placed in looked technical rooms.
- Visualize energy savings as savings for the municipality in total, despite different departments and budgets. This strengthens energy savings as a driver for renovation.

- To build competence in the organization, join research projects and aim for pilot projects.
- Plan with a sustainable communication strategy towards the residents. Use the media; positive media attention may be used to empower the stakeholders and workers in the project.

### RECOMMENDATIONS TO POLITICIANS/AUTHORITIES ON FINANCING:

- Passive house, nZEBs or positive energy house level is not always within reachable limit for public housing organizations. There are other aspects more important to vulnerable residents than energy ambitions. For example, the quality of the outdoor areas around the blocks is significant to increase the resident's well-being. This type of renovation is not favoured in subsidies for energy efficient buildings. Financing subsidies for *social sustainability* qualities should be aimed for.

# 2 Scope and research aim

## 2.1 Scope

The aim of this work has been to

1) identify barriers to renovation of public-owned social housing, and
2) to develop a guidance to help lower barriers to deep renovation and increase the stakeholders' motivation for deep renovation in different EU geo-clusters.

The focus are not the technical barriers, but mainly the organizational and societal barriers. Many of the findings may be generalized also to renovation of other types of housing.

The study is based on the organizations that owns the demo cases in the 4RinEU project, which are all public-owned residential buildings for social housing. The overall goal of the 4RinEU project is to achieve a successful and efficient implementation of deep renovation solutions, and to increase the renovation rate of this kind of buildings.

## 2.2 Delimitation

Delimitation of the scope of the study is necessary. It is tempting to include all kind of apartment buildings and single-family houses, as the renovation potential is large. However, the decision-making process and the financial mechanisms are very different according to type and ownership, residents and building.

The focus of this study has been on *public-owned social housing*, but we have also been looking for similarities/generalization to privately owned apartments. Single-family houses have not been a part of the scope, since the decision-making processes and financing are very different.

The findings may therefore also be relevant to other types of housing, like privately owned apartments in residential multifamily buildings, and co(operative)-ownership (common in Norway) where decisions on renovation are taken on a basis of 2/3 majority during the annual general meeting.

## 2.3 Demo cases included in the study

The three organizations and demo-cases included in the study are:

1. Boligbygg (BBY), Norway. Renovation of two-storey housing for single people with special needs.
2. Wohnzoorg Netherland (WZN). Renovation of a residential building for independent elderly people consisting of four floors.

3. AHC, Spain. Renovation of apartment buildings for families with difficulties (social housing for families)

To support the study, SINTEF in Norway, Trecodome in Netherlands and Aiguasol in Spain have been involved throughout the process and in the further analyses.

It is important to notice that the findings in this study are not based only on experiences with the 4RinEU demo-cases, but also exploit experiences with renovation in general in the above listed organizations.

# 3 Method

## 3.1 Literature study

All the demo-cases in the project are public buildings with tenants, meant for social housing. The people who live there are less advantaged groups (elderly people or people with socio economic difficulties).

We searched for literature to support our studies, with the aim of comparing our results and maybe state differences or possible generalisation. The literature was used to strengthen advice and generalize the findings to private housing as well, beyond public-owned buildings.

This part was carried out in the analysis phase, after the summing up of the interviews. Literature study reports the results and the approach from similar studies/analyses.

## 3.2 Expert interviews

In the introductory phase of this study, expert interviews were used (Bogner et al 2009), i.e. interviews with persons in a central position in the organisation, with a responsibility to plan and oversee renovation and good overview of the situation. Expert interviews have been used for many years in social sciences, especially in the initial/exploring phase of a research project, to effectively gain an overview of the situation, the challenges and the roles involved. A problematic side with this kind of interviews is that it will be a risk to only get the point of view from the "elite". Following up with interviews of the users will however correct the picture (Bogner et al 2009). Expert interviews were used in this study for two reasons: to get a first impression of the situation and identify roles involved in a renovation process; then, to get an insight in the owner's perspective and challenges.

To lower the barriers and increase motivation for successful renovation, we needed to identify the different roles in a renovation process. Who is involved in the decision-making process, who will be affected by the renovation, and who influences the process? Owners of the building, tenants and public authorities are obvious participants. To understand the decision-making process, it was necessary to identify their roles, the context, and influence from other parties.

Prior to the focus group interviews, we interviewed the building owners. This was done mainly in the Norwegian case organization, and the answers were used also to plan the focus group interviews in the other demo-case organizations.

The main questions were:

- Who influences the decision-making process in their organization (need for renovation, size of renovation, number of projects, ambitions, technical choices etc)?
- Who represents the users/tenant's interests?
- Which regulatory or granting authorities influence the possibility/ambitions for renovation?

The roles for the demo-case were identified, and their influence and interactions discussed. Identified roles were grouped according to main interests mentioned above, see appendix A.

The different roles were evaluated (by building owners, SINTEF, AIGUASOL, Trecodome), and the most relevant ones identified as suitable participants in a focus group interview.

The selection was based on following criteria:

- Topics to be addressed, according to the interview guide
- Roles relevance and suitability for the topics
- Dynamic of the focus group, with possible different views brought to the discussion, representing several interests
- Level of discussion – will the representatives discuss at the same level of details? Will the presence of one representative hinder other participants to present their point of view?
- The size of the group should be maximum 8-10 persons
- If smaller groups were needed to obtain good discussions, the interviewees could be divided in two groups.

For each of the relevant roles, qualified representatives were identified and invited to the focus group interview. The list of roles identified for each country is included in appendix A. The involved people were identified by name in each country but are identified solely by role in this report.

The Norwegian case was analysed prior to the other demo-cases. The Dutch case had a similar structure of roles, and only adjustments were necessary to fit local conditions. The main difference was the type of users, in the Dutch case elderly people with nursing needs. However, during the study and writing of this report, the Dutch case study changed to a demo-case with self-sufficient elderly people. The Spanish organization model is a bit different from the Norwegian and the Dutch case organizations, and some adjustments to what stakeholders to include in the focus groups interview were necessary. Also, the Spanish demo-case was replaced during the barriers study, however, in this case the type was the same.

## 3.3 Focus group interviews

The focus group interview method is well-suited for exploring attitudes and arguments (Morgan, 1997). As for any collection of personal based information, ethical issues were considered. Identification of people was only done for practical

reasons and related to invitation etc, and results were reported by roles. No health-related topics were addressed, and all notes were handled confidentially. The sessions were recorded, but recordings were available only to interviewers, and safely destroyed after reporting.

### 3.3.1 Interview guide

Based on the scope of the study, the preliminary interviews with the building owners in each country and identification of issues to address from other parts of the project,
SINTEF developed an interview guide grouped by the themes listed below:

- Barriers (Economics, budget, funding, payback, rent, savings, influence on users, technical barriers and use of innovative technology, social barriers)
- Drivers (improved indoor air quality, energy and time savings, costs for rig up)
- User (Who they are, do they have special needs, how to inform them and ensure the right use of new technology)
- Decision process/actors involved/different stages
- Measures
- Best practice examples
- National competence level (mapping).

The work was coordinated especially with the needs of 4RinEU WP4 (Business Model) task 4.5 (Financing deep renovation) and task WP5 (Local Demo Case). Important issues were identified also for WP2 Deep Renovation Technologies, WP3 Deep Renovation Packages and services, WP6 Path to Market and WP7 Dissemination and Communication.

The interview guide is included in appendix B. The interview guide was developed for Norway, and then translated to English. Later, the involved partners in Netherlands and Spain have translated the interview guide to local languages and adjusted to local conditions if needed.

It is important to stress that this has been a qualitative study, and the discussions occurring during the interview were important. Focus group interviews often generate constructive and complementary discussions. The fact that the participants listen to each other and then get new thoughts and associations that would not occur in a single interview, is favourable. The dialogue is important to develop innovative knowledge (Kitzinger, 1995).

### 3.3.2 Focus group interviews

The focus group interviews were performed during summer 2017 in Norway, the Netherlands and Spain. In the Netherlands this took more the form of an expert interview, due to the smaller number of participants. The identified and qualified representatives described in 2.2 were invited to participate in the focus group interview for each of the three countries.

The groups consisted of 8-10 persons, the form of the interview and the number of participants varied. The interviews were led by 1-2 interviewees and a secretary.

Further instructions, like the agenda for the meeting, how the participants were moderated and guidance for the interviewers on how to engage all participants and ensure a broad panel of answers were provided to the organizers of the sessions.

The results of the focus group interviews were reported as independent descriptions of decision processes, barriers and possibilities in each of the demo-case organizations.

## 3.4 Timeline

The development of the study and the report was done according to this timeline:

1) Expert interviews and focus group interviews spring/ summer 2017
2) Analyses of findings autumn 2017/winter 2018.
3) Supplementing literature review winter 2017/ spring 2018.
4) Development of guidance spring 2018.
5) Final deliverable October 2018.

# 4 Results of literature study

## 4.1 The meaning of renovation for the residents

### 4.1.1 Housing and quality of life

In her review of the connection between housing and public health, Shaw (2004) demonstrates how housing is an important determinant for public health. Investment in housing and neighbourhood qualities are therefore important for health and quality of life. Even if a house affects health directly through e.g. cold or lack of ventilation, the meaning of housing is context dependent. External threats like noise or burglary may change potential positive experiences of a dwelling. The meaning of a home is also individual, and some people do not experience home as a safe place. Shaw (2004) has developed a model that categorizes the various levels of how housing affect people's health through how it affects their life quality. The influence is both direct and indirect, both on individual level and on neighborhood level (see figure 1).

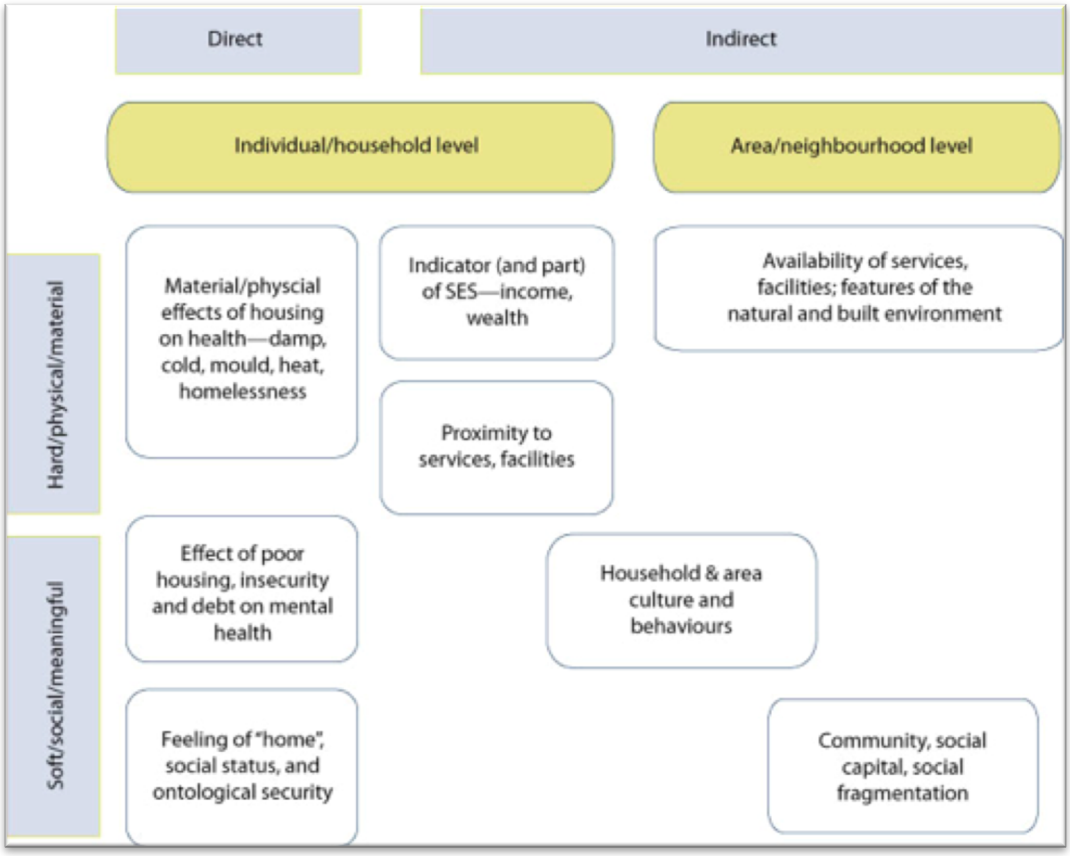



**Figure 1.** Model of direct ("hard") and indirect ("soft") levels of how housing relates to public health. Shaw (2004, s. 398).

The direct ("hard") factors are typically draft and moisture that may lead to sickness and poor health. The indirect levels ("soft") are how we are influenced through meanings and associations connected to housing, for example how neighborhood signalizes socio economic status, or the feeling of having a real home. These aspects typically influence quality of life and may be one of many factors contributing to low self-esteem and depression.

The case studies in 4RinEU are for disadvantaged groups in need of help to find a place to live, and in need of housing services. Especially for this group, unable to choose where to live, housing is important for quality of life. Technical and aesthetic standards influence quality of life both directly and indirectly (Shaw, 2004). Housing and environments release connecting thoughts/associations we use when trying to understand the world around us. Residents may be judged based on visible signs that are interpreted as resident information by outsiders (Gullestad, 2002). Neighbourhoods are important to lifestyle and identity of those who live in them. Gram-Hanssen & Beck-Danielsen (2004) have shown how people associate specific residential neighbourhoods with different symbolic life values.

Ortiz & Salom (2017) studied the impact of the energy retrofit of households in the residential health in Spain. They found that an overall energy retrofit of 1.5 million of buildings built in 60-80s, would make it possible to prevent 100,000 people with poor or very bad health, and 120,000 people with cardiovascular diseases. In addition, the households could save around 400-550 € per year in energy costs, reducing by a half the total energy costs of the household. The public administration could save around 370 € per house in health services costs (150 €/house) and labor costs (220 €/house).

### 4.1.2 Resident participation in renovation processes

Renovation of housing for disadvantaged groups is especially meaningful because this user group is often unable to move or to choose their dwelling. Renovation is therefore a perfect opportunity to influence their quality of life positively. A renovation process with residential participation also influences the social environment and create sense of community and inclusion among the residents (Hauge & Støa, 2009; Hauge, 2009). A criterion for success seems not necessarily to be the degree of involvement in the decision-making process, but rather the leaders' (initiators and planners) respect for the needs of the residents, the level of information provided and the follow-up (Hauge & al., 2012a).

SINTEF Building and Infrastructure was involved in a large research project on renovation of blocks of flats from 2009-2013, called REBO. One of the case studies in REBO (Kjølle & al, 2012) involved two blocks of flats with municipal apartments for substance abusers, where the residents participated in the planning of the housing renovation. The residents were pleased with the results, experienced improved quality of life, and had a feeling of ownership towards their block of flats. The renovation processes and architectural changes affected their social status and pride positively. The leaders were enthusiastic and guided the renovation process in close contact with the residents and with good routines for information and follow-

up. The case studies show that involving the residents in the ongoing renovation activities is a way to develop a strong feeling of ownership towards the project. The "worst" of the housing cases was lifted in the eyes of the residents, the project leader, the social and health professionals, and the city administration. Before the renovation, nobody wanted to live there. After the renovation, there were waiting lists. People walking by saw the changes and asked the renovation project leader "who is living there now"? (Hauge et al, 2012a).

In Spain, the research project Prohabit (see http://www.prohabit.org/en) have detected some recent successful experiences on deep retrofit actions at district level. These actions have been implemented to facilitate the end-user's engagement on the design and implementation processes. An online *bidirectional channel* was widely used for the residents and, in part thanks to that, most of them have expressed their satisfaction on the end-results of the retrofitting actions through a public survey process. The aim of the ongoing project is to analyse the impact that urban transformations have had on the inhabitants of chosen cities, and to citizens to be able to participate in a more effective manner in decision-making processes that affect the transformation of the inhabited space.

## 4.2 The drivers and barriers for renovation

### 4.2.1 Renovation of cooperatives and single houses

Hauge et al. (2012b) did a qualitative study of barriers and drivers for renovation of housing cooperatives in blocks of flats. They found success criteria and barriers on both societal level and organizational/individual level. Factors of importance on societal level are knowledge about energy efficient renovation among relevant stakeholders in the building sector, owner structure of housing cooperatives, and existing regulations and incentives. On the organizational and individual level, time frame and organization of the process, understanding residents' needs, economy, information giving, and available exemplary projects and role models are important influencing factors. Necessary renovation is often problematic when the owners are lay people without experience from building/renovation processes, and especially when a building has many owners, like in housing cooperatives. The case studies in 4RinEU are public housing for disadvantaged groups, and not affected by the challenges of getting many owners to agree on renovation. However, many of the success factors described in Hauge et al. (2012b) can be used as a guide to create feelings of ownership towards the project among the residents. The social barriers are relevant for renovation of all types of housing. Hauge et al. (2012b, p 326) summarize important measures to obtain more sustainable renovation:

- Coordinate and harmonize regulations, incentives and other support systems for energy efficiency of buildings.
- Continue pursuing and strengthening the work to support exemplary projects (front runners pilot buildings) with high ambitions on energy efficiency.

- Introduce regularly condition reports (MOM-reports) decreed by law for housing cooperatives.
- Go through policy instruments critically to develop a detailed regulation system that gives motivation for high ambitions for sustainability, regardless of the scope of the renovation. Ambitious demands for building components may contribute in a positive way.
- Continue pursuing knowledge elevation of players in all segments.

Thomsen and Hauge (2014) did a qualitative study on barriers and drivers for sustainable renovation among single family households in Norway conducting ambitious renovation. They found that the main drivers for introducing energy efficiency measures were increased comfort and higher indoor temperature, improvements when there was a general need for maintenance, saving energy, and receiving low energy bills. The main barriers were lack of information about energy efficiency measures, lack of knowledge among players in the building sector of construction details and of technical installations, as well as the house owner's economic possibilities, and availability of materials and products for energy upgrade. Too scarce information on energy upgrading was available. The owners had invested a lot of time in their projects. In some cases, the owners themselves had become experts on energy efficiency measures and taught the constructors how to conduct the project. These findings underline the need for upgrading skills in the construction sector, and skills among those who order the renovation projects.

### 4.2.2 Barriers and drivers for sustainable building in general

Häkkinen & Belloni (2011) say that sustainable building is not hindered by a lack of technologies and assessment methods but is instead affected with organizational and procedural difficulties entailed by the adoption of comprehensive approaches to building renovation considering all aspects of sustainability. They see the most important actions to promote sustainable building as development of the awareness of clients about the benefits of sustainable buildings, the development and adoption of methods for sustainable building requirements management, the utilization of sustainable building tools, the development of designers' competence and team working, and the development of new concepts and services. To make many of these changes happen, the authorities have a certain responsibility.

In their review, Isaac et al. (2016 p 6) derive barriers on the uptake of Nearly Zero Energy Buildings in Europe from the literature. They use the following main categories of barriers, on both renovation and new buildings:

- *Technological barriers* - there is still a major lack of skills and expertise throughout the construction sector, as well as uncertainty as to how new technologies perform;
- *Economic & financial barriers* - the lack of access to affordable finance to carry out new construction meeting nearly-Zero standards is a major barrier, and higher up-front costs can also be a factor;

- *Regulatory and legislative barriers* - the unclear definition of NZEB and a lack of policy coherence;
- *Market organization barriers* - The numerous parties involved (architects, engineers, specifiers, purchasers, contractors, lenders, owners, and tenants) in building construction and operation have different and conflicting financial motivations that discourage investment in innovative energy-efficient building designs.
- *Awareness and knowledge (credibility) barriers* - a lack of familiarity with existing solutions by professionals is exacerbated by the lack of mainstream examples of good practice and robust data from nearly zero energy homes, which has fostered an atmosphere of confusion and misinformation.
- *Institutional barriers* – the construction industry is a conservative one, and the many changes in practices required for the construction of NZEBs are resisted by many in the sector.
- *Social and behavioral barriers* - saving energy is not simply a technical issue, but it also depends on the lifestyle of residents. These barriers are important to the energy use in homes once they have been built and occupied.

These barriers are also recognizable in the data material from the 4RinEU demo-cases.

For the Spanish market, Cuchí & de la Puerta (2016) have concluded, after a detailed analysis and a harmonization between the different regional existing backgrounds, regulations and local stakeholders, that the main barriers for the wide implementation of sustainable buildings are, in order of relevance:

- The economic status of the end-users and the required higher investment costs (4,88 out of 5)
- The awareness of the end-users (4,81 out of 5)
- The funding requirements (4,60 out of 5)
- The regulation framework (4,00 out of 5)
- The lack of new building sector products or solutions (3,88 out of 5)
- The economic status of the building sector (3,75 out of 5)
- The lack of appropriated skills of the professionals on the sector (3,63 out of 5)
- The existence of new companies adapted to the current and next future paradigms (3,50out of 5)
- The lack of information regarding products and solutions (3,19 out of 5)
- The price increase for the housing sector (2,94 out of 5)
- The certification requirements to prove the end results (2,88 out of 5)

From there, the main drivers detected are related to the inter-institutional collaboration, cooperation and coordination, and the new financial solutions and mechanisms that are being introduced to meet the different building sector directives, to swing from a current subsidies model towards a financial one.

## 4.3 Building process and procurement

### 4.3.1 Procurement

Based on Nordic and European research in this section, we will go through findings on procurement for environmental ambitious building projects. There are differences between countries on how procurement and building processes are performed, but there might be similarities between countries when it comes to overall possibilities and challenges.

Official authorities have recently started to focus on how the environmental profile of buildings can be influenced by public procurement processes (Michaelsen *et al.* 2009). In relation to buildings, Eriksson & Westberg (2011) stated that environmental impact has become a new main performance aspect to measure success in building projects, among the traditional aspects of cost, time, and quality. In Norway, this is enforced by the Public Procurement Act. This law demands that all official bodies have a legal obligation to take environmental performance of products into consideration when new acquisitions are planned. The Public Procurement Act is, however, vague in its demand for pro-environmental choices. If an actor takes into consideration environmental criteria, there is no juridical constraint on giving them little or no weight (Michelsen *et al.*, 2009:161).

According to Lædre (2005) choices in procurement routes include type of competition, type of contract model, and type of compensation format. Lædre (2005) pointed out the importance of the selection of a proper procurement route for project success. The procurement route influences the cooperation between the owner and the contractor because it decides who is responsible for the project risk. Procurement routes that public building owners can choose among depend on project investment size. For instance, when making procurements in building and construction in Norway above 40 Mill. NoK (ca. 4 Mill. €), the Norwegian Public Procurement Regulation (implemented 2007) demands owners/developers to set up a bidding competition. Below that, developers are allowed negotiated bidding, or at very low costs, direct negotiations (Lærdre, 2005; Public Procurement Regulation, 2007).

Erikson & Westberg (2011) described advantages and drawbacks of different procurement routes at the design stage (p. 199). They differentiate between design processes where the owner performs detailed design work together with consultants before contractors are involved (e.g. Design-Bid-Build). Design is held separately until the plan is placed for bids. These projects have a solid basis for competitive bidding. However, mutual influence of involved parties is limited. In Design & Build projects, the contractors are chosen on early design sketches, and the contractors are responsible for the detailed solutions. The contractor has great influence on the design work and the final outcome. Another alternative in between these two extremes is a collaborative procurement procedure ("partnering") where the consultants and the owner cooperate in the development of the design (p. 199).

Collaborative procedures aim at avoiding drawbacks of too late or too early hand over of project responsibility to contractors. Based on extensive findings from

previous research, Erikson & Westberg (2011) hypothesised that *"the higher the level of integration between client and contractors in the design stage, the better the project performance in terms of cost, time, quality, environmental impact, work environment, innovation"* (p. 199 f). Kadefors (2002) also stated that many studies have found that *partnering projects* are more successful than traditional ones, however not always. The risk of ending up in quite traditional roles and relationships seems to be substantial. The mechanisms involved in establishing and maintaining trust and co-operative relations in construction projects are complex.

Lædre *et al.* (2006) found that public owners in Norway usually selected the same procurement route as they were in the habit of. They stuck to traditions and did not consider what procurement route suited each single project. He also stated that the Public Procurement Regulation contributes to limiting the selection of procurement procedures, as in most cases the costs of public buildings are above 40 Mill. NoK, meaning that public owners are forced to use bidding competition. Informants in three Norwegian case studies believed that negotiated biddings or directed negotiations, as would be possible in private projects, often would give "better" results. In both cases possible solutions can be discussed before contracts are signed. Despite being forced to use bidding competition, type of enterprise and contract models still give a variety of choice.

### 4.3.2 Green procurement

Lærdre's studies (2005; et al. 2006) of procurement processes in Norway did not discuss implementation of environmental criteria. However, the findings revealed that due to public regulations and habits, it was difficult to leave known territory in this kind of processes. The question is whether the implementation of environmental criteria can be understood as unknown territory, and hence lead to challenges with integrating new criteria into processes.

Mokhlesian (2014) stated that green construction differs from conventional construction because of its underlying principles and use of environmentally-friendly materials and technologies. He has done a study on how procurers in contractor companies in Sweden adopt green projects. There was a consensus among respondents about the need for close collaboration between contractors and suppliers. Mokhlesian states that green purchasing is hindered by the lack of available, reliable knowledge about green products, materials, systems, design, correct green specifications, assessing green requirements, and the availability of green suppliers.

Häkkinen & Belloni (2011) found that resistance to new technologies is the main barrier for implementing green projects. Introducing new efficient processes, decision-making methods, tasks, actors, roles and ways of networking can help resolving this problem. The most important actions to promote sustainable building are the development of clients' awareness about the benefits of sustainable building, the development and adoption of methods for sustainable building requirements

management, the mobilization of sustainable building tools, the development of designers' competence and team working, and the development of new concepts and services. To make many of these changes happen, the authorities have a great responsibility, and the public organizations and companies must be role models.

Gluch *et al.* (2014) have studied the construction sector in Sweden and found that environmental work is becoming institutionalized as a strategic part of the companies' business, and environmental management and activities are integrated within the companies' work practices. They see a greater maturity and raised ambitions in companies' environmental actions in general. Legislative pressures have become a reduced driver; instead there is increased pressure from, and need for cooperation with, a larger variety of stakeholders and across disciplines.

Michelsen *et al.* (2009) investigated to what degree Norwegian municipalities and counties had implemented environmental demands in their procurement processes of products and services. Their findings showed that there was a focus on green procurement in municipalities and counties in Norway. Nonetheless, the requirements from the Public Procurement Act were far from implemented in all cases, there were great differences between the municipalities. Large municipalities had significantly more established green procurement practices than small municipalities.

Hojem *et al.* (2014) investigated one example of a green building private procurement process in Norway. Barriers were found in the fear of extra costs, the unwillingness to surpass existing building regulations, and the lack of understanding of green building requirements of involved actors. Success factors for this project were flexibility of the procurement process and contract, as well as the possibility of learning and the implementation of changes during the process. One should not expect a straightforward process when surpassing building regulations, therefore flexibility of process and stakeholders is imperative.

# 5 Results Focus group interviews

## 5.1 Norway

### 5.1.1 Background: Social housing in Norway

*Access to social housing*
Only 5 % of the Norwegian housing stock is publicly owned (SSB, 2018) and can be categorized as social housing. The Norwegian housing policy promotes ownership, which is predominant. According to the policy, social/public housing should only be a temporary solution. Public support for vulnerable groups has been given through individually directed instruments rather than provisions for subsidized housing. Public housing has been reserved for the worst off, socially as well as economically. Meeting the basic conditions for social housing is not even a guaranty to obtain municipal housing. The districts will always prioritize the applicants with the greatest needs.

The tenants are expected to plan a future residential career outside the social housing. It could be either continuing to rent or buying a home. When people are allocated a municipal dwelling, the district will encourage them to make a "Housing proposal" (boligplan) to plan their future housing career.

*The Norwegian State Housing Bank*
The Norwegian State Housing Bank (Husbanken) has played and still plays an important role in Norwegian housing policy. The bank has financed some 50% of all housing built after the Second World War. It has contributed to the existing quality of housing in Norway by developing standards and specifying floor space needed for functional solutions. The criteria for Husbanken financing changed in 2005, to promote sustainable development, accessibility for all, and architectural quality, as well as to allow easier access to owner occupied housing for disadvantaged groups and young people. The Husbanken has until last year subsidized the development of methods and models to achieve housing quality. The bank currently offers basic loans for new housing projects and a range of other financial instruments through the municipality or district (start-up loans, housing allowance and grants). Disadvantaged households can apply for housing allowance to be able to pay the rent, which is based on the lowest of the current level of rents.

### 5.1.2 Identified roles included in the focus group

**External:**

- Districts (administrative divisions of the town of Oslo) - allocate dwellings to users (need for dwellings, number) and provide also a user contact at the municipality.

**Internal:**

Boligbygg Oslo KF (BBY) is a municipal enterprise that owns, manages and lets social housing in Oslo. They administer over 11,000 homes, with more than 25,000

occupants, which makes them Norway's largest landlord. Their homes are distributed in all 15 districts in Oslo, ranging from listed buildings to completely new buildings. BBY has several departments:

- Property management (condition analysis, choice of building and priority-setting)
- Project department (how to renovate)
- Economic/legal department (finance, budget, rent, subsidy etc)
- Facility management/operation.

BBY have recently hired a climate and environmental manager for their residential buildings.

**User (representatives for the residents):**

- Customer centre (Call centre with direct contact with the users.)
- Accommodation department in the city district.

### 5.1.3 The residents

There are no residents in the focus group, but they have representatives who should convey their opinions, needs or challenges. The profile of the tenants of BBY varies a lot, but they have in common their experience of low economic resources. In the specific demo-case chosen for this project, the tenants are single, mostly men, and with special needs. Some groups are drug-users, people coming out of jail and people with one or more psychiatric diagnosis. BBY also have buildings where refugees are housed, mostly families. The tenants are not a compound group of people; e.g. young, financially disadvantaged and/or other marginalised groups. The reason for their special needs is often seen as psychosocial, behavioural or financially disadvantages, impairments, health problems or problems speaking the official language. Some people need help to find a house, while others also need services to be able to live in the house.

*The allocation of housing*
Because there are less housing opportunities than needed, housing is allocated to people in a very precarious life situation who don't have the capacity to get housing on their own. Some of them will also need an accommodation which is adapted for wheelchair users.

### 5.1.4 Attitudes to renovation

BBY experience that attitudes to renovation vary a lot and are closely depending on the information given. According to the informants from BBY, it is important to provide enough information at an early stage. However, as BBY plans with careful disclosure of information to minimise relocations and strong emphasis on expected discomforts to ensure full awareness of residents. It happens they exaggerate the discomfort that may occur during construction (e.g. provisional bathrooms), so the residents get finally pleasantly surprised. As it is very difficult to find replacement homes, having to move many residents at the same time would lead to huge delays and at worst to postpone projects.

BBY are mapping the residents' needs before construction. When renovating bathrooms, they will install temporary bathrooms in the backyard. The first week the tenants may have to manage without water. People from BBY contact each resident. Families with children and people with medical certificates are usually offered to move temporarily.

When people are moving into renovated or new housing, BBY and the coordinators from the city district go together to inform them. The informants are though unsure if the all information is understood by the tenants.

Maintenance intervals are shorter than in private owned housing. According to the collected information, the value of the building and maintenance requirements are not a priority for tenants. Many of them feel the natural ventilation is cold and they seal the shutters. There are often many people in the dwellings and the indoor air quality is poor because the ventilation is not in use. At times, it can take as low as 6 months to require extensive maintenance in the buildings. The residents expect BBY to maintain the homes in good working order.

According to BBY, the residents are very positive to changes such as renewal of staircases and new playgrounds. The renovation of outdoor and indoor communal spaces gives them increased self-esteem. They are proud of the new measures; there are few complaints about the living environment, people are more focused on their small part.

### 5.1.5 Drivers

*Urgent need for renovation*
There has been a huge maintenance backlog/accumulation in public property companies in Oslo. It is a goal for the city council to close this backlog, making it a catalyst for renovation. The poor quality can turn out to be an advantage when planning for increased energy efficiency, because there will be few barriers to renovation.

*Procedures prior to renovation*
BBY now prioritise condition evaluations, to get an overview of the current state of their building stock. Based on this, they make a maintenance schedule.

BBY is not used to involve the residents directly. The mapping of their needs is based on the experience of BBY in related projects. In the demo case BBY is also aware of the needs of other users, as the employees who shall do the maintenance.

*Funding*
Green ambitions in the municipality may lead to more funding for renovation projects. The municipality of Oslo has high ambitions for their new projects and encourages the building of plus-energy buildings. BBY is one out of four different public property companies in the municipality of Oslo. The city council has identified these four companies as important stakeholders to reach the climate objectives of

the municipality. The council wishes to be a driving force for more environmentally friendly buildings and proposes therefore to allocate 72,5 million NKR (app. 7 million euros) in 2018 for energy efficiency measures in existing buildings. The measures consist of control systems, PV panels, added insulation with standard materials, and installing heat pumps among others.

According to the municipal policy, the management of the building stock should be cost-effective. Standardized solutions and common requirement specifications will ensure cost-efficient buildings with good quality at the right time, according to the city council (budget 2018).

*EPC*
BBY has tried out Energy Performance Contracting (EPC). This is a form of creative financing for capital improvement which allows funding energy upgrades from cost reductions. Under an EPC arrangement, an external organization (Energy Service Company - ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings or the renewable energy produced to repay the costs of the project (including the costs of the investment). Essentially, the ESCO will not receive its payment unless the project delivers energy savings as expected[1]. However, if the residents themselves have no incitement for saving energy, the profit for an ESCO might be uncertain.

*Funding and loans from the Norwegian state bank*
Husbanken's basic loan scheme aims at promoting universal design and environmentally sustainable solutions in new and existing dwellings. Most of the basic loans are given to professional stakeholders in the home construction industry. Municipalities and property-owners providing social rental housing may also use the basic loan scheme to finance their projects.

*Exemplary rehabilitations and pilot projects*
There has been a large focus in Oslo on exemplary projects. The quality level is high when the municipality of Oslo builds new projects. Such projects can be funded, and the conditions are strict and ambitious. When it comes to housing, it is more difficult to achieve features which are ambitious enough to get funding.

*Requirements*
The municipality of Oslo has common requirement specifications (FKOK). In self-initiated (and rare) total renovations with the application of full FKOK, BBY try to find a good balance between benefits and costs. "Good enough" and not too high ambitions may have been the key to reach their goals in many earlier renovation projects.

The building code with regulations (TEK10 or TEK17) not always applies – only if the measures are considered as a total renovation. In the demo-case the measures have

[1] http://citynvest.eu/content/what-energy-performance-contracting-epc

mostly affected the envelope and the ventilation. No renovation has been made inside the dwellings, which means that the building regulations do not apply. Nevertheless,
BBY has opted for solutions which are far above the building requirements. In the demo-case the ambitious façade renovation has led to better indoor climate beside reduction of energy consumption by 60 %.

*Conclusion*
Grants often determine plans and ambitions for residential buildings. Since the municipality has high ambitions for energy savings and promotes environmentally friendly buildings there has been a turning towards greater focus on the living milieu; as well as energy and environmental topics. The fewer the previous renovation measures, the fewer are the barriers to renovation.

### 5.1.6 Barriers to renovation

*Inadequate information*
BBY always has start-up meetings with the residents before construction projects. They are sending information in different languages, especially when craftsmen must enter the apartments. You-tube videos about how to clean switch off, change filters, air vent etc. have seen by many residents. BBY are however conscious they could do more.

According to focus groups, communicating with the residents may be challenging. The difficulties appear to go both ways. Much of the information is written and given by letter. BBY realise that they could formulate the information more easily understandable: "We use many difficult words".

In which way the information is given could make a difference. It seems that You-tube videos and written information, which are currently in use, are not always adequate to reach the residents. They may need more individual face to face information about how to use their dwelling, even if this is costly and time-consuming for the municipal staff.

Inadequate and poorly adapted information between the building owner and the tenants may lead to misunderstandings and lack of trust. In the end, communication challenges can contribute to improper use of the buildings with subsequent high degree of wear and tear.

*Small degree of participation*
The overall attitude of the landlord towards the tenants is crucial when it comes to user participation. It seems that participation for the moment mostly happens by means of representation (as e.g. the housing coordinator, social workers from town district). The informants say that some residents are very engaged.

*Mismatch between "dwelling competence" and technology*

The residents struggle with simple things such as replacing light bulbs and doing the dishes. The BBY staff experience for instance that residents have problems to clean the drains. (That's however the case for many other people in Norway: it is not unusual and indicates that technical solutions should be easy in use). The tenants can easily contact the customer centre and ask for their help. Many people are concerned by asthma and allergy and they could benefit from better indoor climate. Sadly, adjusting temperature and air is often a challenge for them.

*Knowledge*
The technical staff feel their competence related to new technologies is insufficient. They are depending on external competence. They have little experience with operating e.g. BMS. It is important in terms of operation and maintenance. They must be able to quickly restart systems that are not working.

*Provisory housing during construction*
Adopting solutions that allow the residents to stay in place during the construction is a great advantage, both economically and practically. However, there are circumstances where there is no other option than moving residents temporarily. It is very difficult to find provisory housing for the residents during the construction. It is not always needed, but BBY tries to, at least, rehouse families and residents who have got a medical certificate.

*Time*
Emphasizing prefabrication and off-site work would contribute to reduced construction time. Both BBY and the residents, who are staying in the dwelling during construction, would take advantage of that. Prefabrication requires however more precise planning and will therefore need more time before realization. Regardless of that, some projects, where new needs shall be covered, and several considerations are weighed against each other, need long-time planning. Time is important and long-time planning projects doesn't fit with yearly budgets. When BBY initiate simple measures as simple renovation of facades (e.g. only changing the windows) the solutions are tried and tested. The process is then much easier and time less important.

The public procurement process is more time-demanding than a private procurement. The processes take longer time and that must be considered.

*Funding*
Public budgets must be fulfilled by 31.12 each year. BBY must meet the budget goals exactly, not lower nor higher. This means that they are aiming a little over the goal the first part of the year, to allow for unforeseen events. By the end of the year they usually must organise measures that may not be optimal or rational to use the funds. This sometimes leads to less desirable decisions like changing only the windows instead of renovating the whole facade. To achieve more holistic and ambitious renovations, the owner would prefer three year rolling budgets instead of yearly budgets. That would be an improvement and a driver for more ambitious renovations.

It is difficult to get funding for renovation. Most of the financial support available goes to environmental measures in new buildings.

*Conclusions*
Enough and appropriate information must be given upfront the renovation and under construction. It should be adapted to the residents.
There is a need for updated technologic knowledge in the owner organisation.
BBY must relate to an annual budget, which could be a barrier to more ambitious and holistic renovations. Longer budget periods would allow more time for comprehensive planning.

### 5.1.7 Use of innovative technology

To avoid a possible mismatch between the skills of the residents and the complexity of the technology, BBY is aware that the right way to build for their residents is: Diffusion open, good heating system. Solutions must be resilient and easy in use. Important parts of the systems are therefore not accessible to the users. Only the facility employees have access to operate and maintain the systems. BBY has defined an agreement on janitorial services and framework agreement on crafts services.

### 5.1.8 Success stories

The informants highlight different positive experiences. Some of them are related to technical aspects, others are social.

BBY have for instance developed effective methods to fireproof buildings from the eighties. BBY are also good at organizing bathroom renovation. One of the main reasons for that is that they can handle residents so that measures can be done quickly and efficiently. They work hard to get clear and simple information.

The stakeholders have managed to cooperate well internally and consider the building stock as a whole.

The operation and maintenance team of BBY is very clever when they deal with the residents – they find simple and creative solutions to make things work. The residents allow them e.g. to shift locks, which makes it simple for the electrician to get inside the dwelling.

According to the informants, the residents seem to withstand the renovation period and are satisfied afterwards. Most people want to stay in their apartments during the construction period. They have got assistance from the social services in the district and the resident coordinator during the whole period. This arrangement seems to work as intended.

Photo: Anine Johansen, Boligbygg. With permission: Residents Skjævland and Østhus at Haugerudsenteret, Oslo.

**About the demo-case Haugerudsenter**

A goal in the demo project was to make systems that take the utmost account of the residents with the least possible load during the construction phase and afterwards. Friendly communication with the residents is key. As one of the building team expressed it: "A success factor has been to see people and to be open, to look at them and be safe with them, saying hello to them".

The handling of the residents was exemplary, with good contact between the workers, managers and the residents. The residents are proud and follow the work closely. The project was coordinated in a way that gave very little disturbance in the residents' apartments.

The stakeholders developed a strong feeling of fellowship during the building process. They consider the horizontal structure of the team to be very positive. They feel equally important, the craftsmen being as important as the architect or the consultants for the results. They have learned to know each other and have no fear to ask questions. They have been through a team building session before the construction period where they have discussed possible risks and how to meet them.

*Conclusions*

The demo is experienced as a success by all the stakeholders. BBY is very motivated to continue to renovate and build further on the positive experiences. Transferable and varied knowledge has been developed through the project. This is not just about technical solutions, but also on procedural and social approaches.

## 5.2 The Netherlands

### Actual developments in the project – September 2017

Initially the Soest demo case was a nursing home built in 1979, in the current situation there are approx. 65 residents. These residents are people aged 80 and older, from whom the majority is suffering from dementia. However, in the last months of 2017 Woonzorg Nederland proposed to transfer the demo-case to the adjacent residential building, because of organizational issues. The involved consortium partners discussed the possible change and agreed to replace the former demo with the proposed one.

### Current demo case – Mariënheuvel Soest

**General Information:** The residential social building belongs to and is managed by Woonzorg Nederland. It is a residential building for independent elderly people consisting of four floors and around 72 dwellings (2-room, average surface around 58,5 $m^2$). It presents high primary energy consumption, around 180 kWh/$m^2$y for heating and domestic hot water production. In fact, it was built with quite poor constructive standards and low quality and requires a renovation.
**Building features**: It was built in 1980 and it has a concrete structure and double layer brick walls with internal air gap and double-glazing windows with wooden frame. The building presents a non-insulated pitched and flat roof (around 1.300 $m^2$).
**HVAC:** Central collective condensing gas boilers recently renovated for the heating supply and central separate boilers with storage for DHW production. The building presents natural ventilation supply and mechanical exhaust ventilation with vertical duct distribution.

***Scope of the demo case:*** The residential building that is the demo case now, Mariënheuvel, will be renovated to current Dutch standards. The insulation of the roof construction will be changed and improved to a level of new constructed buildings. The envelope thermal insulation will be improved, the glazing will be replaced by double glazing of the highest insulation level. The entrances will be enlarged and refurbished, the corridors refurbished, and bicycle storage rooms will be added.
On top of this renovation, the 4RinEU project will be applied on 15 of the 72 dwellings, mainly existing of mounting prefab façades on the exterior side of the existing façades.

#### 5.2.1 Bakground

The Dutch social rental sector has a large size, offers dwellings of a relatively good quality and functions without receiving substantial subsidies. There are about 2.4 million social rental dwellings in the Netherlands, which means that the Dutch social rental sector has a share of 31% within the total housing stock. The share of social housing is particularly high, often above 50%, in the bigger cities. Dutch social rental dwellings are let by housing associations, which can be defined as private organizations with a public task. The rental price of the social rental dwellings is

usually well below the market price and rents are regulated by the government (Hoekstra, 2013).

### 5.2.2 Identified roles in focus group

Stichting Woonzorg Nederland is one of the largest social housing companies in the Netherlands. They develop and manage residences especially for elderly people. They provide independent living in 27,000 dwellings, assisted living as well as sheltered homes in 18,000 apartments in caring and nursing homes. Woonzorg Nederland does this nation-wide, they are represented in about 170 municipalities.

The head-office is in Amstelveen, a town adjoining the south part of Amsterdam. The company employs about 275 people, most of them are working close to the residents all over the country.

Woonzorg Nederland exists in its present configuration since 1996 and is a merger of three organizations, from which the oldest has been founded in the 50's of the last century. So, Woonzorg Nederland has a history of over 60 years.

Woonzorg Nederland is a non-profit organisation, legally a foundation, and not a public service organisation.

The interview had the following groups of stakeholders and was done in the former demo-case:

- On behalf on Beweging 3.0, the single tenant for the whole building:
    - Staff members (care manager & location manager)
    - Employees (care takers)
    - Facility employees
- On behalf of the residents:
    - Direct relatives (children, brothers/sisters)
    - Board of client representatives.
- On behalf of Woonzorg different colleagues, involved in planning, asset management and maintenance.

Since Woonzorg has changed the demo-case, they did not have the possibility to interview the tenants with the guide that has been developed in the 4RinEU project. For the already planned renovation Woonzorg Nederland has involved the tenants in different ways and on different occasions.

### 5.2.3 The roles in the renovation phase

Woonzorg has five important 'players' in the renovation process: Asset management, social management, technical management and the financial

management (planning & control). The fifth "player" is the decision maker, the board of Woonzorg.

The asset manager initiates a project. The social, technical and financial managers have a consulting role, they are co-makers. The asset manager decides to bring a project and investment proposal to the board. The board decides.

### 5.2.4 The residents

According to the change of demo-case, as described above, the users/tenants are different from the initial residents.

The residents of the current demo-case Mariënheuvel are independently living people aged 75 and older. Most of the households are one-person, mostly women. They are managing their own households, preparing their meals and doing their own housekeeping. Some of them need support, domestic care and services, meals on wheels and so on. They can get this on demand from a care organisation of their own choice. Most of the residents are taking advantage of the care and services of the care organisation 'Beweging 3.0', who is the tenant of the adjacent carecenter Mariënburg (the previous demo case).

Most of the residents have modest income levels. This is mainly due to the Dutch regulations but also a consequence of the objectives of Woonzorg Nederland, namely to provide social housing to elderly people with low incomes.

### 5.2.5 Drivers

Woonzorg considers the following aspects as drivers for renovation:

- The tenants ask for functional improvements.
- Our asset manager concludes that the building is obsolete.
- High level of maintenance budget. They have a long-term maintenance program. If, in any year, this leads to a high investment for a certain building, they take into consideration to do a deeper renovation. (They distinguish between maintenance and renovation: the first means just replacement of parts by new parts, renovation is a real upgrade of the building or parts of it, an amelioration.)

Woonzorg has a yearly renovation portfolio of around 30 – 40 projects, leading to the realisation of yearly 10 – 15 projects.

When a renovation is conducted, the following considerations are important:

- safety (personal, social, burglary, fire)
- accessibility
- sustainability (energy savings)
- affordability for our residents

- the demands of the main tenant (care organisation) or the residents (more room for meetings; rooms for coffee-meetings, or to organize games, and just to meet each other (but also for storage of bicycles).
- demands of the local authorities
- demographics

The condition of the building when the renovation process starts, can be very different. It depends on the age of the building. Sometimes a building of 25 years is already renovated for functional reasons. Sometimes the condition of the building is the reason itself to renovate. Sometimes maintenance is postponed because of the renovation. In general, Woonzorg maintains their buildings well, so the condition is rarely very bad.

The reasons for renovation are the considerations/ issues mentioned before (safety, accessibility, sustainability, etc.). Aesthetics are included too. On top of that, Woonzorg studies the local market circumstances, and what type of residences is the most wanted in a certain neighbourhood. Budget in terms of financial key performance indicators, such as added market value, IRR, TCO calculations, are considered. Woonzorg also has a certain 'reach', a yearly budget ceiling which must be taken into consideration.

For Woonzorg it is important to create buildings where people, the residents, can live happily together for the next 20 to 30 years. From their business point of view, they want to have real estate that last longer and has meaning and significance for the neighbourhood around too.

It is important to Woonzorg to involve the residents and other tenants in the process of preparation for the renovation. During the realisation phase, they have experienced that communication with the users is crucial.

The drivers for renovation are varied. It is a constant process of weighting qualitative aspects such as comfort, convenience, feeling at home and quantitative aspects such as feasibility in terms of financial KPIs. In the end, Woonzorg prioritises creating a meaningful housing environment instead of profit (as stated Woonzorg is a non-profit organisation).

### 5.2.6 Barriers

The most important premise for a good renovation project is support, and a thorough preparation. In relation to "support" we distinguish between what we consider external and internal support. External support is from the residents (the residents in the building, sometimes the elderly residents don't want to have any change at all), b2b[2] tenants, and other users. It also means support from people in

[2] https://en.wikipedia.org/wiki/Business-to-business

the neighbourhood, and from local authorities. A good and inspiring plan generates support, but we need to communicate it well to get it.

Internal support is very important too. All co-makers involved should be consulted in the right phase and all their support is important to establish a successful project. No need to explain, given the importance of support - a good preparation is important.

Of course, political guidelines concerning environmental ambitions of municipalities are important too. Most of the time the environmental ambition is not the issue, it is the speed, the planning. Municipalities tend to have more rush than we can realize. Wohnzorg has 200 buildings all over the country in 170 municipalities, they all want to improve energy performance, but we cannot execute this all at once.

### 5.2.7 Time aspect

It is hard to speak of normal time spent on renovation, since Woonzorg projects differ so much, both in size as in complexity. The shortest renovations take 3 to 4 months, and the deepest ones within a year. This is the realization period; is very difficult to say how long the preparation period takes.

Most time consuming are the negotiations with our tenants in the care organizations. In Woonzorg projects, preparation take longer than the realization. The residents stay in the apartments during the construction period, therefore, plug and play solutions are interesting to study. They used plug and play solutions for instance for renovation of bathrooms. They developed a method that reduced the renovation period of a bathroom of 50%.

*Mapping user-needs*
First a delegation of the residents was asked already 2 or 3 years ago to collect the main demands of the residents. Together with this delegation they did a walk-through. The things that the residents came up with were:

- Airstream and bad isolation of the windows in the apartments (there are still some windows with single glazing)
- Smell of cooking in the apartments
- Entrance of the building is too narrow, lack of social safety (too easy to enter the building for strangers)
- Lack of room to store bicycles
- Finishing of the corridors obsolete.

*Building process*
After Woonzorg made a renovation plan where they also solved the question above, they organised an information meeting for the residents. They asked the architect to present the plans. In the last year there has been two information meetings with the residents. The residents agree mostly with the proposed plans, their greatest concern in about the planning. Woonzorg are still not able to ensure them of when

the works will be done, due to challenging tender conditions in the Netherlands now. During these meetings Woonzorg asked for focus group with the residents.

This focus group exists now and together with them the detailed designing takes place. In the Netherlands we need an agreement of 70% of the residents for the renovation. This takes place normally after the procurement phase. This step is not done yet.

### 5.2.8 Finances

The most important financial elements are added market value and IRR. Those are the two elements that our board considers first. To achieve cost reduction for renovation projects, replication potential of the applied solutions could be an answer.

For Woonzorg the situation is similar to Boligbygg in Norway. They invest, and the users take advantage of energy costs reduction. In NL the government established a way to give housing companies the possibility to profit of the energy investments, a so called "energy performance compensation". This is the case for residences with individual residents. Woonzorg rents to individual residents, as well as groups or business to business (B2B). B2B-tenants may be care organisations, medical services, sometimes hairdressers – all tenants that are not residents.

### 5.2.9 Use of innovative technology

Woonzorg is interested in innovative technologies such as prefabricated façade elements, energy-hub, and use of renewable technology such as PV and solar thermal collectors. Currently it seems to be many obstacles at different levels. Information about the product, develop product/concept still in process, who can design, how is it to operate, warranty for service and reserve parts, innovative procurement – contracts are needed to feel safe to choose such solutions?

A good instrument to split the incentives would help (split the incentives between investor and end-user). Cost reduction of energy saving measures would be helpful. Innovation in energy saving measures and environmental impact reduction is a good instrument, but not only material innovations, also multi-client procurement approaches or to procure more projects at a time could help possibly.

The availability of contractors and suppliers is an issue in Norway and in NL, with the huge (national and maybe even international) challenge of achieving low environmental impact. We are afraid of being short on contractors and suppliers to realize the renovation projects.

### 5.2.10 Success stories – What are you good at?

Woonzorg is good at a thorough preparation. Communication is the keyword. You can never put enough energy in communication before, during and after a project. They are aware of this but still, they claim to do not execute it enough.

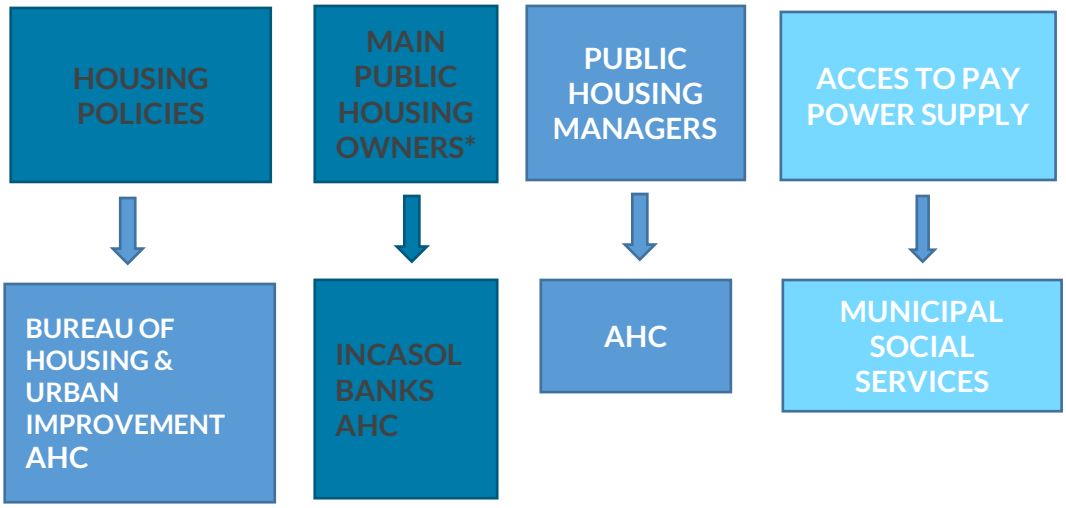
## 5.3 Spain

### 5.3.1 Bakground

### Housing Agency of Catalonia

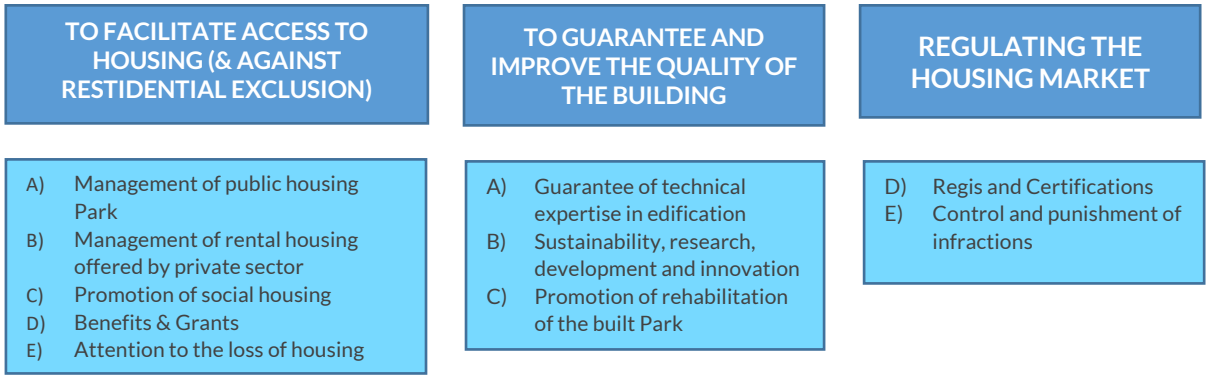
The Housing *Agency of Catalonia* (AHC), created by Law 13/2099, aims to provide the *Government of the Generalitat of Catalonia* with an agile administrative tool that facilitates public actions in matters of Housing, with the aim of unifying and simplifying management. The management of housing policies in Catalonia is based on two pillars: the *Bureau of Housing and Urban Improvement*, as responsible for the design and control of these policies, and the *Housing Agency of Catalonia* (AHC), as instrument of execution.

**Public Housing Organigram in Catalonia**




*Other Public administrations (as municipalities and Diputació) have and manage their own public housing park (Although they have not been considered in this Organigram as they are local entities)

**Main services of the Housing Agency of Catalonia (AHC) ***



### 5.3.2 Identified roles in focus group

Participants in the group interview were:

- Representing the Housing Agency of Catalonia: Manager, Director of the Housing Improvements and Renovation Services, Lleida's Housing territorial Service Manager and Legal Department Assessment Manager.
- Representing users (tenants): Close Area Manager (from AHC).
- In addition, moderators and assistant from AHC and Aiguasol were present.

The participants were divided in two groups.

### 5.3.3 Tenants

Concerning tenants, there has been an important change of profile, due to the economic crisis. Before 2012, most of them were young people, who were living in our apartments temporally (a few years). As their economic situation improved, they use to leave our dwellings to enter in the conventional rent market. Therefore, the type of social housing that AHC have are small apartments (for just 1/2 users+ a young child).

Due to the crisis, now, another user profile has increased: families from evictions. Those users are normally older and may have children of different ages (or they take care of older relatives). These more numerous family units can experience several difficulties to find stable work, due to their age, and they stay in the social housing for longer periods. However, these flats were not intended to be permanent homes and they are too small to accommodate these types of families.

Tenants can come also from other groups that have always been at risk of social exclusion (battered women or Romanian families). Current users of AHC's flats require a follow up. The AHC does not do social services (it is a responsibility of other entities), but it does financial and coexistence supervision.

Before the current emergency situation, the access to social housing was done following economic criteria and by drawing of lots. Our users had a varied profile. However, during the last 2 years, the apartments are directly awarded to population at risk (through the "Mesa d'Emergència"). This means that in AHC dwellings there coexist a high concentration of disadvantaged and conflictive population.

The social problem becomes more serious, when AHC consider that many of their social housings were built in degraded areas, previewing that they would be inhabited by young users. It was expected that these young tenants would revitalize the area, but as the user's profile has changed a lot, now these dwelling are promoting ghettoization. To avoid the forming of ghettos, this population at risk of social exclusion could be dispersed, e.g. by placing these families in the bank's social

flats (which are in buildings that are not entirely social housing). However, AHC tenants, sometimes, do not want to be dispersed, as they prefer to live close to their relatives and friends.

When designing/renovating social housing, it is necessary to bear in mind that most users do not have the economic resources to pay the energy bills. In the case of Lleida, a user could not pay the heating, and that caused moisture on the flat. She and her children ended up in the hospital for several weeks, at a high cost for the public health service. Therefore, energy efficient homes can indirectly reduce the public spending in other services (e.g. health).

Even though AHC provide regular information about sustainable habits, their users still have inefficient habits for many reasons (rotation, difficulties to change habits…). In the Demo case, some users have psychological disorders, with behaviours like the ones caused by Diogenes syndrome and Noé syndrome. To be able to properly use new efficient technologies, they need to be supervised, receive constant information and awareness actions.

In general, they have little environmental sensitivity, as the cost factor is paramount. Their energy consumption is limited if they do not get subsidies, but if they receive grant for the energy bill, or they are irregularly connected to the energy system, they can consume large amounts. For this reason, AHC insist in the importance of designing social housing as energy efficient buildings where the user's behaviour will not become such an influent factor.

*Conclusions*
The social housing users' profile in Catalonia has changed, due to the economic crisis, from mainly young workers to families at risk of social exclusion. The current user is in an emergency, with basic needs, little ability to achieve a comfort via energy bill, and few motivations in rehabilitation processes or energy management. This problem affects different public entities and for this reason, it is necessary to strengthen the cooperation between these public authorities. Concerning building renovation, due to the users' profiles, the public social housing requires, more than in other cases, to promote energy efficient renovation actions, to encourage a lifelong learning, and to adapt the technical solutions to the existing reality.

### 5.3.4 Drivers

Building's renovation is not the main function of AHC, although the Housing Agency has an annual budget to promote renovation in both, public and private housing buildings.

<u>Concerning private housing</u>
To promote the housing refurbishment in the private sector, AHC have funding lines that subsidize up to 30% of the cost if the renovation has the purpose of improve the buildings' energy efficiency.

For multi property buildings, this subsidy may not be enough, because they can have more difficulties to get the complementary funding need. However, in the case of single-owner buildings, as most of them are business and have financial resources, this aid should be interesting enough to encourage renovation. Therefore, in the future, the public administration could eventually pose a penalty to multi-storey building owners, if their buildings do not reach a minimum level of energy efficiency. Or, at least, establish a minimum level as a requirement to obtain any renewal permission.

Concerning public buildings

For public building improvements, in the past, the annual budget amounted to 30M€, although nowadays it has been reduced to 5M€, because of the economic crisis. This reduction of resources for works will have consequences in the future.

The main reasons why the Agency do renovation in public housing are:

- Serious Pathologies in existing dwellings (the prioritization is established depending on the pathology).
- Serious social situation of fuel poverty, which makes necessary to seek solutions to reduce energy consumption.
- Agreements with neighbour communities. E.g. AHC has rehabilitated the dwellings of Can Jofresa community following an old agreement with the owners, in which AHC assumed the blocks maintenance cost for a period of 50 years (those were social housing flats built to be sold, not for rent).
- European projects as 4RinEU or el RELS that allow having access to funds and expert advice to make innovative projects.

In addition, as a public agency, they must become an example, to trigger the rehabilitation in the private properties.

*Procedure to initiate renovation project*

The first step to renovate a building is to make a diagnosis of its current state. This involves the identification of different pathologies and an evaluation of the level of compliance with current regulations. Along with the technical diagnosis, it is also necessary to consider the climate conditions in the region and the users' profile.

AHC prioritize solutions that reduce limitations caused by users and ensure, at the same time, a good comfort to residents.

The Agency is working on a plan to renew the entire building park it manages. The idea is to do a diagnosis in a large scale and establish a calendar of the actions to be implemented (to make a activities programme). However, the technical staff in AHC cannot perform this complete diagnosis and, simultaneously, proceed with the daily maintenance of the buildings. Therefore, by the moment, the Agency is just doing pathologies studies for specific buildings, without having a global view.

After the diagnosis, to proceed with any important modification in the building, it is necessary to have the agreement of the owner of the property. AHC manage a

residential park that mostly belongs to the public company INCASOL (80% approx.), in addition to others that are owned by banks (and are intended for social rental) or by AHC itself.
Commonly the budget for the renovations works become directly from AHC, although the owner can sometimes bring a supplementary funding. Other financing sources can be considered. It might be interesting to study other Spanish communities work to obtain financing resources for housing renovation.

*Conclusions*
Concerning the private sector there are subsidies up to 30%, to finance energy efficiency renovation. For the renovation of public housing building the AHC has an annual budget (currently 5M€).

The main reasons to renovate public buildings are serious building pathologies, extremely energy poverty situation, European projects (as 4RinEU) and specific agreements with neighbour communities. In addition, as a public entity, AHC have to become an example, in order to encourage the rehabilitation in the private properties.

The renovation procedure initiates with a diagnosis of pathologies. For any important work the Agency needs the INCASOL agreement. The INCASOL, can provide extra funding for carry out the renovation if it is necessary. Although commonly the financial resources for renovation come from AHC.

The AHC is working on a plan for an entire diagnosis of the public housing buildings, to develop a Renovation Director Plan.

### 5.3.5 Barriers

*Many agents affected but no global vision.*
Within a few years, there will be a large housing park to be rehabilitate without a definite actor, as there several agents with public powers to carry out policies of rehabilitation of housing.

To make major reforms for improving energy efficiency in most of the dwellings it is necessary a consensus between AHC and INCASOL. However, it is not always easy, as this improvement benefits AHC, but makes no difference to INCASOL. To reduce the energy bill of the neighbours by renovation, would allow them to have more financial resources to pay the rent, in consequence, AHC would not devote so much budget in financing aids to pay the rent. However, the economic situation of INCASOL would not change: INCASOL always receive the payments because, if the tenants do not pay, AHC pays for them.

Other administrative bodies are indirectly benefit from improving energy efficiency in housing, although it is not obviously visible. E.g. saving expenses of the City Council by reducing the number of the energy bills unpaid or reducing the expenditure on health arising from diseases caused by the thermal conditions of the

housing. (e.g. City, County Council, Department of health, the Ministry of public works, State Secretary of housing, etc.)

This lack of global vision could be solved with the creation of a unique entity, with its own economic resources, and the goal of promoting energy rehabilitation in housing. Similar solutions were implemented in previous situations, when it was necessary to implement measures that affected, at the same time, different public powers.

*The current emergency situation*
In the current context of crisis, there are great difficulties to access to housing. Therefore, the Agency is mainly focused on solving the problems of social exclusion, at the risk of forgetting other important challenges that do not have immediate consequences, but medium-long term (as the energy efficiency issue).
Currently, many financial resources are destined to subsidies and to reinforce the AHC social education staff, while the technical issues are relegated. For this reason, in the last years, AHC has strongly reduced the budget for building improvements.

*Conflict of interest*
As public administration AHC represent and protect different interests simultaneously.

On one hand, as a public administration they must be an example to our society by promoting energy efficient housing and by ensuring our tenants the worthier houses as possible.

On the other hand, the society can misinterpret that people with low resources receive better dwellings than the ones that middle class can afford. Especially in this moment, that the crisis has diminished salaries and the economic resources of the middle class. Our reality is that the population at risk of social exclusion is growing, and some reject jobs not to lose their social aids and the public administration protection. They have to be careful in not creating a situation where living of public subsidies can be more advantageous than having a job.

These social problems could be reduced if the Employment Dpt. worked together with the public housing policies, creating an Employment Plan for AHC tenants at risk of socials exclusion.

*Housing Park characteristics*
Regarding private housings.
AHC also act on the private housing sector as part of its services. Private dwellings receive subsidies to do efficient energy improvements. However, in multi propriety buildings it is not easy to reach consensus between the neighbours to renovate a building. In addition, as our society is much oriented to purchase houses rather than renting them, most of the private residential buildings are multi property.

Concerning social public housing.
The dwellings managed by AHC, despite being relatively new, have intrinsic characteristics that make them especially low energy efficient. Although it is difficult

to assume that it is necessary to invest in renovating houses built recently, some problems of our newest residential buildings are:

Plots with poor orientation. Historically, in the plotting process, the Administration has always acquired the most disadvantaged solar exposure to avoid conflicts between the parties concerned. To achieve optimum levels of efficiency in these plots is possible from the technically point of view, although it is more expensive, and the poor orientation makes it difficult to achieve the highest standards.

Residential architectonic typologies with lack of adequacy to the geographical and social context. Ex. In Lleida, where climate conditions are more extreme than in the coast, several residential buildings had been designed with a typology like “beach apartments ". Common areas open to the outside, flats unprepared for the cold, some even without any heating system.

The lack of houses requiring different needs. AHC do not have, as they saw in Netherlands, different housing types according to the degree of autonomy of the elderly. They do not have either initiatives that e.g. encourage the coexistence of different generations (spaces for the elderly close to nurseries).

*The bureaucracy of the public administration*
The bureaucracy of the public administration makes difficult some important process.

When a multi property community, finally, agree to renovate its building must face a complex funding application process. The protocol requires several documents. Residents, not used to this process, usually do not have the experience and time to do this heavy management.

During the last 6 years, the public administration experienced significant restrictions in expanding its staff. Although technicians, or other professionals, with new specific skills are needed (e.g. Experts on dynamic energy efficiency simulations or BIM), it is difficult to contract them. Consequently, it is difficult to have different data that will allow us to take the best decisions.

*Conclusions*
There is a lack of global vision concerning the promotion of energy efficient renovation in housing, as there are different public agents involved, and the benefits are indirect. Concerning public housing policies, in this context of crisis, social measures are prioritized in front of technical/environmental ones. In addition, many public buildings are placed in the cheaper plots (with bad exposure) and have typologies not adapted to the climate conditions, so to renovate them requires expensive actions.

On the other hand, in the private sector, multi-property buildings are the most numerous, and that makes it difficult to establish agreements and obtain financing to renovate. There are public aids to finance the refurbishment of private dwellings, although the bureaucracy required to obtain them is complex.

### 5.3.6 Use of innovative technology

For AHC, the most important factors concerning new technologies are robustness and minimal maintenance cost. AHC users are transient and many of them do not have the necessary skills, so technologies must be strong enough to support an intensive, and sometimes wrong, use. In addition, the less they spend in maintenance the more resources they will have for other purposes.

On the other hand, the kind of technic solutions that AHC prioritize are the passive ones, in front of active solutions. This is due to two main factors:

- Passive solutions are not affected by the tenants' behaviour and habits. Many passive solutions have higher costs than active solutions, but AHC technicians believe that the best way of having energy efficient buildings is to reduce demand.
- To have a further technical information about new technologies it is also an important factor to have confidence. Training for our technicians to update their knowledge, is also another important requirement, as AHC has its own technical department, and the renovation projects are carried by the Agency technicians.

*Conclusions*
Passive solutions are prioritized in front of active solutions. Passive solutions' effectiveness is less influenced by the skills of the tenants and are more durable. To update our technician's knowledge is an important requirement to be able to apply new technologies.

### 5.3.7 Success stories

AHC has wide experience in working on passive technic renovation solutions that consider the social factors. Its decisions combine social and technical requirements. In fact, the social factor is always included in any action of the Agency staff (technicians, lawyers, etc.)

AHC has the following social criteria when carries out maintenance works:

Apply maintenance solutions that also represents an improvement in the energy efficiency sense, even if this involves some additional cost (e.g.by improving the insulation when renovating a facade). Our Technical Dpt. was awarded on its focus on energy efficiency as a strategy to solve energy poverty.

AHC renovates achieving quality levels above the requirements of the current regulations. As they have realised that to go above, has no big economic differences and at long term it compensates. In the 80's AHC was already using ETICS insulation in its renovation works, going above what was required by the regulations.

AHC seek solutions that allow users to stay in the building while the renovation. Little-invasive solutions of external appliances and that do not to interrupt the

normal use of the building (otherwise, to move users to do the works would have a high cost).

AHC knowledge has been systemized. Each Dpt. has its own procedures; to follow the established protocols ensures the correct execution of processes, regardless of the level of expertise of each professional.

They have a methodology to refurbish the buildings, called RELS[3] (Energy renovation in social housing), a result of a European project of Mediterranean cooperation (ENI program CBC-Med) and created together with the UPC (Universitat Politècnica de Catalunya). The method (through surveys and monitoring) add the user's behaviour as a factor to take into account in the energy rehabilitation projects. Now, The UPC University is teaching the methodology to their architecture students, and other Catalan administrations are using it to make building diagnoses. The Agency has planned to analyse its entire residential Park with the RELS method, in order to have a complete diagnosis to develop a future Renovation Plan for Public Social Housing.

The whole RELS project (that gave the name to the RELS methodology) is a success story. During this European project, the Agency did an energy efficient renovation in 2 social housing buildings. The experience was a success, and the Catalan public television included the project as an example in a documentary about energy efficient renovation.

*Conclusions*
AHC is good at considering the social factors in the different services it offers. This include also AHC renovation projects that seek solutions that allow users to stay in the building. Moreover, the AHC renovation pursuit levels of quality above the current regulations, and during the maintenance works, promotes passive solutions to reduce energy demand (as insulating facades).

It is important to highlight that AHC has protocols to ensure the correct execution of all the process, regardless the level of expertise of each professional. An example of a success story is the RELS methodology (created during the European RELS project in collaboration with the UPC). The method (through monitoring and surveys) introduce the user's behaviour as a factor to consider in the energy rehabilitation projects. Now the Agency intends to analyse its entire residential Park with the RELS method, to have a complete diagnosis to develop a future Renovation Plan for Public Social Housing.

[3] http://www.enpicbcmed.eu/communication/energy-renovation-social-housing-rels-project-develops-common-mediterranean-model

# 6 Discussion and conclusions

## 6.1 Drivers and barriers

The three case organizations have in common that they help vulnerable groups with housing facilities. However, the organizations are differently organized and have different decision processes towards renovation.

Drivers and barriers are often two sides of the same issue and are therefore analysed together. As we refer to in chapter 3.2 drivers and barriers could be on both societal and organizational/individual level.

Most of the following factors were found in all three case studies:

### 6.1.1 Organizational and individual level

**The residents**

The resident's needs are an important *driver* for renovation in all three organizations. Many of the informants express that they have an aim of contributing with dignified housing for people unable to procure housing of their own. An aim is to improve the resident's quality of life, and the housing standard is seen as an important contribution to their well-being.

At the same time, vulnerable groups of residents are also a *barrier* towards renovation. Resident groups across the organizations have some shared challenges. Elderly and sick residents, immigrants or people with mental illness may all struggle to understand information in a renovation process. They are also vulnerable for relocation during renovation processes. All organizations try to avoid relocation of residents during the renovation process, and this places constraints on the choice of renovation measures and building methods.

The literature review in this report summarize literature that explains the meaning of housing for the life quality of residents, and how important these aspects are when the residents cannot choose where and how to live (Shaw, 2004). At the same time, many of the resident groups in the case organizations are difficult to include in decisions, and many decisions must be taken without their meaning represented.

Still, a renovation process with residential participation can be used to influence the social environment and create sense of community and inclusion among the residents (Hauge & Støa, 2009; Hauge, 2009). And research has shown that a criterion for success seems not necessarily to be the degree of involvement in the decision-making process, but rather the leaders' respect for the needs of the residents, the level of information provided and the follow-up (Hauge & al., 2012a). Based on this literature, and on examples from the Dutch case organization, we recommend more focus on user involvement. We also recommend that the process with the users become more formalised, not dependent on the interests of the renovation project leader. The Dutch case demonstrates a way to involve the residents through collecting information about building standards and use through

*walk-through methods* with delegates of residents, followed by discussions of the information among the renovation managers in the organization. The Spanish case refers to the use of an online bi-directional channel to collect the users' needs and understandings.

*Advice*
User involvement is recommended to empower the residents and give them ownership to the project. Taking their needs and preferences into account must be done an appropriate way, depending on their capability. The employee's needs (e.g in relation to maintenance) should also be considered.

### 6.1.2 Communication

Communication with the users is seen as crucial for a successful renovation process in all case organizations. The employees in the Norwegian case organization recommend being ahead of the situation with the communication to obtain a successful renovation: "Prepare the tenants for a bit more hassle than assumed. Be present and show your face if complaints occur." The literature (3.1.2) shows that guiding the renovation process in close contact with the residents and with good routines for information and follow-up is a factor of success.

*Advice*
The level of information provided must be adapted to the residents and given before and during construction. Adapted user-information is also needed to ensure adequate operation, even if it seems easy.

### 6.1.3 Media and press coverage

The possibility to get press coverage can give motivation to the team involved in the building process. The use of media can be targeted to reach different goals, as welding together the residents, among other things. An architecture prize could also be a catalyst, encouraging the stakeholders to continue their efforts.

### 6.1.4 Technical standard

All the case organizations say that the renovation backlog is a *driver* for renovation. They make renovation plans for their property portfolio based on technical standard and backlog. There is evidence that the fewer the previous measures, the fewer are the barriers to renovation. However, the balance between renovation and maintenance can be a challenge.

In two of the organizations, the interviewees state that there is a quick degradation of the technical standard after renovation, due to the vulnerable resident group. It is not expressed in words, but one might assume that the short period the apartments are in good shape before the degradation is visible again (one year in some cases) may act as a *barrier* for renovation. The Spanish organization do also express concerns about technical standard/ performance targets that is too good compared to average housing. A barrier for renovation is that the employees feel they must avoid that the housing quality in public housing becomes better than middle class

standard. If the standard is as good as middle-class housing, there is a risk of increasing the number of people would want social housing.

*Advice*
Making systematic renovation plans will allow to prioritize measures where they are needed and avoid measures which could be barriers to more ambitious renovation. Robust materials and solutions should be considered.

### 6.1.5 Financing

Financing is mainly talked about as a *barrier* towards renovation. A problem for the Norwegian organization is the yearly budgets. They must renovate as much as possible within this yearly budget. They express a concern about the "leftover money" at the end of the year, when all the allocated budget must be spent within a certain date. The last small projects are not always what they would have spent the money on if they could have made budgets over a longer period.

The Spanish organization addresses another problem with budgets: the results of measures for energy efficiency are not visible on the budgets in their organization. The energy costs are paid by the residents – or if the residents cannot pay the rent themselves, the municipality contributes. However, in completely different budgets. Visualizing energy savings as savings for the municipality in total, despite different departments and budgets, would strengthen energy savings as a *driver* for renovation.

Loan and subsidies for projects with high environmental ambitions may act as a *driver*, however, these assets are often meant for new buildings, not renovation, and requires higher environmental ambitions than the organizations usually manage. The interviewees therefore experience that they are disregarded in the allocation processes, that the allocations are better suited for other types of organizations. Passive house or positive energy house level is not always within reachable limit. In addition, there are other aspects more important to vulnerable residents than energy ambitions. For example, the quality of the outdoor areas around the blocks is significant to increase the resident's well-being, and this type of renovation is not favoured in subsidies for energy efficient buildings.

Two of the organizations have tried EPC/ Energy performance contracting, however this aspect is mentioned in-between other issues. There are no interview data on the experiences with this type of financing energy efficiency projects. An EPC-providing company may pay for investments for energy efficiency and use the energy savings to pay for the investment. However, when the residents living in the housing block do not have any incitements for saving energy, the savings may be uncertain, and the EPC-company may be unwilling to take the risk. Energy savings after EPC-measurements are more stable in public buildings operated and used by professionals. Especially when the residents are vulnerable groups of people with little knowledge on how heating and ventilation systems work, an energy performance contract might be a risky investment.

### 6.1.6 Competence

All case organizations mention lack of competence in the organization as a *barrier* towards ambitious renovation. This is also shown in Isaac et al. (2016); uncertainty as to how new technologies perform. Participating in networks for learning about new technologies, participating in pilot projects/ research projects can lower these barriers.

### 6.1.7 Pilot projects, EU-projects, success stories

In all the three case organizations, the participation in pilot projects/ EU-projects is pointed out as a *driver* for renovation. It inspires the stakeholders for reaching higher ambitions, and they get in contact with technical competence they find innovative and helpful. They also say it gives motivation for new renovation projects. Pilot projects are pointed out as an important driver in Isaac et al. (2016). Joining research projects increases the competence in the organizations.

### 6.1.8 Use of innovative technology

Because of the special resident groups in the case organizations, the need for advanced technical solutions may act as a *barrier* towards ambitious renovation. The organizations all strive for robust technology that the users may understand. The informants in the Norwegian organization say that if user advanced technology is installed, this is placed in a technical room the residents have no access to.

Vulnerable resident groups' lack of ability to use innovative technology may therefore be a barrier towards ambitious renovation.

### 6.1.9 Team building in the building process

The Norwegian demo case exemplifies how the stakeholders developed a strong feeling of fellowship during the building process. They considered the *horizontal structure* of the team to be very positive. They felt equally important, the craftsmen being as important as the architect or the consultants for the results. They earned to know each other and did not fear asking questions. They had been through a team building session before the construction period where they discussed possible risks and how to meet them. Amplifying the feeling of having performed together in a strong team and achieved something worth the effort, was a success criterion in the Norwegian demo case. This is in line with the research of Erikson & Westberg (2011) and Kadefors (2002), stating that a high the level of integration between client and contractors in the design stage contributes to better project performance in terms of cost, time, quality, environmental impact, work environment, and innovation.

# 6. Guidance

## 6.2 Recommendations to stakeholders

Based on the three case studies of organizations providing housing for disadvantaged groups, the following advice can be given on how to lower barriers and increase stakeholders' motivation for deep renovation.

Table 1: Protocol showing drivers and barriers for renovation of social housing in each phase of the building process with recommendations for public housing providers and stakeholders. Fields in green show drivers, and fields in red show barriers.

| **Preparation / Brief and strategy** | |
|---|---|
| **Drivers and barriers** | **Recommendations** |
| Urgent need for renovation | Plan for systematic condition evaluations Maintenance schedule for the building stock |
| Ambitious goals and political support | Achieve quality levels above the requirements of the current building regulations. Go beyond the expectations of an ordinary building process. |
| *Necessary competence* on innovative technologies in the housing organization | Join research projects and networks and aim for pilot projects to increase the competence in the organization. Train the technicians to upgrade their knowledge. |
| Strong fellowship between the stakeholders | Formulate a common goal for the whole team. Gather the team and visit exemplary projects together (or other relevant activities). Aim for a horizontal organisation of the building team. |
| Mapping user needs | Aim at involving the residents through planning of renovation as much as possible. Enable the residents to participate with methods like walk-through and online bi-directional channel. Select a small group of residents and employees who can act as a liaison. |
| *Vulnerable residents* (elderly, disabled, immigrants etc.) are challenging to handle in a renovation process. | Consider the renovation process as means to increase the residents' well-being and commitment to the dwelling. If this is not possible to involve the residents, extensive information throughout the whole process and treat the residents with respect may make the process easier. |

## Preparation / Financing the renovation

| Drivers and barriers | Recommendations |
|---|---|
| The *financing budget periods are* too short and limited. | Make budgets for sustainable renovation cases over more than one year. |
| *Energy savings* are not visible to the municipality department paying for the renovation. In many cases of social housing, the energy bill is not paid by the municipality, the residents pay. If they cannot pay themselves, the support comes from other public budgets. | Visualize energy savings as savings for the municipality in total, despite different departments and budgets. This strengthens energy savings as a driver for renovation. EPC – energy performance contracting – may be an interesting solution where the municipality themselves pay the energy bills. There might be companies interested in EPC also for social housing. |
| *Loan and subsidies* demand too high environmental ambitions to fit for renovation of social housing. | Work for dialogue with the governmental organizations providing loan and subsidies for energy efficiency projects and aim for understanding the complex context of social housing. May new types of subsidies be introduced in the market? Consider other financing sources. |

## Procurement and development phase

| Drivers and barriers | Recommendations |
|---|---|
| *Procurement processes* are chosen based on habit rather than what type of procurement that fit the different projects. | Evaluate different procurement processes and make a strategy for what process to choose depending on kinds of project and environmental ambitions. |
| Enthusiasm and understanding of the environmental ambitions in the construction team during the planning phase. | Consider different procurement processes and the advantages and downsides with each of them, depending on the specific renovation project. Facilitate for team-building. |
| Challenges with some of the residents having trouble *understanding information*. | There can never be enough information in advance. Formalize the information process towards the residents. |
| Challenges with *relocation* of the residents. | Choose prefabricated solutions for shorter and easier construction processes, to avoid relocations. |
| The *residents' skills* do not match the technology needed for energy efficient solutions. | Technical standard should be adapted to the residents' skills. Go for robust technology that works regardless of the function level of the residents. Advanced technology must be placed in locked technical rooms, only accessible to operators. |

## Construction phase

| Drivers and barriers | Recommendations |
|---|---|
| Ensure smooth completion of construction | Develop a thought-out communication strategy towards the residents with regular information every week of the construction process. There can never be enough information. Use the media to empower all the stakeholders in the project. |
| Ensure that workers on site treat the residents with respect and friendliness. | Inform the residents earnestly and minimize disturbance in their apartments. |
| Ensure enthusiasm and understanding of the environmental ambitions in the construction team during the construction process. | Focus on team-building by doing e.g. a joint risk analysis in connection to the start of construction. Create enthusiasm and the feeling that they are building something important.<br>Try to get positive media attention to generate pride and focus on the renovation project. |

## Use and evaluation

| Drivers and barriers | Recommendations |
|---|---|
| The residents do not *understand* the use of new technology after the renovation, or they use the heating and ventilation technology wrong. | People working with operation and maintenance for the building owner must be well-informed and capable of providing the right information to the residents, in the right way. |
| Quick degradation after renovation | Choose adequate materials and robust solutions.<br>Follow-up with information and assistance when needed. |
| *Evaluation* and learning through executed renovation projects. | Evaluate each renovation project and make use of the success criteria when initiating new projects.<br>Systematize knowledge. Following established protocols will ensure the correct execution of processes, regardless of the level of expertise of each professional. |

The list in table 1 is not exhaustive but includes suggestions for measures to lower barriers and make the most of drivers for renovation based on experiences in the demo case organizations. Much of the advice may also be relevant for other types of housing organizations as housing cooperatives or private-owned residential complexes.

## 6.3 Recommendations to politicians and authorities

- Aim for financing subsidies for social sustainability qualities. Passive house or positive energy house level is not always within reachable limit for public housing organizations. There are other aspects more important to vulnerable residents than energy ambitions. For example, the quality of the outdoor areas around the blocks is significant to increase the resident's well-being. This type of renovation is not favoured in subsidies for energy efficient buildings.

- Plan and build a case for renovation as financially positive across departments and budget lines.

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# Appendix

The appendix presents data collection tools for the specific demo-cases in WP3 and is not a part of the usual procedures related to preparation of renovation projects.

## A. Identifications of roles

**Premise provider**

- Labour Inspection Authority
- Agency for Planning and Building Services
- City council departments (e.g. EBY, BYA, BYM, UKE, NOE, EHS)
- Hearing institution (public inquiry)
- City council finance
- Districts (part of a town) - allocation of dwellings to users
- Housing bank
- Politicians

**Technical:**

- Bymiljøetaten (urban environment department)

**Internal (owner):**

- Board
- customer centre
- Property management
- Accommodation department
- Project department
- Economic department
- Legal department
- Support (HR, Communication and others)
- Facility management/operation

**Users:**

- Users
- Next of kin
- Neighbours
- Personal/health care
- (Tenants – like in Netherlands – could be only one business partner. We need then to divide between tenant and user)

**Others:**

- Private building owner, similar users – similar knowledge/problems
- Cooperatives, users

**Identified roles included in the Norwegian focus group interview**:

**External:**

- Districts (part of a town) - allocation of dwellings to users (need for dwellings, number). Potentially, also the user contact at the municipality.

**Internal:**

- Property management (condition analysis, choice of building and priority-setting)
- Project department (how to renovate)
- Economic/legal department (finance, budget, rent, subsidy etc)
- Facility management/operation

**Users:**

- customer centre (direct contact whit the users. Call centre)
- Accommodation department

# B. Focus group interview guide

How do we increase the renovation rate for residential buildings (and accordingly energy savings)?

**Agenda for the meeting:**

1. Welcome
2. Presentation of the project
3. Presentation of the focus group method
4. Presentation of the people present and their role
5. Description of the users, as a soft start
6. More difficult topics

**Instructions:**

Give some general instructions to the organizer of the workshop and interview (main questions to ask, how to act to include all participants and how to get a good discussion going)

**Topics**

**Users**

Users – Describe the users. Who lives here, how is the user environment, kind of users, next in kin, others involved. How to achieve user satisfaction. User needs, IAQ, special problems/needs. How to give information. Health related problems- How are the users of the buildings (residents) integrated in the renovation process? Attitude towards renovation. User understanding of energy efficiency and new energy technologies (adaptation)?

**Drivers**

- What are the drivers for renovation in residential buildings: factors that increase motivation and implementation? (see bullet points under measures as well)
  - Indoor climate?
  - Increased comfort?
  - Environmental aspects?
  - Housing regulations for energy efficiency (national)?
  - Other actors' motivation (political goals?)
  - Market value/aspects (rental increase)?

**Barriers**

- What are the barriers for renovation in residential buildings: factors that lower renovation?
  - Funding/finance/expenses?
  - Time/planning?
  - Implementation issues with residents (user needs and interests)?
  - Technical challenges (for users/residents)?
  - use of innovative technology?
  - Social barriers/issues?
  - Indoor climate?
  - Maintenance/follow-up?
  - Competence (craftsmen etc)?

**Measures**

- What measures are in your opinion the most important measures to increase the renovation rate in residential buildings?
  - Economic support systems?
  - Energy labelling of buildings?
  - Inspiration/ counselling etc?
  - The national/ regional building codes?
  - The revised EPBD (energy performance of buildings directive)?

**Renovation process – decision making etc**

- Describe the process for a renovation project: where are the critical stages?
  - What is a successful process for renovation projects?
  - Who is involved: public and private actors at what stages? External advisors? Enthusiasts? Cooperation between actors?
  - How can the "requirement specification" be used to increase the renovation rate?
- How would you describe the national competence level regarding renovation?
  - How can the competence level be raised (crafts men and other involved actors)?
  - How do (in your opinion) property owners and other actors incorporate the goal of energy efficiency and other environmental criteria?

**Best practice**

Do you have any special experience, good advices on how to succeed with renovation projects that you could transfer to others?
– how to handle tenants, how to prepare them for a renovation, what if they need to move etc?

- What is your best practice for efficient renovations of other parts of the buildings, for instance renovation of bathrooms etc
- Good ways to handle complaints or avoid them to occur etc?
- In all focus groups, interviewers should watch out for best practices to transfer to other groups.

# Focus group interview guide in Italian

**Linee guida per l'intervista al focus group**

In che modo è possibile aumentare il numero di riqualificazioni di edifici residenziali (e di conseguenza il relativo risparmio energetico)?

**Programma del meeting:**

1. Saluti di Benvenuto ed introduzione
2. Presentazione del progetto
3. Presentazione della metodologia di lavoro del focus group
4. Presentazione dei componenti del ruolo di ciascuno
5. Descrizione degli utenti
6. Topics più critici

**Istruzioni:**
Fornisci alcune indicazioni generali all'organizzatore del workshop e dell'intervista (domande più rilevanti da porre, come favorire la partecipazione di tutti per una discussione propositiva).

**Topics**

**Utenti**

Utenti - Descrivi gli utenti. Chi vive negli edifici oggetto di analisi, la tipologia di utenti, la composizione famigliare, altre persone coinvolte. Come ottenere il benessere degli utenti. Quali sono le esigenze dell'utente, la qualità interna dell'aria, se sono presenti problemi/esigenze particolari. Come comunicare le informazioni. Se sono presenti problemi relativi alla salute. In che modo gli utenti (residenti) vengono integrati nel processo di ristrutturazione. Qual è il loro atteggiamento nei confronti della riqualificazione delle abitazioni. Qual è il livello di conoscenza dell'utente relativo all'efficienza energetica e alle nuove tecnologie?

**Elementi chiave**

Quali sono gli elementi chiave per favorire la riqualificazione negli edifici residenziali: quali sono i fattori che possono favorire la motivazione e l'implementazione? (vedi anche l'elenco riportato in *Misure*)

- La temperatura e la qualità dell'ambiente interno?
- L'aumento del comfort?
- Aspetti ambientali correlati?
- Normative nazionali sull'efficienza energetica?

- Altre motivazioni, ad esempio obiettivi politici
- Aspetti legati al valore di mercato degli immobili (crescita degli affitti)?

**Barriere**

- Quali sono le barriere ed i fattori che rallentano la riqualificazione degli edifici residenziali?
  - Reperimento di fondi/mancanza di capitale/eccessive spese?
  - Tempistiche/pianificazione degli interventi?
  - Problemi con i residenti (bisogni e interessi degli utenti)?
  - Nuove sfide tecniche (per utenti/residenti)?
  - Uso di tecnologie innovative?
  - Ostacoli/problemi sociali?
  - Temperatura interna?
  - Manutenzione/mantenimento degli interventi negli anni?
  - Mancanza di competenze (artigiani etc)?

**Misure**

- Quali sono secondo te le misure più importanti per favorire il numero di interventi di riqualificazione degli edifici residenziali?
  - Misure di supporto economico?
  - Certificazione energetica degli edifici?
  - Stimoli esterni? Consulenze?
  - Regolamenti/requisiti nazionali/regionali?
  - Aggiornamento della Direttiva sull'Efficienza Energetica degli Edifici EPBD?

**Processo di riqualificazione – decisioni**

- Descrivi il processo di progettazione di un intervento di riqualificazione: quali sono gli stadi più critici?
  - Quali sono i fattori di successo in un processo di riqualificazione?
  - Chi è coinvolto: soggetti pubblici e privati e in quale fase? Consulenti esterni? Altri soggetti interessati? quale forme di cooperazione si instaurano tra i vari soggetti?
  - Come possono essere utilizzati i "requisiti specifici" per aumentare il numero di interventi di riqualificazione?
- Come descriveresti il livello delle competenze su scala nazione relative alla riqualificazione degli edifici?

- Come può essere aumentato il livello e le competenze (artigiani ed altri soggetti coinvolti)?
- Secondo te, i proprietari degli edifici, hanno assimilato (e come) gli obiettivi relativi all'efficienza energetica ed, in generale, alle tematiche ambientali?

**Best practice**

Hai esperienze positive o suggerimenti per la buona riuscita di progetti di riqualificazione che puoi condividere con gli altri?

- come avere a che fare con gli inquilini, come prepararli al processo riqualificazione, ad esempio con il fatto che ci sia un possibile trasloco?
- Hai esperienze di successo di riqualificazione di porzioni di edificio, ad esempio di bagni ecc.
- Quali sono le migliori strategie per gestire lamentele e per fare in modo di evitarle?
- In tutti i focus group, gli intervistatori sono invitati a prestare attenzione alle best practices per condividerle con gli altri gruppi.

# Focus group interview guide in Norwegian

## Intervjuguide – Boligbygg

(Innledning om målet for prosjektet)

**Beboere**

Beskriv beboerne. Hvem bor her, hvordan er beboermiljøet, grupperinger, pårørende, andre som er inne? Hvordan skjer tildelingen av bolig (kriterier som ligger til grunn)?
Hvilken oppfølging får beboerne (kontakt med Boligbygg og Bydelen)? Hvilke spesielle hensyn må dere ta for denne typen beboere?

Hvilke **holdninger** har beboerne til **rehabilitering**/oppussing/tiltak? Er det motstridende interesser hos bruker/Boligbygg eller andre? Hva skal til for at beboerne blir fornøyd etterpå? Hva skal til for at de bruker systemet riktig – evt hvilke hensyn må dere ta?

Hvordan forholder beboerne seg til **energibruk**? Hvilke vaner/hverdagspraksiser har de (dusjing, innetemperatur, matlaging, trekk, bruk av leiligheten)? Vil beboerne kunne håndtere nye teknologier?

Hvilke forhold har beboerne til **eget inneklima** (temperatur, trekk, lufting, matlaging)?
Spesielle hensyn ved rehab – stille, ikke forstyrre, ikke adgang, helse, kan ikke flyttes etc?

**Hvordan involvere** dem i prosessen (de er ikke beslutningstakere men er i høyeste grad involvert)? Hva kan gi problemer underveis? Hvem er deres viktigste informant?
Informasjonsmøter eller annen form for informasjonsflyt – hvordan informerer dere best brukere/beboerne deres?
Hvilke begrensninger legger beboerne på valg av løsninger?
Hva skal til for at beboerne skal bruke løsningene riktig?
Hva skal til for at de forstår og aksepterer løsningene?
Hva skal til for at de føler seg involvert i prosessen?

**Hvorfor rehabilitere (drivere)**?
Hvordan velger dere ut hvilke prosjekter som skal rehabiliteres (lag liste over kriterier)?
Hvor mange prosjekter rehabiliterer dere hvert år? Hvem/hva bestemmer behovet?

Hvilke hensyn (tilstand på bygningen, størrelse på rehab-prosjekt, hensyn til beboere, politiske føringer)?
Hva er som regel tilstand for bygningen når dere starter rehabilitering? Hvordan registrerer dere tilstand/oppgraderingsbehov?

(Hva er viktig når dere skal rehabilitere?) Hvilke elementer inngår? Energinivå/miljøhensyn/bruk av fornybare energiløsninger, estetikk, bedre inneklima, antall rehabiliterte bygg (raten/antall eller størrelse på tiltak som prioriteres), budsjett, brukerhensyn, tid for rehab?

Hva er viktig å oppnå med rehabiliteringen? Til hvilket nivå rehabiliteres det normalt? (Dagens tek, vedlikehold på gjeldende standard, ambisiøs standard?)
Hva er viktige hensyn underveis i prosessen?
Hva er driverne for rehab? Komfort, inneklima, miljøaspekt, energibruk, renomme/politiske mål/føringer, økonomi? Hva er viktigst?

**Beskriv saksgangen for å komme i gang med og tidligfase for et rehabiliteringsprosjekt (før drivere?).**
Tegne faser og roller? Hvem er involvert, hvem beslutter, ulike barrierer for forskjellige roller? Beskriv roller, kompetanse og beslutningsmyndighet

**Forutsetninger for å få til rehab? (Barrierer)**
Nevn viktige forutsetninger for å oppnå et godt rehabiliteringsprosjekt?
Hvor støter dere ofte på problemer? Beskriv – økonomi, tid, beboere, tekniske utfordringer
Hvilke tiltak gjør dere for å løse disse? Hva kan gjøres annerledes?
Politiske føringer, mål. (Oslo kommune har høye ambisjoner for klima)

**Tidsbruk**
Hvordan er tidsbruk ved vanlig rehabilitering? Hva er utfordrende på tid? Spesielle ting de vil nevne for hva som kan forsinke/forsere prosessen? Hva er effekten av raskere rehabiliteringstid (bruk av elementer) for dere? (Beboere kan bli boende, mindre rigge-kostnader etc?) (også økonomisk gevinst)

**Økonomi**
Hva er viktigste elementer i forhold til budsjett og økonomi?
Årlig budsjett, tilskudd, tilbakebetalingstid, energibesparelser/leieinntekter (gjengs leie -boligbygg må investere, leietaker tjener på spart strøm uten at leie kan økes)
Hva slags støtteordninger bruker dere? (Enova, husbanken, kommunalbanken). Hvor godt kjenner dere til disse? Og brukes det ofte? Hvor egnelige er de.
Politiske prosesser, bevilgninger – utfordringer?
Hvilke tiltak hadde hjulpet dere å rehabilitere flere bygg/bedre rehabilitering?

**Kunnskapsnivå**
Er det noen utfordringer knyttet til kunnskap om rehabilitering? Nye krav i TEK, passivhusnivå, andre krav? Forskjeller hos ulike beslutningstakere?

**Ta i bruk innovativ teknologi**
EU-prosjektet fremmer innovative teknologier som fasadeelementer, energi-hub, og bruk av fornybar teknologi som PV og solfangere. Hva skal til for at dere føler dere trygge på å velge slike løsninger?

(Informasjon om produktet, utvikle produkt/konsept underveis, hvem kan prosjektere, hvordan blir det å drifte, garanti for service og reservedeler, TG, innovativ anskaffelse – kontrakter)
Hvilke hindringer ser dere som de mest sentrale? Hva har vært det vanskeligste så langt?

**Suksesshistorier – hva er dere gode på?**
Hva er deres beste råd for god gjennomføring av rehabiliteringsprosjekter?
Dere har blant annet mye erfaring fra baderom-rehabilitering?

# Focus group interview in Catalan as used in Spanish case

Moderadors _ Aiguasol + Acció Exterior d'AHC

Benvinguda (1-2 minuts)

Presentació del Projecte (5-10 minuts)

Presentació del mètode-Focus Group Interview

Presentació dels participants

**Objectiu**

Una de les finalitats del projecte 4RinEU és desenvolupar una guia per ajudar a identificar i reduir les barreres en la renovació energètica integral dels edificis d'habitatges, així com fer créixer la motivació dins dels grups d'interès en l'àmbit de diferents Geo-clústers de l'UE. Mitjançant entrevistes a Focus grup ("grups objectiu") i l'estudi de bibliografia existent, el projecte intentarà identificar com planejar, informar i incloure els usuaris per aconseguir l'estalvi energètic previst i per minimitzar les molèsties en els processos de renovació. L'objectiu global és la implementació de solucions de forma exitosa i eficient, i l'augment de la taxa de renovació en aquest tipus d'edificis.

El present estudi es fonamenta en els casos demostratius del projecte 4RinEU, que són tots edificis residencials de propietat pública destinats a habitatge social. L'anàlisi identificarà els rols, les necessitats i els interessos dels propietaris, arrendataris i autoritats públiques (i es definirà l'esquema de la presa de decisions).

**Temes a debatre**

Quines són les barreres i estímuls relacionats amb les diferents funcions i diferents etapes del procés?

*Llogaters (25 min)*

Descriure els inquilins.

Com s'assignen els apartaments (basat en quin criteri)?

Quin tipus de seguiment reben els inquilins?

Quines consideracions són necessàries per a aquest tipus d'inquilins?

Actituds que tenen els inquilins pel que fa a la renovació/rehabilitació/mesures? Hi ha conflictes d'interessos entre l'usuari/l'Agència de l'habitatge o d'altres? Què es requereix per tenir els inquilins satisfets posteriorment?

Com gestionen els inquilins l'ús d'energia? Quins hàbits diaris tenen (temperatura interior, cuinar, ús habitual de l'apartament)? Els inquilins serien capaços d'utilitzar les noves tecnologies?

Quines són les consideracions especials i/o rellevants, en el procés de renovació - soroll, no pertorbar els inquilins, problemes amb accés a l'apartament (claus), la salut del llogater (usuaris, que no poden sortir de l'habitatge durant la renovació) etc.?

Com involucrar els usuaris en el procés?

Què podria causar problemes en el procés? Qui és l'Informador més important?

Quines limitacions posen els inquilins alhora d'escollir solucions?

Què es necessita per a que utilitzin correctament les solucions?

*Per què renovar? - estímuls (25 min)*

Quin criteri es fa servir per seleccionar els projectes de renovació?

(estat de la construcció, la mida del projecte de renovació, consideracions dels inquilins, directrius polítiques...)

Quants projectes de renovació fa l'AHC cada any? Qui o què decideix la necessitat de fer-ho?

Quines són normalment les condicions de l'edifici quan s'inicia el procés de renovació? Com es valoren les condicions de l'edifici/els requisits de millora?

Què és important per l'AHC quan renova? Quins elements estan inclosos? El nivell d'energia/aspectes ambientals/ ús de solucions d'energies renovables, estètica, millora del clima interior, nombre d'edificis renovats (taxa/ nombre o mida de les mesures prioritàries), pressupost, l'impacte de l'usuari, temps destinat per a la renovació?

Què és important aconseguir amb la renovació? Fins a quin nivell s'arriba amb la renovació (segons normativa, manteniment segons nivells estàndards, nivell ambiciós?)

Quines són les consideracions importants a seguir durant el procés?

Confort, clima interior, aspectes ambientals, reputació/objectius polítics/estratègia, finances. Què és més important?

Descriure el procediment a l'inici i al llarg de la primera fase d'un projecte renovació.

Identificar fases i rols? Qui està involucrat, qui decideix, diferents barreres per a diferents funcions? Descriure les funcions, competències i presa de decisions.

*Premisses per aconseguir la renovació - barreres (25 min)*

Nomena les premisses importants per garantir un bon projecte de renovació.

Quin tipus de reptes són habituals? Descriu reptes financers/costos, de temps, dels llogaters o tècnics.

Quines mesures es prenen per resoldre aquests reptes? Què es pot fer de manera diferent?

Directrius polítiques, objectius.

L'aspecte del temps

Quant temps es necessita normalment per una renovació normal? Què és el que consumeix temps? Segons AHC, quins són els efectes/beneficis d'utilitzar solucions "plug and play" (fàcilment instal·lables) i períodes més curts de renovació? (els inquilins poden romandre/no han de ser traslladats, reducció dels costos de

construcció in situs, menys costos vinculats a les instal·lacions dels treballs de construcció, etc.)? (també guanys financers

Finances

Quins són els elements més importants relacionats amb el pressupost i les finances/costos?

Pressupost anual, beques, temps de retorn del pagament, estalvi energètic/ingressos de lloguer. Dificultats vinculades a inversions que AHC ha de realitzar, estalvis energètics que beneficien al llogater, establiment del preu de lloguer per part de les autoritats públiques.

Quins mecanismes de suport utilitza l'AHC? (Fons per l'estalvi energètic, Fonts FEDER, etc...). L'AHC està familiaritzada amb aquests tipus d'ajudes? S'utilitzen freqüentment? Són adequades?

Quines mesures permetrien a AHC renovar més i millor els edificis?

Nivell de coneixements

Hi han reptes relacionats amb el coneixement sobre la renovació? Noves necessitats en els codis de construcció, estàndards en edificació passiva o eficient, altres requisits? Diferències entre els diferents agents involucrats?

*Ús de tecnologia innovadora (20 min)*

El projecte europeu promou tecnologies innovadores com elements prefabricats de façana, l'Energy-Hub i l'ús de les tecnologies renovables com PV i captadors ST. Què necessita l'AHC per confiar en l'elecció d'aquestes solucions?

Obstacles que considereu més importants? Què ha estat més difícil fins ara?

Casos d'èxit – En què és bona l'AHC?

Quins són els millors consells per un procés de renovació exitós?

L'AHC té experiència/competència/mètodes especials que vulgui compartir?

Fi del Focus Group Interview

Gràcies per la seva participació